

BUSINESS INTELLIGENCE COMPETENCE AND ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS TOOLS¹

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Abstract: The study focuses on current aspects of implementing contemporary digital tools for solving planned tasks and achieving goals. The potential of integrated enterprise resource planning (ERP) systems is analysed, as well as the competence needed to work with them. Special attention is paid to the so-called Business Intelligence (BI) competence. The concluding part of the article assesses the potential of specific BI tools for solving various management tasks and successful realization of strategic goals.

Key words: digitalization, planning software, enterprise resource planning (ERP), competence, digital tools

JEL: M21, M41.

Introduction

Digitalization of planning and management processes at the current stage of development of economic relationships highlights a variety of opportunities and is a key factor in gaining new competitive advantage. The most important obligation with digitalization is the introduction of digital and ICT technologies in existing business processes aiming to optimize activities

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and to increase their efficiency through ascending gradation of the use of digital data. The ultimate aim is to create more value for customers and consumers of products or services, which has a positive effect on the increase in own revenue generation.

The *research problem* of the study is the key practical aspects of the ERP systems (Enterprise Resource Planning).

The *research area* of the study is the Business Intelligence (BI) competence and its importance for the successful implementation of ERP systems.

The *aim* is to bring out the important aspects of BI competence development in its role as a determining factor for increasing the efficiency of working with ERP systems and their functionalities.

The research *methodology* is characterized by the use of primary and secondary sources of information. The research methods used are observation, analysis and synthesis.

ERP systems are characterized by rich functionality that provides speed and reliability in solving accounting cases and tasks, quality and usefulness of accounting information, opportunities for accounting analysis, budgeting and control. Studies show that most often the *financial statements compilers* are professionals who work, respectively administer an ERP system, while the *operating accountants*, although not the only ones, play the role of one of the main specialists-users of the ERP system in enterprises. Naturally, this requires that Bachelor and/or Master graduates in Accounting have BI competencies in order to be prepared for the new business requirements.

1. Integrated resource planning and management system

Today's dynamic and highly competitive business environment poses new challenges and new issues to management and to corporate planning and management systems. Corporate, business and functional strategies and operational-tactical approaches and decisions affect the whole range of activities and processes in a company. They are relied on to achieve a higher degree of efficiency and to meet the goals and priorities. The concept of the ERP (Enterprise Resource Planning) system is launched in response to these needs.

ERP systems are a set of: Integration and data sharing; General rules for resource management; Full information integration of business processes with those of partner organizations; Quick reaction to the dynamics of the environment; Uninterrupted information consistency among the professionals involved, etc. This concept is based on a common database and corresponding modular software. It enables each individual functional unit to generate and use information in real time. ERP is a factor for full integration of business functions.

ERP is a systematic set of innovative technical, software, technological and information tools, combined with modern management methods, techniques and technologies, complemented by the competence of professionals and managers, it carries out management processes in business organizations on a rational and efficient basis, from production and financial-economic positions. ... The high level of automation of information activity is designed to maintain management at different levels - operational, tactical and strategic. (Vakharia, 2005), (Kraev, 2006)

The *positive aspects* of ERP systems in planning and management activities are as follows: increasing the efficiency in the use of resources; optimizing the management of material flows; intensifying information flows; reducing product cost; fully integrating functional areas; improving management control over various processes and activities; taking advantage of the possibility of continuous development related to the option of step-by-step, modular upgrade of the system.

ERP systems have some *negative aspects* as well: difficulties in adapting to the specifics of the processes in an organization; possible reduction of the level of flexibility and quality of control; significant initial costs; a low level of integration of individual modules, etc.

On a modular basis, ERP systems integrate processes and activities in an organization. Specialized software products also exist for particular fields such as customers (CRM), supply (SCM) and human resources (HRMS). What is specific about them is as follows: (Integrated Management Systems, 2020)

- *Customer Relationship Management (CRM)* – customer relationship management system, enabling the consolidation of complete information about them (marketing, sales, service, etc.), while making it accessible to all functional and structural units.
- *Supply Chain Management (SCM)* – supply chain management system, facilitating the management of processes related to delivering

the resources needed for production while performing the following main activities - transport, warehousing, inventory management, etc.;

- *Human Resource Management System (HRMS)* – human resource management system, whose functionality is to support personnel management in the context of implementing tasks in business organizations.

Depending on the needs of an organization, the structural content of an ERP system may vary. The established practice is to select and implement modules that best meet the assessed requirements and needs in a particular case. All this is a permanent process of constant renewal and improvement according to current and future corporate, business and functional strategies. In principle, ERP systems can cover about ten functional areas such as: Customers; Providers; Life cycle; Production; Human resource Management; Fixed assets; Cost price; Projects and investment; Accounting services and financial management; Business analysis and decision making. The necessary condition for a certain system to be classified as an ERP system is to have at least two modules.

It is safe to say that ERP systems are an extremely reliable tool for improving the efficiency of corporate planning and management. Their introduction is associated with the imposition of common rules and procedures for the various functional areas and strategic business units in an organization. They optimize the use of different types of resources and increase productivity. They significantly facilitate the process of making operational decisions, improve the mechanisms of management control over the implementation of the target (planned) performance indicators.

2. Business Intelligence (BI) competence

One of the most important critical factors that could hinder the effective integration and the use of ERP systems is the risk associated with the lack of the necessary competence.

Competence development to operate with ERP systems includes psychological, theoretical and practical staff training for gaining specific knowledge, skills and abilities needed for the changes resulting from the introduction of the system. (How to prepare and train staff with the introduction of ERP systems, 2020)

Joint work of clients – users and consultants in the process of implementing the system usually varies from several months to two years.

Practically, this involves training, exchange of experience and developing competence for working with ERP systems.

The basic course on working with the system is designed in two levels - for key users and for end users (Stefanova, 2012). Key users are actually the functional directors in an organization. Their training starts at the beginning of the implementation project and aims to prepare the team of key personnel for the potential of the software system and the interrelationships between the different functional areas and business units. End-users are usually at relatively lower hierarchical levels and their training takes place when the ERP system is already adapted to the specific characteristics of the activity and real testing of the various functionalities can be carried out. An additional course can be conducted to upgrade the main training programme in 6-8 months or when expanding the ERP system by adding new modules or expanding some of the existing functionalities. It will aim to compensate for any identified shortcomings, to consolidate what has been learnt or to convey new knowledge. These training sessions could be targeted at a specific department or group of staff. For example, to conduct a course in the field of the supply chain.

The term ERP competence implies not so much having digital competence for working with the system, but rather having competence for “managing a business”. **According to A. Zhelezova**, an expert in sales of educational products at Varna Business Services EOOD, “key users must have a wide range of competencies, including outside the field of purely technical knowledge. For example, teamwork skills, good knowledge of a company’s business processes, and interests in the field of good practice” (Stefanova, 2012). Therefore, the focus in the process of developing competence in working with the system should be on the economy, administration and management, as well as on the financial and accounting reflection of business activities. The most important are the competencies in corporate management, business planning, business logistics, business management, financial management and financial accounting.

A new concept is emerging – *Business Intelligence (BI) competencies*. These are knowledge, skills, ability, experience, speciality (special potential) for transforming ‘raw’ databases into ‘meaningful’ management information and solutions aimed at improving the efficiency of development processes and the operation of companies.

That is why it is so important for planning experts to have BI competencies to work with a software product for data processing and management, to generate clear visualization dashboards, as well as data

presentation models useful to other teams and units in a business organization, incl. logistics, production, marketing, finance, accounting, etc.

BI competencies are a combination of knowledge, skills, experience in working and managing diverse processes, tools and technologies necessary for the transformation of data into management information, while the information itself - into management decisions and plans that require rapid and effective business actions. BI competencies are reduced to the following: (Business Intelligence solutions – what, who for and why, 2019)

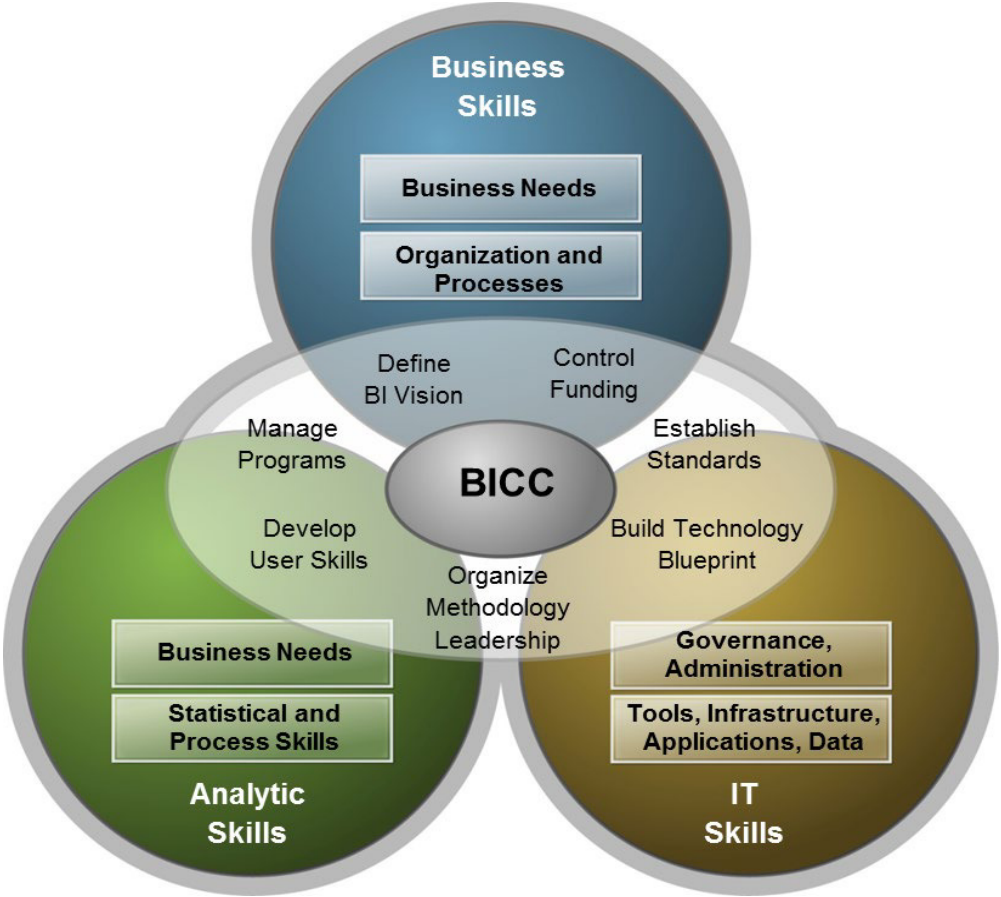
1. Active support in formulating effective and informed solutions;
2. Transforming the large volume of information into valuable content for a business;
3. Facilitating the accessibility, exchange, processing and analysis of information by “the right people, at the right time and in the way they prefer”;
4. Creating and storing new knowledge in a business organization;
5. Minimizing time and resources.

In another even more detailed aspect, BI competencies reflect in: (Pizhev, 2017) technical knowledge of SQL and other BI tools and platforms such as Tableau, OBIEE and BOBJ; extracting, processing and analyzing data from various sources and management systems; skills for conducting comparative, prescriptive and predictive analysis; ability to synthesize data and present them through dashboards, metrics and reports; creating and maintaining databases; ability to synthesize models and versions; ability to use Agile and/or Lean methodologies in practice; having excellent communication skills.

In recent years, there has been talk of leadership impact and leadership influence on the process of building BI competencies. The focus is on “business intelligence and efficiency management initiative”. Implementing the change requires the ability of leaders to persuade the other staff involved that the change is justified. Very often, leaders in ICT-oriented BI introductions, who primarily envisage the use of data to improve the company, secondarily develop competencies for making management decisions and decisions related to improving productivity. This can happen through organizational change, such as transferring key business analysts from a functional to a corporate role as part of the *Business Intelligence Competency Center* (BICC) or through technical change. It can also happen through cultural change, affecting the way an organization makes decisions and manages performance. The key problem is: what are the best practices for developing organizational competencies and consumer skills? (Gupta, 2017) As already mentioned above, one of the biggest obstacles to the

success of ERP is the lack of skills related to the use of information, tools and applications available as part of the implementation. Next, we will present the results of our research on how an organization can develop and organize the management of the user skills development programme needed to turn business research, data processing and performance management into a core BI competence. We will also present some of the best practices for organizing BICC, in the sense of shared service/competence within an organization.

The importance of creating a BICC is practically related to ‘equipping’ its staff with the right *business skills, analytical skills and IT skills* to support BI processes (Saporito, 2013). By creating a BICC, organizations can align their BI initiatives with corporate strategic goals (Figure 1). In addition, companies can get more out of their investment in ERP systems by using information assets more efficiently to gain new competitive advantage.



(Source: Business Intelligence Competency Center, the Glue that Hold Business and Technology Together, <https://blogs.sap.com/2013/07/12/business-intelligence-competency-center-the-glue-that-hold-business-and-technology-together/>)

Fig. 1. Logic of relationships within BICC.

To explain the logic of relationships within the BI Competency Center, we will make the following clarifications:

▶ Business Skills –and respectively:

- Business Needs –;
- Organization and Processes –;

▶ Analytic Skills – and respectively:

- Business Needs –;
- Statistical and Process Skills – Statistical skills and skills underlying scientific thinking and decision making (ways of thinking and interacting with processes and phenomena that can lead to understanding of new scientific ideas and concepts);

▶ IT Skills – Technical skills and respectively:

- Governance, Administration;
- Tools, Infrastructure, Applications, Data;

▶ BICC (Business Intelligence Competency Center) that includes:

- Define BI Vision – Defining BI vision clearly shows the positive effects of BI for an organization. This is the first step in developing a company’s BI strategy (WHAT IS A BUSINESS INTELLIGENCE VISION?, 2022);

- Control Funding – (cash flow management within a project);
- Manage programs;
- Establish Standards;
- Develop User Skills;
- Build Technology Blueprint – Developing a technological plan

(project);

- Organize Methodology Leadership.

All these skills, to a large extent, should also be possessed by:

- the person preparing financial statements, who in many cases (especially in medium-sized and large enterprises) is the specialist who works with, respectively administers an ERP system, and
- operational accountants, who, although not the only ones, play the role of one of the main users of the ERP system in an enterprise.

All this naturally requires that Bachelor and/or Master graduates in Accounting have BI competence in order to be prepared for the new business requirements.

A number of organizational roles also exist within the BICC. Depending on the specific needs of the business, these roles can be performed by people having different combinations of the three required skill sets, resp.

competencies presented in the figure above. The four mandatory organizational roles are as follows: (Point, 2021)

- *BICC Leader*. They are responsible for the day-to-day operations of the BICC and report directly to the senior management team. They must be able to provide ‘compelling’ and impressive information to specified users on the benefits of BI. It is necessary for them to have leadership experience, as they will be responsible for the entire BI portfolio.

- *Business Analyst*. They monitor all business and analytical knowledge available to BICC. This role requires a combination of strong business and analytical skills and experience. They serve as a liaison between functional experts and analytical and business experts.

- *Technical Advisor*. These are the leading IT representatives at BICC. The key competencies they need to have are experience in working with BI systems, data warehouse architectures and software development. In addition to technical skills, they must have an affinity for an organization’s business. Maintaining a BI portfolio is a business-critical task that is of paramount importance.

- *Data Steward*. Responsible for maintaining information on business processes, including ensuring supervision of data models and data quality. Responsibility for the latter is crucial, since most organizations face data quality issues. They monitor and if necessary make adjustments to information and manage the data model. They must also have the ability to see beyond the technical aspects of the data model in order to understand how these data affect the business.

It is important that human and expert resources at the BICC are not provided on a ‘borrowed’ basis from other business units. The maintenance of the BI portfolio is a critical goal for the business, which should be given priority.

3. Business Intelligence (BI) Solutions Tools

In this part of the study we will present the Zeron® V/4 Enterprise BI solutions tools. This is a high-tech digital solution developed by the Bulgarian company Elite Software. It offers all standard modules such as ‘Accounting’, ‘Warehouse and Trade’, ‘Customer Relations’, ‘Production’, ‘Service’, ‘Project Management’, ‘Shipping Management’ and ‘Business Intelligence’. Zeron V/4 Enterprise also supports established concepts such as MRP,

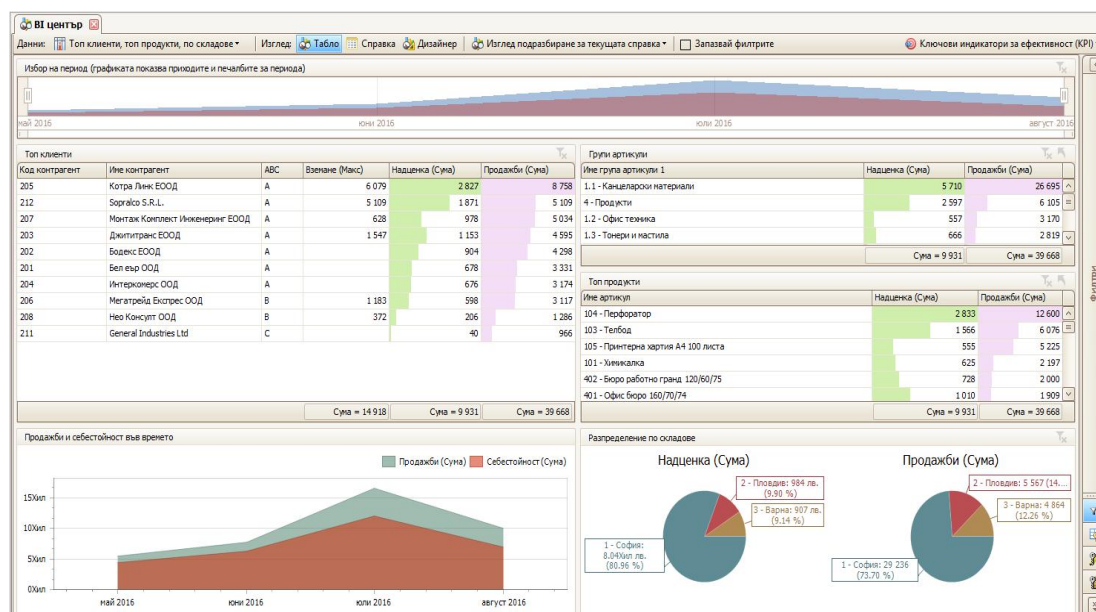
MRPII, Distribution Resources Planning (DRP), Capable-To-Promise and more. The package price includes analysing a particular business, modeling specific internal processes, setting up, and training personnel to work with Zeron V/4.

When evaluating such a relatively expensive and complex software product, a variety of complex factors (maintenance, introduction) must be taken into account, not just the product itself. As a software solution, however, the advantages of Zeron V/4 Enterprise are classified into three areas – functionality, innovative business process management system and full integration of all software modules and components. It is a high-end ERP system and has large-scale functionality covering all aspects of a business.

Zeron V/4 is fundamentally different from other ERP systems. It is based on the BPM (Business Process Management) management system, where the various functionalities are not performed by clicking on standard menus, but rather work with pre-visualized sequences of actions. The full integration of Zeron V/4 Enterprise means that it is designed, built and improved as a whole, and while most ERP systems work with the so-called ‘patches’ - modules and functions from different manufacturers, the creators of Zeron V/4 Enterprise have designed and integrated all modules and functionalities to work precisely and smoothly as mutually integrated.

In this case, the new ‘BI Center’, a system for conducting business analysis through boards or the so-called dashboards is of great interest: see Fig. 2 (New ‘BI Center’ (Business Analysis System through dashboards), 2021) The information in the dashboards is interactive and when selecting an item (e.g. a specific customer), the rest of the information in the dashboard (data on items, warehouses, graphs, total amounts, etc.) are automatically filtered according to the item selected by users.

Thus the system allows for revealing and analyzing the relations with the selected element, resp. detailed information on this is obtained. For example, when choosing a customer, you can immediately see the products they buy or the warehouses where they receive them in a ranked order, and vice versa - when choosing a product of interest to see its largest customers, etc.



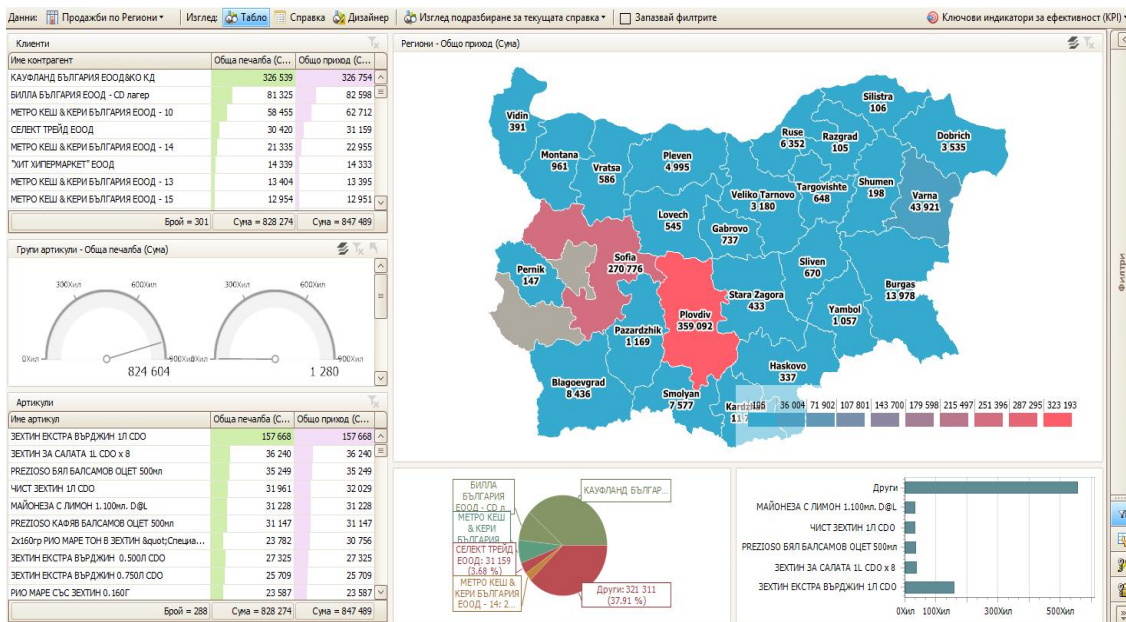
(Source: New "BI center" (Business analysis system through dashboards), <https://zeron.bg/bg/novini/nov-bi-centyr-sistema-za-biznes-analizi-chrez-tabla-dashboard-24.html>)

Fig. 2 Zeron V/4 Enterprise BI Center - Dashboard menu (overview).

A dashboard designer who makes it easy to change data, graphics and tools displayed is also at users' disposal at Zeron V/4 Enterprise. The system offers a wide variety of visual elements such as tables, graphs, instruments, maps and more. Fig. 3 shows a dashboard for presenting the revenues of the respective business organization by regions, resp. on a map. (New BI Center (Business Analysis System through dashboards), 2021)

Since the initial introduction of Zeron V/4 Enterprise, each customer receives nine types of pre-designed business analysis dashboards in the field of most important customers, most important products, sales and profits, receivables and payables, products in stock and estimated days until they are exhausted, cash, fixed assets, accounting revenues, expenses and profits, responsibility cost centers, etc.

Key Performance Indicators (KPIs) are another important component of the Zeron V/4 Enterprise BI Center. They are a very important system for formulating goals and tracking their implementation. In practice, these are quantifiable indicators. They are individually selected depending on the specific features of activities. They measure the degree of progress towards important short-term and long-term business goals. Last but not least, they are crucial for the formulation of a corporate strategy. (What are KPIs for your business?, 2018)



(Source: New „BI center“ (Business analysis system through dashboards), <https://zeron.bg/bg/novini/nov-bi-centyr-sistema-za-biznes-analizi-chrez-tabla-dashboard-24.html>)

Fig. 3. Visualization of revenue distribution by customer and geographic feature through Zeron V/4 Enterprise BI Center.

Practically, KPIs can be used in all functional areas. For example, in the field of finance - the amount of profit, ROI (return on investment), ROE (return on equity); in the field of marketing and sales – sales growth for a given target group, growth in market share for a certain market segment; in the field of logistics, resp. supply chain management - improving the delivery time of important raw materials by 2 days; in human resource management - automating the process of using annual leave – successfully when used for the first six months after entering 75% of the staff, turnover, age structure. (Babanin, 2020)

The importance of using KPI, resp. integrating this functionality into ERP systems, lies in tracking the ‘goal setting - goal implementation’ relationship. Each key objective is transformed into a key performance indicator. And then it is decomposed into its constituent (predetermining) components. For example, a defined sales revenue goal for a given period is assumed by individual retailers/distributors. On this basis, the ERP system indicates the degree of implementation at a certain stage of implementation. In addition, it is possible to calculate estimated values of the indicator for a future period. Thus estimates of the degree of fulfillment of the objectives can

be obtained in advance, given that the business is developing at the current pace.

The principle of developing and working with KPI in this aspect resembles the logic of Gap analysis, also known as difference analysis (Gap Analysis: The starting point for successful strategic planning, 2020). Gap analysis is a tool for identifying problems and finding opportunities of operational and strategic nature to overcome them. It is used to correlate the planned value of a certain strategic goal to the expected business result, specified on the basis of the scope of current activities. Comparing the targeted/desired development with the probable (actually expected) one helps to establish the gap that needs to be 'narrowed' in order to achieve the fully defined strategic goal. (Chipriyanov, 2009) Alternative (project) strategies for improvement are developed on this platform, respectively reengineering business processes to support efforts to close the planned gap.⁴ Thus a stable construction for future solutions is established. A bridge is built between strategic analysis and strategy⁵ evaluation and selection.

Integrating KPI in the ERP system in this way makes it possible to bind BI decisions not only to operational and tactical, but also to strategic management decisions, thus once again raising the question of the competencies the staff involved have. Competencies related to analyzing activity data, conducting process-oriented benchmarking⁶, synthesizing new business models, etc.

⁴ An important criterion for the formulation of draft strategies is the so-called 'Law of diminishing synergy'. Its essence, related to the problem of closing the strategic and operational planning gap, is expressed in the different relative synergetic potential of the alternative draft strategies. It is assumed that in the direction of convergence with the target line there is a constant decrease in the relative synergistic potential.

⁵ The main advantage of using the Gap-analysis results from the ability to link the backlog of achieving the goals with possible operational and strategic solutions to overcome it. At the same time, it should be noted that this method focuses on tracking trends by extrapolation and on the prognostic improvement of the values forming the existing line of development. To a large extent, the relative competitive advantages and disadvantages of a business organization are not taken into account. In addition, the financial relationships of a highly horizontal company are not sufficiently clear.

⁶ Process-oriented benchmarking compares parts of processes or entire processes and activities in a business organization and seeks new options for 'reshaping' certain processes. Thus processes can be compared and new, alternative and more efficient ways of running them can be explored. The active use of quantitative approaches in measurement and analysis brings additional advantages – they 'value' the differences and you get better 'understanding' of the processes in your own organization. (K. Mertins, 2012) (Chipriyanov, Methods for Strategic Research and Decisions, 2008)

The most commonly used performance indicators in Zeron V/4 Enterprise belong to the group of financial ones, such as: net sales revenue, profit, number of customers, number of sales per day and average amount per sale. A set of non-financial indicators are provided for the purposes of operational management such as average order realization time, customer satisfaction index, average time for logistics service of one client, etc.

Conclusion

A leading trend in the development of modern corporate and business management and planning is related to intensive digitalization and the introduction of ICT in business process management. One of the leading directions concerns the introduction of a comprehensive system for managing and planning resources in a company (ERP systems), aiming to achieve full integration of business operations. One of the most important factors for the ultimate success of the process of digital transformation is related to the competence in working with these digital and ICT solutions gained by the relevant professionals, and the planning and management, and financial and accounting professionals in particular. One of the most important competencies among them are BI competencies. These are special knowledge, skills, abilities and experience for analyzing and forecasting the dynamics of business processes in an organization based on the data collected from its activities (Big Data). They are a key tool for maximizing the useful value of this information by processing, extracting and systematizing it by key performance indicators (KPIs). Having BI competencies allows planning and management and financial and accounting specialists to establish patterns and causal relationships and to synthesize certain models by using specialized BI tools. This facilitates report preparation process or the development of visualization techniques that help managers from different management levels to see changes in business processes in a dynamic context and to make quick, accurate and adequate decisions on the way to achieving goals related to realizing business benefits and/or regulating inefficient activities.

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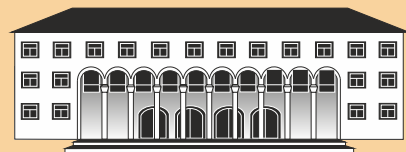
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