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IMPORTANCE OF BUSINESS INTELLIGENT INFORMATION SYSTEMS IN INCREASING THE COMPETITIVENESS OF BULGARIAN SMALL AND MEDIUM-SIZED ENTERPRISES

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Abstract

The successful management of modern companies increasingly depends on the implemented and functioning information and communication infrastructure through which to collect, process and analyse huge amounts of information effectively. At the same time, today's companies face persistent challenges in controlling the flow of business data and adopting decisions for its management and analysis in a highly competitive business environment. However, as a result of the growing mobility of enterprises and the automated activities performed on the Internet or the intranet/extranet, unfortunately the large generated information flows are in most cases not processed efficiently, so that their analysis can lead to a clear assessment of the state and priorities of an organization's development, as well as to data interpolation and extrapolation.

The purpose of this document is to analyze the significance of contemporary business intelligent systems in supporting decision-making processes and increasing the competitiveness and sustainable development of today's small and medium-sized enterprises in Bulgaria.

Keywords: *information and communication technologies (ICT), business intelligence systems (BIS), small and medium-sized enterprises (SMEs)*
JEL Codes: *C80, C88, L86, M10, M15*

1. Introduction to the problem

Modern companies are facing serious challenges developing their business in a dynamic and competitive environment. The managers of the companies have long been aware of the importance of the processes related to the processing of quantities of data generated daily by various systems and units of the business activity of the enterprise. They face the increasingly persistent challenge of controlling this information flow and achieving effective collection, processing and analysis of the huge amounts of business information accumulated over the years. It is exactly this key aspect that is decisive for the development

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of the structure of the organization, the effective planning of the business activity and as a result – the improvement of its competitiveness.

Well-established good practices among organizations worldwide show that the successful management of the business community increasingly depends on the adoption of effective strategies related to the improvement of the implemented and functioning information and communication infrastructure (ICT), as well as the integration of innovative, adaptive, flexible and adaptable platforms and solutions (Neykova & Miltchev, 2019). Unfortunately, in practice, as a result of the growing mobility of enterprises and the automated activities performed on the Internet or the intranet / extranet, large generated data flows are often not processed efficiently, so that their analysis can lead to a clear assessment of the situation and the priorities for the development of the organization, as well as to the planning and extrapolation of the data. In response to this in recent decades the industry of information and communication technologies (ICT) continuously generates applications and technological tools that can be used for data management, for studying models and trends in data and information, and for business intelligence (BI).

In this sense, the presented article is aimed at studying the capabilities of intelligent information systems for business analysis in order to monitor and control the large volumes of data generated in small and medium-sized enterprises in Bulgaria. These systems are evolving simultaneously with the rapid growth and complexity of data, and with the need for accurate information in a dynamic competitive business environment. As the main purpose of business intelligence systems (BIS) is to support decision-making processes, they are applicable in all small and medium-sized enterprises (SMEs) and will contribute to increasing their competitiveness. The implementation of such a system will lead to the transformation of business data into valuable information and knowledge which will help the management team of professionals to make timely, informed, well-founded management decisions and actions in the context of the rapidly changing business environment worldwide. In addition, business intelligence technologies will help to create a more complete picture of the organization's development at the particular time of analysis, as well as to integrate data generated from different sources, which will help support the process of rethinking and future planning of the vision and development of the business structure.

The idea of implementing BIS is provoked by the growing need of SMEs to rethink and revise the elements of BIS, as the selection and implementation of an appropriate model for improving the business analysis strategy can become a source of innovative growth and give a strong impetus to the development of organizations, providing them with priorities for positioning and expanding the market of manufactured goods and services, and higher competitiveness. Business intelligent information systems can be seen as a

natural improvement of an enterprise's ICT. They are perceived positively by the management units, as they open up opportunities for increasing the innovation capacity of the organization and improving its business activities.

2. The importance of Business Intelligent Systems (BIS) in increasing the competitiveness of SMEs

According to the statement of Bitterer and Sood (2011), intelligence is related to the comprehensive ability to use existing experience or knowledge to adapt to new situations or solve new problems. From this point of view, the importance of business intelligence systems (BIS) and their development is directly related to the new challenges that different SMEs face in the process of collecting, processing and storing huge amounts of data, whose tendency is to grow steadily. Large data can be defined as high-volume, high-speed and / or diverse format data that require cost-effective and innovative forms of processing and they allow better decision-making and process automation (Yordanova & Stefanova, 2019).

Numerous reports and academic studies have examined a trend showing BI solutions as an important element present in the list of priority technologies of different sized organizations. This is because company managers, as well as lower-level employees in organizations, need accurate information, analysis and visualization through various real-time business analysis software tools to properly assess the state and priorities for the development of the company and to make effective management decisions. As a result, the organizations today are forced to look for the right technological solutions and software tools to collect, transform and analyse large amounts of data in real time (Wen-Chen, 2014). In this sense, Business Intelligence systems today provide applications and technologies which help companies to acquire more extensive and thorough knowledge of their own business activities and the results they have achieved (Dell'Aquila et al., 2008). For example, Herrington et al. (2011) stated that BI helps in identifying the actual business intelligence needs of the organizations.

In other words, the main purpose of Business Intelligence technology systems is to provide various levels within organizations with timely, relevant and easy to visualize and use business information that can be effectively analysed in order to support and improve the managerial decision-making process across a wide range of business activities (Elbashir et al., 2008). In this way, Business Intelligence systems support the analytical decision-making process by performing multifunctional data analysis which presents a fuller picture of the business activities of different sized organizations, including SMEs.

In addition, the new intelligent analytical applications and visualization technologies are constantly developing and improving, allowing managers to perform real-time statistical analysis and forecasting of business processes and to meet today's business requirements (Ramakrishnan et al. 2012; Howson at al., 2019). They provide the management of the companies with an effective way of presenting a multidimensional description of data through tools for quick extraction, transformation, organization, analysis and summary of a large amount of business information. (Shariat & Hightower, 2007; Watson & Wixom, 2007; Yeoh & Koronios, 2010; UL-Ain et al., 2019). In this sense, BI platforms are becoming an increasingly strategic tool that boosts the competitive advantage of the organization (Watson & Wixom, 2007), where Business Intelligence capabilities are becoming important functions that support the organization both in the process of innovating and improving performance. This strategic tool must be coordinated and integrated with the business space and the decision-making environment used in the organization and it is exactly this proportion that is the key to the success of business intelligence (Clark at al., 2007).

The integration of BI solutions with other systems in the Bulgarian SMEs is a very necessary function whose capabilities can impact BI success in different decision-making environments. For this purpose, the process is implemented at the data, application, and user level (Isik et al., 2013). Because BI platforms are based on the processing of operational data which are collected and stored sequentially, many software companies offer BI systems that are an extension or integral part of embedded ERP systems, such as Microsoft's SQL Server, SAP's Business Objects BI Suite, and IBM's Cognos BI. The variety of BI software is great – some of the platforms have free versions (QlikSense, Microsoft Power BI), while others have high prices (Tableau, QlikView), but also offer additional free services for different types of mobile devices (laptops, tablets, smart phones). Some of the applications are more user-friendly, while others require IT professionals with coding skills and experience in business data analysis. In this regard, according to the International Data Corporation (IDC, 2019) forecasts, global revenue for big data and business analytics solutions is expected to reach $ 189.1 billion in 2019 with a double-digit annual growth in 2022.

2.1. Functions of BIS increasing the productivity and competitiveness of Bulgarian SMEs

It became clear that BIS plays an important role in the monitoring and control of business data. At the same time the implementation of an intelligent information system in order to improve the existing ICT in Bulgarian SMEs will contribute to the systematic extraction and creation of multidimensional analyses and associations of connections in

business information arrays, so that the data can be tracked, visualized and managed. For this purpose the functions of business intelligence systems are designed to ensure the generation of interactive dashboards on which the values of key indicators are constantly monitored and controlled. They provide important information about the organization in summary form, reflect the current situation of the organization and signal the presence of potential problems at a very early stage. The dashboards should be designed to be easy to understand, relevant, strategic, quantitative and up-to-date. They should include key graphical performance indicators to help visualize detailed information on the change in values, as well as to summarize them. Based on this, BIS allows fast retrieval of information and generation of personalized reports and real-time analytical processing.

The key functions of BIS, which are responsible for normalizing the data in a general framework and allowing the creation of associative links between the data, are the three steps of the ETL process - extract, transform and load. Based on the loaded data, virtual boards are generated with different types of text, graphic and tabular objects that support the visualization of information. The virtual dashboard is interactive and allows the extraction of very detailed information and the user can control both data interpolation and extrapolation. The possibilities for adding and combining different types of diagrams in one virtual board are practically unlimited and depend on the needs and the hierarchical position of the decision maker. Using the method of analytical processing of these data it is possible to analyze the organization's assets in real time during the survey period as the user is able to control the various visualization objects as well as to filter the data according to his/her interests. The priority functions of BIS, which will contribute to increasing the productivity and competitiveness of Bulgarian SMEs, can be summarized as follows:

- extraction and integration of a large amount of data and information;
- management of loaded data and information, including visualization and knowledge extraction;
- real-time analytical processing depending on the needs of the hierarchical position of the decision maker;
- associative analyses in order to interpolate and extrapolate data;
- generation of custom reports.

When choosing BIS, Bulgarian SMEs are advised to consider not only the functionality of the platform, but also its suitability for decision support and implementation of specific tasks related to the business activity. The implemented business intelligent solution can initially cover only part of the available data (for example, related to finance and personnel management), and subsequently expand its application to other functional areas. This will support the development of key areas in Bulgarian SMEs such as:

- general management - monitoring and analysing data and information for the purpose of brand management, market positioning, improvement of the business development strategy, risk management, etc;
- financial management - monitoring and analysing data and information in order to implement combinatorial strategies for sales, marketing and human resources to improve financial operations;
- marketing management - monitoring and analysing data and information in order to track marketing campaigns and the participation in them, timely evaluation and support of all activities directly related to the marketing activities of the company;
- sales management - monitoring and analysing data and information in order to provide a clear view of sales, their current status, future planning and financial return;
- human resources management - monitoring and analysing data and information for individual and group control of staff based on statistical samples, estimates and trends; workforce planning;
- production management - monitoring and analysing data and information in order to track efficiency and profitability.

Management of the process related to customer service - monitoring and analysing data and information in order to track trends related to the consumer use of a product or service, as well as its demand.

2.2. Challenges in the process of BIS implementation in Bulgarian SMEs

The analysis undoubtedly shows that the implementation of BIS in Bulgarian SMEs will contribute to the transformation of business data into valuable information and knowledge, which will lead to timely, informed, reasonable management decisions. In this regard, BIS are applicable in all Bulgarian small and medium-sized enterprises, but unfortunately a large number of SMEs face many problems and challenges that can affect the process of implementing BIS solutions in organizations and make it difficult for them to compete in the market. An example of this is the difficult choice between the great variety of new platforms and the high dynamics of their generation on the world market, which requires high professional competence and in-depth knowledge of the ICT specifics of the particular enterprise, as well as the willingness of the staff to cooperate in carrying out innovation activities. In addition, the process of BIS implementation is directly related to the existing and operating ICT system in the enterprise. Also SMEs may also face the issue of financial insufficiency for the implementation of BIS and their maintenance. At the same time, with the introduction of BIS, modern companies increasingly tend to look for qualified specialists who have the skills and knowledge to work with software platforms

and technologies for in-depth multi-dimensional analysis, but they are difficult to find on the market.

However, despite the problems and challenges discussed above, the author agrees with Jones and Van (2010), who emphasized that the benefits of BI for the business far outweigh the costs, stating that BI can be the differentiating factor in the market during periods of poor economy, can facilitate marketing communication plans, and aid in pre-selling an idea to the target customers. In this sense, the statement that "strategic leaders are known for thinking ahead, preparing for succession and implementing strategy" (Stamevska & Stamevski, 2020) suggests that Bulgarian SME managers need to rethink and adopt a comprehensive strategy for the application of intelligent technologies for business analysis. Such a strategy can be considered to be the key to improving the ICT of the enterprise. It can become a source of innovative growth and give a strong impetus to the development of organizations, giving them priorities for positioning and expanding the market of manufactured goods and services, as well as for achieving higher competitiveness.

3. Conclusion and Recommendations

Business intelligence analytics are a key aspect in developing the competitiveness of Bulgarian small and medium-sized enterprises and achieving sustainable development in the process of monitoring and controlling the processes involved in big data processing. The observations in the conducted survey allow the conclusion to be made that the introduction of a BI platform in Bulgarian SMEs will contribute to supporting associative data research and detailed visualization of dynamic processes in different sized organizations in order to rethink their vision and present its positions among business structures at the international level. Such an approach will lead to a direct interaction between the established information system that is currently operating and servicing the functional units of the organization in order to increase the efficiency of data and information processing, generating emergency analysis and reports across all units for timely decision-making, which, as a result, will lead to an increase in the quality of the products and services provided, a reduction in costs and an increase in the efficiency of the entire organization. In this sense, the managers of Bulgarian SMEs must rethink and adopt a comprehensive strategy for the implementation of BIS, which will affect the achievement of specific business benefits, the faster and more efficient functioning of the organization and its proper positioning on the market. Such an approach will contribute to increasing the sustainability and competitiveness of Bulgarian small and medium-sized enterprises on the economic market.

4. Future Studies

The performed analysis is a logical basis for future in-depth research on possible problems and challenges that affect the process of implementing BIS solutions in Bulgarian SMEs and may make their competitiveness on the market difficult.

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