

BUSINESS INTELLIGENCE IN THE ECONOMIC MANAGEMENT OF ORGANIZATION

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ABSTRACT

The study identifies the necessary and sufficient conditions for the system of economic management for ensuring the uniformity of the process of developing cost-effective management decisions based on business intelligence technologies. Authors summarize the theoretical approaches to the definition of the economic management of an organization, and the corresponding system, which provides the process, influencing the control object - the enterprise as a whole, or individual business processes. Comprehensive analysis of the economic management of the process is made in the context of the strategic objectives of the organization in the conditions of formation of a new culture of cooperation with customers, suppliers, and competitors. Comparative characteristics of the information needs of Ukrainian and foreign companies identified the priority areas for the use of modern BI-technologies for economic management of an organization.

KEY WORDS

Business Intelligence, BI, management, economic management, strategic analysis, KPI (Key Performance Indicators).

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Introduction

With the advent of post-industrial society from business leaders, businessmen, and entrepreneurs there is a need to develop new methods for the preparation and implementation of management decisions of different nature. This need is worthwhile to consider on several levels, specifically: 1) the focus of the decisions – whether this or that decision is of a strategic or operational nature, in what area of the organization's operation its implementation is assumed; 2) the scope of the administrative decision - at what scale did this or that decision resulted in a change in the business

system; 3) solutions information capacity – how much information is necessary for the preparation and implementation of solutions. It is clear that these aspects are interrelated. The focus of management decision determines the areas of the company such as business system will be affected and to what extent, that determines the selection of the necessary information for monitoring and analysis, as well as the production of new information for the realization of the planned changes. In such circumstances, the necessity arises to form a new professional profile of business

experts (entrepreneurs, business managers, economists, financiers, etc.), corresponding to the requirements of the post-industrial economy. This profile, in addition to the purely instrumental (professionally oriented) competencies, should reflect the ability of people and organizations at large to work effectively with information that involves monitoring of the enterprise (business) information environment, the choice of sources of information with characteristics necessary for the preparation of the administrative decision, generalization and systematization of information resources, and interpretation of the information obtained in the context of developed business solutions.

The rapid development of information and communication technologies, the greening and the socialization of business generate the problem of creation of information support for the economic system of an enterprise, future-proof solution of which rises in the area of business intelligence technologies (Business Intelligence – BI), subject to the availability of professionals able to develop and carry out effective work with information necessary for the implementation of the economic management of an organization. For most businesses, this problem remains topical because of the multiplicity of approaches to its solution.

1. Methodology and aim of the research

The goal of this research paper is to determine the necessary and sufficient conditions for the economic development of the control system to ensure the unity of the process of development of cost-effective management decisions based on BI-technologies. To achieve this goal the following tasks were set and solved:

- summarize the theoretical approaches to the definition of the economic management of the organization, and the corresponding system, which provides the process, influencing the control object - the enterprise as a whole or individual business processes;
- comprehensively analyze the process of economic governance in the context of strategic objectives of an organization in the conditions of formation of a new culture of cooperation with customers, suppliers, and competitors;
- give the comparative characteristic of the information needs of Ukrainian and foreign companies to identify the priorities of the use of modern information technologies in the BI practice of Ukrainian enterprises;
- analyze the possibilities of BI-technologies for information support of the economic management of an organization.

The research is based on such methods: contextual analysis – for specification of economic management and Business Intelligence in the practice of Ukrainian enterprises; factor analysis and expert assessments – for identification of the determinants of implementation of BI technologies in economic management; generalization and synthesis – for identification of prospects for the formation of a modern system of economic management based on Business Intelligence.

Analytical data provided to confirm the working hypotheses were obtained from two main sources: 1) the published research results of Ukrainian and foreign scholars and practitioners (as defined by relevant links in the text); 2) results of surveys of more than 100 representatives of businesses in Ukraine, conducted by

authors during the period of 2007-2015. It should be noted that the studies were fragmented, as they were conducted in different areas and aspects of the problems stated in the title of this article. However, a generalization of the results allows hypothesizing about the possibility of an analytical assessment of the use of BI technologies in the economic management of Ukrainian companies and firms of different business profiles.

2. Theoretical approaches to interpretation of the economic management of organization

The economic component is present in virtually every integrated management decision through the identification of key parameters of the enterprise, with which they are associated. These parameters are usually: changes in the volume of production or services, changes in their nomenclature, production technology, and the quality, that right away entails the changes in the structure of costs of necessary resources, and, as a consequence, the financial results of economic activity.

Based on a systematic approach as a fundamental to the economics and management studies, there's a need to understand management as a meaningful impact on the system to ensure the achievement of a beneficial effect (Denisov, Zhdanov 2002). Based on a systematic approach as a fundamental to the economics and management studies, there's a need to understand management as a meaningful impact on the system to ensure the achievement of a beneficial effect. In any organization the key management subsystem is the system of economic governance, the essence of which is a ratio of performance objectives (desired future state) of enterprise with the

resources available or affordable to attract, determining the methods and criteria for assessing the actual condition of the company and the economic mechanism of the management control and influence on the goals achievement through KPI (Key Performance Indicators). Based on this, we propose to interpret the economic management of the enterprise as a process of management decision-making process that affects the control object (the company as a whole or individual business processes), implemented with the help of the key indicators of business performance based on criteria of economic efficiency of resource mobilization and use (Kyzenko, Kyzenko 2016). Due to this definition, it follows that the conditions of formation of a full-fledged economic management system were originally laid in the various subsystems of the enterprise.

The base is the system of management accounting and analysis, which forms the methodological basis for the indicators and criteria of economic efficiency of business, their recording, and analysis for management decision-making. Hence, the economic management system is required to use techniques of managerial accounting and analysis, which already exist in the enterprise of specific areas of activity.

It should also be noted that the question of finding ways to improve the methods of economic management of the enterprise are addressed today in various domains of economics, and therefore have some character of isolation and limitation of the subject area in which they are developed. In project management, research and standards are aimed at improving management practices and costs in the performance of projects (International Federation of Accountants 1998). In studies on enterprise economics, the effectiveness of economic management of an enterprise is judged

in the context of the overall objectives of the enterprise activity. In foreign practice, this approach can be seen in the works of scientists, whose studies are linked to management accounting, controlling and budgeting, for example in the works of Drury (2002), Yarugovoy (1991), Kyzenko (2008) and others. Certain issues of management processes optimization in financial management aspects are examined by researchers such as Groppelli and Nikbakht (2000), Van Horn et al. (2006), Savchuk (2005). Improvement of certain problems of economic management, namely, methods of calculation and cost management are considered by Ukrainian scientists, in particular Golov (2006), Butinets (2000) and others, in accounting and management theory. It should also be noted that no less controversial remain the strategic aspects of economic management, which were reflected in our earlier publications (Hrebeshkova, Kyzenko 2010; Kyzenko 2011, 2013).

Thus, the system of economic management of the enterprise is based on management accounting systems in order to address these problems: 1) identification of the impact of key economic parameters of the enterprise to ensure its profitability and maintain competitive advantage; 2) the reasoning of the market position of the enterprise; 3) identification and quantitative substantiation of reserves of increase of efficiency of resources use on the basis of the system analysis of operations and financial condition of a company; 4) justification of prices for products and pricing methods to ensure the required level of profitability; 5) economic feasibility of investment projects, the development of strategic and operational plans of the enterprise, analysis, and control of their performance.

From the perspective of schematics, economic management system, like any other socio-economic system, may be considered in the structural, functional, organizational and process aspects. Such an analysis can more accurately show the key relationships in the system, which lay the foundation and limits of its development.

In the structural aspect, the system of economic management is characterized by a projection of a set of elements, of which it is composed, namely: method of management accounting and analysis of economic performance, technical support and information support, the system of distribution of powers and responsibility in decision-making.

In the functional aspect of the economic governance system is viewed through the prism of controllability of the system in terms of the effectiveness of actions to achieve the established KPI's. Functional aspect characterizes the functions allocated to the economic governance system, namely planning the main indicators of the company for the planning period, adjustment, analysis, and control of operating parameters. The choice of a methodology of management accounting and analysis is the basis of the functional aspects of economic management and at the same time limiting it to generate a set of performance indicators. All companies have the ability to use economic management system of financial and economic indicators based on historical databases, data accounting, and management using the traditional tools such as CVP-analysis, budgeting, and analysis of financial ratios. Today it is not enough for the successful operation of the enterprise, therefore, these instruments should be complemented by strategic goal setting and system of customer relationship management.

The organizational aspect studies the distribution of responsibilities between the performers of specific functions in the economic management system and their hierarchy in the organizational structure of the enterprise. It is important to understand the balance between levels of economic development on the level of company management and the existing system of delegation of powers and responsibilities. Economic management is carried out by the "top-down" method with responsibility for the distribution of structural subdivisions of the enterprise. At the same time, objects of economic management can act as a separate unit within the company's organizational structure and business processes or projects that set targets for their activities.

The process aspect is considered a set of administrative actions in time, which form a single process of developing cost-effective management decisions based on the laws and regulations mutually agreed key parameters of business economics. The process determines the economic aspect of the management cycle, ie the period of time during which the preparation of planning documents, registration of the actual performance of the enterprise in the accounting system, control, and analysis of deviations from the planned values in the process of decision-making. Thus, a process aspect combines the spatial and temporal regulation of economic management in the company, namely, regulates the activities in the process of economic management, determine the compliance of the actions set time parameters in the management cycle. The process aspect of economic management depends on the specifics of the operating activities of the enterprise, its financial and operating cycle, and determines the way of developing the economic governance in a particular enterprise, depending on the timing and

methods for the preparation of the planned and actual information on the values of economic indicators of the effectiveness.

3. Economic management in the long-term strategic objectives of organization

In the 21st century, the need to re-examine the traditional paradigm of economic competitiveness is intensified. Developed in the 1980s, the model and the concept of competitive strategy, of course, remain useful, but it does not correspond to the current strategic context. "The internal cause of the progressive development of strategic management theory lies in the pursuit of a holistic analysis of sources and mechanisms to create a sustainable competitive advantage of firms" (Kat'kalo 2006: 147).

An important feature of the post-industrial economy is the shift of competition to the global level, on the one hand, and on the other – the level of the individual. Competition is becoming multi-level, penetrating the internal environment of the organization, and the organization should be competitive at every level of both external and internal environment. In the external environment, the role of the interaction of the company with its partners (so-called "co-competition" (Brandenburger, Nalebuff 1996) in the entrepreneurial ecosystem format (Moore 2006) and networks, which are becoming the most important economic entities of the new economy. In the internal environment, an increasingly important impact on the competitiveness of the company gain its employees, as well as the mechanisms for implementing the exchange of knowledge between them and the development of collective solutions.

We are witnessing the formation of a single global information space. The strength-

ening of intellectual nature of the business is a continuous process of introduction of new production and management technologies, the determining factor for the increase of its effectiveness and efficiency.

The struggle for the consumer (customer) has led to a rethinking of the value of the product, which creates an enterprise. Customer value went beyond the physical quality of the product. In place of the industrial logic of the business, organizations have principles of integrated solutions for the client, that involve not only the production of a technologically high-quality product but also impeccable service and maintenance. At a time when companies are fighting for the customer, the recreation of the entire value chain by forces of one company is virtually impossible. That is why direct competition (as in the last century) has given way to cooperation and partnership.

Building partnerships by attracting companies to cooperate, perform activities beyond the "strategic core" of business, promotes the efficient allocation of resources cost minimization, causes a competitive advantage in the market. Strategic partnerships are an important component of any business.

The postindustrial economy is not just creating qualitatively new conditions for existing businesses, it puts fundamentally different tasks in front of them that require finding new ways to ensure competitiveness, as well as new approaches to management. Such an economy leads to the emergence of new types of organizations, business forms, a transformation of hierarchical models in flexible structures. In order to become or remain a leader, not enough companies to own resources, it is necessary to adapt to a new culture of cooperation with customers, suppliers, and even competitors.

In such circumstances, the system of economic management of organization is intended to address a number of specific objectives, namely: a) due to the exponentially growing amount of information needed for management decisions, tougher requirements for the methodology of management accounting adopted in the organization, which includes the appropriate qualifications of personnel involved in economic governance system; b) there is a need to ensure the implementation of appropriate information on the basis of specific IT applications (platforms) to track real-time key parameters of the economic condition of a company.

The development of economic governance, of course, is aimed at integration with Business Intelligence system (BI) for use in a single management process (Simon 2014). At the same time, the transition to a new stage of development is associated with the diagnosis of readiness of the accounting system to be integrated into the ERP-system with a gradual transition to BPM (Business Performance Management) system, which has extensive integration with BI system. First of all, this is due to the possibility of differentiation of management and accounting (financial accounting). This distinction implies the possibility of providing equal access to primary data, taking into account the participants of administrative process within their competence in management decisions.

In addition, there are inevitably problems of compatibility of different software products used by the company for accounting and operational planning and accounting, marketing and accounting information in the logistics system. This is especially noticeable in areas where the structuring of objects of economic management lies not within the organizational structure of the enterprise, and on business processes or

projects. In this case, as a rule, operational activities are carried out with the help of specialized software products that have already been implemented and contain the necessary data sets for operational management. According to research (Valeev 2015), only approximately 30% of companies in Ukraine can use modern analytical tools for forecasting, competitive analysis, and corporate governance, which is comparable with common problems solved with the help of economic management system in the enterprise.

4. The information needs of Ukrainian and foreign companies: the comparative characteristic of research results

Empirical evidence and the results of our studies (Grebeshkov 2010) show that the degree of knowledge of the theoretical problems of information support of the company at the operational and strategic levels remains low.

The results of the survey and interviews with the representatives of Ukrainian companies, as well as summarized data published in the literature on the informational aspects of companies development, reveal the conscious information needs of domestic and foreign companies and conduct a comparative analysis on the basis of the results of which (Grebeshkov 2009) will allow ourselves to draw several conclusions.

Firstly, it should be recognized that the majority of domestic enterprises are not oriented in the information market: the question remains of what they want and knows how and where such information can be obtained.

Secondly, the structure of the information needs of Ukrainian industrial enterprises favored analytical information of accounting and management nature, the data on the availability of financial resources and investment, as well as information of political and legal nature. In contrast, foreign companies give the priority to information about new technologies and innovations, as well as on the results of fundamental and applied research. This reveals a gap in management approaches: the innovative focus of foreign companies and the focus of Ukrainian companies on issues of compliance with unstable legal environment and regulatory issues that dominate in Ukraine. In addition, the underdevelopment of a market infrastructure of Ukrainian business environment should be identified, as well as its dependence on the actions of regulatory institutions, which, in turn, indicates a high degree of asymmetry of information space in Ukraine. For trade companies, the Ukrainian and foreign companies show the same discrepancy in the estimates of the significance of information resources: domestic firms put the need for business information and information about the availability of financial and investment resources in the first place (which corresponds to the pressing problems of functioning and development of the Ukrainian enterprises, particularly the lack of working capital, finding strategic investors and reliable partner for commercial transactions); for foreign trade companies of primary interest is the data on the state and dynamics of commodity markets, stock news, trends and market trends.

Based on the evaluation and comparison of the importance of information resources for domestic and foreign companies an attempt was made to reveal the structure of their information needs. In our view, the results were interesting and ambiguous.

According to the survey of representatives of domestic enterprises of various spheres of activity, it turned out that the list of information resources that can be attributed to the group of universal (ie, equally important for production companies and trading companies) is quite wide, ranging from the official information of the authorities and regulatory instruments in the marketing to the educational and methodological information.

The group-specific sources of information (which are of high importance for only in some groups) are internal accounting and management data. Indicative is also a part of the specific information resources: for industrial enterprises such were data on the results of research and development, labor market information and political news; for trading companies – the stock exchange, financial and commercial information.

Significantly different are similar estimates for foreign companies. The composition of universal information resources is relatively narrow and contains the necessary information about the company – accounting and analysis of the internal origin, information on manpower and personnel (including management staff training tools) and on foreign commodity markets data. In our opinion, such a structure of information resources, recognized as the most important for companies in different fields (production and trade), indicative of stability and awareness of information needs of foreign companies, their clear orientation in the turbulent flow of information.

So, structure the information needs of domestic and foreign companies in various fields of activity determined on the basis of the above assessment of the importance of information resources is qualitatively different: for Ukrainian enterprises the share of universal needs in the total volume of information requests does not exceed 60%,

while the figure for foreign companies is 86%. Also revealing is the comparison of the proportion of the specific information needs of 14% – in Ukrainian companies, and 1% – in foreign companies.

Based on the identified characteristics of the information needs of local enterprises can be stated that on the one hand, the information needs of businesses are due to the general state of the country's economic system (the level of development of market infrastructure, the influence of political authorities on economic relations, etc.). On the other hand, for domestic enterprises, there is an urgent need to develop and enhance the level of information culture that is expressed in a clear formulation of the objectives of information support of the activity and development, mastering the technology and tools to work with information resources.

Features of the domestic practice of using various sources of information are, in our opinion, of a clear reason. Firstly, high information asymmetry of national information space contributes to the fact that the rating of trust to the external (in relation to the company) information sources remain low. Compared with the foreign practices are perceived even more reliable internal data of enterprises on their activities and information from employees, actually also has "internal" origin.

Second, domestic enterprises have a low level of specialized training in the production and use of professional business information, as evidenced by low scores the importance of market research and cooperation with the consulting agencies, the rating of trust to which among foreign companies are much higher.

Overcoming the negative situation in the sphere of work with information resources is seen by us in the proper use of modern BI information technology.

5. Capabilities of BI-technologies in the economic management of an organization

Despite the active development of business intelligence tools from the beginning of the twenty-first century, that are focused on a wide range of consumers, and the powerful potential of BI-technologies to provide support of management decisions, such platforms are still “the destiny of the elite”. In this context, there’s an interesting survey result conducted in October 2014 by the InformationWeek Internet portal regarding the most popular applications of BI tools, and analytic tools, and the most active BI users and analytical tools (Valeev 2015), according to which the analytical BI tools are most in demand in the financial sector, tracking and forecasting of business activities, and the key users are specialists in the field of business intelligence and IT.

Toward the middle of the first decade of the twenty-first century, the world took a vision of BI usage for solving applied business tasks: budgeting, profitability management, preparation of various types of management reports. BI began to offer ready to use methodologies to address different applications. The results of our previous studies (Hrebeshkova, Kyzenko 2012) suggest that the global practice of strategic management is enriched by fundamental research methodological tools of measurement and analytical support for economic management in the strategic aspect of the organization, including the Performance Measurement model, complex data analysis (Data Envelopment Analysis), Balanced Scorecard, «Airborne board» (Tableau de Bord), system improvement and performance measurement (productivity Measurement and Enhancement

system – ProMES), business management window, total quality management, universal system of performance indicators (Total Performance Scorecard), systems of informational support of administrative solutions (ERP-system), systems of key business performance indicators (KPI), etc. However, each of these concepts is based on a specific set of indicators. Excess performance and complexity of gathering factual information are not conducive to focusing on the identification of promising opportunities that, in fact, supports the company’s competitive advantages. As a result of a natural evolution, BI tools now find application as a platform for business-oriented products for Business Performance Management (BPM).

What opportunities do the implementation of BI-technologies open for an organization? First of all, the answer lies in the corresponding BI-platforms. Most often, companies that have implemented BI-systems, noted the achievement of the following results: optimization of the decision-making process, acceleration of reporting and analysis, improvement of data quality, increase in employees and customers satisfaction. The least effective was the use of BI systems in order to reduce costs (Systems Business... 2014: 18). In the domain of company strategic development support BI-systems provide: assessment of the effectiveness of various business areas; estimation of reachable goals; assessment of the efficiency of resource use, including subsidiaries; evaluation of effectiveness of operating, investing and financing activities; business modeling and evaluation of investment projects; cost management, tax planning, planning of capital investments (Systems Business... 2014: 16).

Since the beginning of the 1990s, there was an increase in BI application deployments in many companies. Having started

with simple operational reports received on the mainframe, the BI applications currently include statistical modeling of marketing campaigns, multi-dimensional OLAP analysis, management accounting for the majority of employees. Implementation of ERP and CRM systems has led to large amounts of data, making it possible to analyze this information. Companies are actively looking for ways to use the accumulated information for the formation of an effective management reporting, as well as business process optimization. BI technologies providers, following market signals, create software for these tasks. Specialists note that there are five main BI styles on which analytic applications are available to end-users: 1) corporate reporting - widely used management reporting, designed for a wide range of managers and employees of the company; 2) analysis of cubes - multi-dimensional analysis of a limited sample of aggregated data, intended for managers who need a simple navigation interface for different data slices; 3) interactive (Ad Hoc) analysis – for the analysis of all the company's data, allowing to perform automated analysis on data slices for any degree of detail, down to the level of individual transactions (for analysts and top managers); 4) statistics and Data Mining - the use of complex mathematical, statistical and financial algorithms to analyze correlations, calculate trends, financial analysis, etc. (for professional analysts); 5) active delivery of information - proactive delivery of reports and signals for a large number of recipients of information on a schedule or at an event (designed for a wide range of users – employees of the company, its customers, suppliers, etc.).

Today in the field of data analysis, there are dozens of mature solutions, each of which has its own characteristics and its target users. Increasingly, software analyti-

cal tools are referred to as the field of “big data” (BigData), while the tools themselves take the form of solutions based on cloud services (SaaS-solutions) rather than complex software systems. This is due to the fact that the business processes of medium and large enterprises generated a huge amount of data, requiring immediate recording and processing. If we take into account the ever-increasing pace and scale of changes in the external environment of the enterprise, which is also part of the strategic planning horizon, it is simply the amount of data that can not be processed by hardware available to one individual company, or the speed and/or quality of such processing will be unsatisfactory. Cloud computing concept in this context allows the company to get their hands on enormous computing power for a relatively small cost.

Among the products that efficiently handle large data, today are Platfora, atScale, ArcadiaData, GoodData, Amazon Quick Sight. Among the products that efficiently handle large data, today are Platfora, atScale, ArcadiaData, GoodData, Amazon Quick Sight. // All of them allow you to quickly collect and analyze the incredible amounts of data and to carry out its initial analysis. Most of these products have analytical modules that allow you to quickly evaluate the KPI activity of the enterprise as a whole, which makes them an indispensable tool for the economic management of the organization. It should be noted that today, BI-solutions are available for business, both in terms of technical ease of implementation and in terms of the cost of such products (Hrebeshkova et al. Kyzenko 2016). In this regard, we should pay attention to Microsoft Power BI, that is not only the incredibly easy to scale and has the functional richness of analytical solutions, but also for its affordable, since

the basic package of services is free of charge and allows you to analyze up to 10 thousand rows of data per hour. Apart from the market of BI products stands the product by MicroStrategy that provides all the functionality of BI styles in a single architecture, delivered in a single interface. MicroStrategy provides a user with more than 300 statistical, analytical and financial functions and data mining functions to create business metrics and the high-level KPI and conduct a complex statistical analysis. Other BI products provide fractions of BI styles using various user interfaces and metadata and various security model for each BI style. Every year there appear new players in the BI market, which seek to provide an even wider range of analytical services, and even easier to use tools in the daily work of manager and analysts.

Conclusions

The economic management of the organization of post-industrial era is a very daunting task for the successful solution of which it is necessary to organically combine the solution of strategic and operational issues. The success or failure of companies depends on the rate and quality of their response to changes in the business environment. In turn, the speed and quality of response are the competencies of modern economists and analysts, which include the ability to collect and “process” large amounts of data in real-time, to provide relevant information in the “custom” format to all participants of the process of preparation, adoption and implementation of management decisions in the company.

Therefore, BI-technologies have broad prospects for implementation in the modern business practice. Their success is predetermined not only by the progressive trend of increasing ease of use (“usability”)

but also the growing demand of business users – the owners and executives of companies of all sizes and business profiles, which are realizing the value of IB-technologies in the area of improving business efficiency and ultimately – the success of the company in the long term. The new challenge opens before researchers – identify the “points of growth” of the organization, based on BI-technologies.

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