Management Support Systems Type Business Intelligence (BI) and Factors Determining Their Implementation

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INTRODUCTION

The article contains the concept and analysis of basic types of Business Intelligence (BI) systems and the analysis of critical success factors of BI implementation. It focuses on the analysis of factors determining the effectiveness of implementation and use of Business Intelligence (BI) tools in organizations, depending on the implementation method applied. A particular emphasis is put on the use of agile methods in BI implementation. This article will present a number of arguments to confirm the hypothesis: Agile methods, in contrast to traditional methods, trigger the synergy of factors determining the effectiveness of using Business Intelligence systems. List of determinants of BI implementation and their link to a selected method of implementation will help organizations to use BI systems efficiently at all levels of management: operational, tactical and strategical. Effectively implemented BI will help organizations to prepare a smooth entering to the Industrial Revolution 4.0 (Industry 4. 0).

BACKGROUND

Nowadays, Business Intelligence (BI) systems are the most advanced approach to the application of information systems within an organization. There are many different reasons for this, such as: global economy, data growth, the increase in information significance - these force enterprises to focus on a better understanding of their environment and the inner circle of the organization, as well as on the reformulation of their strategies. Companies laboring under an overload of data, which they are unable to process, decide to implement BI systems or modify them. This solution is related to the need of identifying endogenous factors affecting the reception of new BI technology. This is required both by the shifting environmental conditions and the necessity to follow the environment. BI systems have become an indispensable element of the Industry 4.0 breakthrough. Industry 4.0 is related to the integration of the existing independent digital management systems and the creation of intelligent management support systems. The result is a new quality in the implementation of the management processes (Chen et al., 2018), which subsequently places new demands on supporting tools such as BI.

In view of the various features related to the implementation of the 4.0 concept, there are many technical problems associated with the transformation of traditional organizations. As BI can be used at various levels of strategic, tactical and operational management, it can help the organization on three

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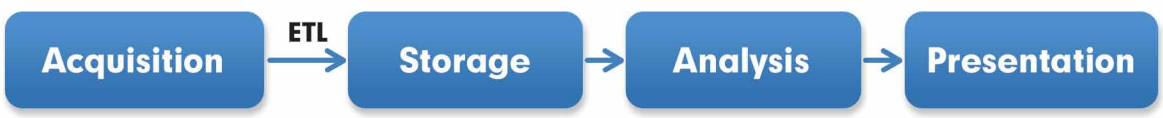
Figure 1. Phases of BI (Eckerson, 2011)



levels of this transformation: identification and preparation, transformation process and implementation, continuous improvement within an already functioning smart organization. At the strategic level, top executives monitor, manage and analyze key organizational performance factors in accordance with the adopted strategy (Eckerson, 2011). Strategic goals supported by BI systems relate primarily to new sales markets, technological investments in production, as well as necessary modifications to the existing business model. The tactical and operational application of BI primarily assumes the enhancement of business processes (Fink et al., 2017). They are usually used to monitor and analyze operational processes in real time, such as production processes, for instance. Even though BI play such an important role, organisations do not use a real power of these systems. One of the reason behind is a weak implementation process which determines the actual usage of BI (Misiak, 2018). This article aims to list factors determining the effectiveness of using Business Intelligence systems and prove that agile methods trigger the synergy between them.

BUSINESS INTELLIGENCE STRUCTURE AND ITS TYPOLOGY

Business Intelligence (BI) covers a broad spectrum of issues such as practices, methodologies or tools related to data analysis. BIs transcribe data into information and knowledge (Olszak, Ziemba, 2012). Technologically, the BI system collects, integrates, analyzes data and then presents the obtained information in the decision-making process (Fink et al., 2017, Chen et al., 2018). The phases of BI performance, according to Eckerson's study (2011), are presented in Figure 1. Data is collected from various sources, then cleaned and unified with ETL tools (Extract, Transform, Load), transmitted to a data warehouse or virtual space, where they are analyzed by established algorithms, and finally the obtained information is presented in dedicated managerial tools.

These tools include reports, interactive dashboards, alerts and operational, graphical user interfaces, operational dashboards, etc. The benefits of BI are often indirect rather than direct. BI allows for a more effective, fact-based decision-making process and provides better quality information compared to those dispersed in various sources. An improved decision-making process based on good-quality information leads to enhanced business performance. Additionally, BI systems offer the possibilities of forecasting, access to real-time information and thus overall cost reduction (Eiskop et al., 2014).

BI systems can be an independent system, only integrated in the architecture of other systems operating in the organization, or they can be a module of Management Information Systems.

In recent years, the amount of data and the need for information has been increasing rapidly - the number of databases, repositories, files, websites and online stores, social media, etc. is growing. The concept of understanding BI remains unchanged, however, BI technology must adapt to changing needs. Therefore, new tools appear among BI solutions that extend the original BI functionalities. These include **Business Discovery**, intended for self-use by users, so-called BI self-service. This BI system allows you to create your own analyzes and reports without preparing OLAP cubes and data warehouses. Busi-