Creation of the corporate information system based on knowledge economy

Ekaterina Vinogradova[1], *Olena* Nikoliuk[2] and *Anna* Galimova[1]

[1]Ural State University of Economics, 8 Marta Str., 62, 620144 Ekaterinburg, Russia

[2]Odessa National Academy of Food Technologies, Kanatna str. 112, Odessa, 65039 Ukraine

Abstract. Nowadays it is impossible to remain competitive by operating on the same template for a long period of time. In order to gain an advantage in the market, companies should adapt to changes in the world as soon as possible and find new competitive mechanisms. Innovation is also needed in order to be able to offer consumers products that will differ from available in the market in rising competitive conditions. The task of the authors in this study is to find and investigate an effective way to plan and conduct production and economic activities through changing value guidelines: a transition from an orientation to material and technical factors to information resources, a part of the knowledge economy. The authors defined the main stages of the formation of a corporate information system based on a sustainable economy.

1 Introduction

In modern economic conditions the activities of companies are accompanied by a state of instability of the external environment, a significant level of risks and fierce competition. In these circumstances there is a need for looking for new effective methods of organizing production, taking into account the large number of orders and product specifics. To maintain a sustainable economy, the enterprise needs integrated production management, which includes organization, planning and control. This integral part of economic growth allows for the integration of all activities in their relationship with each other, as well as with external and internal factors, so as to achieve the rational use of available resources and avoid the depletion of assets. Such a method is the development and implementation of a model of optimization of economic planning and management based on the concept of a sustainable economy.

2 Methods and types

The multidimensional nature of the problem under study made it necessary to refer to the scientific works of scientists addressed to the investigation of ways to increase competitiveness in the context of modern economic development through the transition to a sustainable economy.

In the article "Contemporary Mechanisms of Competition in the Economy and in Business" Dr. Slawomir Czarniewski emphasizes the importance of the information

revolution associated with the development and implementation of technological innovations of the 21st century. By competently using the access to information and opportunities associated with globalization, a company can benefit significantly [1]. It is possible to acquire competitive superiority only if there are unique products that are fundamentally different from other ones available in the market.

Even with introduction of innovation and effective planning, there is a risk of losing competitive advantage. This can happen because competitors quickly borrow successful developments and use them in their practice. The solution to the problem is isolation, which includes patents, copyrights, reputation and cooperation with other organizations, the development of strategic goals. The strength of the company is the presence of such assets as reputation, the creation of which has a complex structure from further actions: training, quality control, building relationships [2]. These assets cannot be purchased in the market and borrowing them is costly. The development of strategic objectives and the identification of the necessary tools to achieve them create some obstacles to the copying of products by competitors [3]. The task of public authorities is to create conditions for the development, protection and support of competition and not to prevent it.

George Ciprian, Leonardo Badea, Víctor Raúl Lopez Ruiz, Domingo Nevado Peña, who published the work "Knowledge Management - the Key Resources in the Knowledge Economy", and Bojan Krstic, Tanja Stanisic in the work "The Influence of Knowledge Economy Development on Competitiveness of Southeastern Europe Countries" agree that the main factor in the survival of the company in the dynamic conditions of the modern world is the knowledge economy. Previous methods of competitiveness are not effective due to the creation of a new economy that affects the production process.

Knowledge management brings an advantage in business, because if you steer knowledge on the right course and use it to achieve the company's goals, then it brings profit along with the sale of products. By contrast with goods the main advantage of knowledge is its endurance, since in fact the ability of a person to create knowledge is not limited. George Ciprian, Leonardo Badea, Víctor Raúl Lopez Ruiz, Domingo Nevado Peña gave a hierarchical structure of the power of knowledge: data, information, knowledge and deep knowledge (wisdom) [4]. The latter form has the greatest value since it represents the optimal use of knowledge.

Japanese scientist I. Nonaka determined that the creation of knowledge depends on the use of language and communications. Based on this, 2 types of knowledge are distinguished: explicit (easily expressed through words, numbers, formulas) and implicit (hidden, not expressed and hard to explain), according to which there is a knowledge transformation system consisting of four models: socialization, embodiment, combination and internalization [5]. Socialization is the process of sharing experience without using language, for example, insight, faith, understanding and intuition. Embodiment refers to the transformation of implicit knowledge into explicit knowledge through the use of metaphors, comparisons. This model is most closely related to the creation of knowledge. The combination is the fusion of knowledge from different sources. For example, information in databases can be used to create new explicit knowledge. Internalization or assimilation is the process of turning explicit knowledge into implicit knowledge. An example is borrowing the experience of others. If a company wants to be competitive, then it must carefully ensure that these models are dynamically interconnected and spiral into one another.

Knowledge management facilitates the acquisition of material value by the intellectual abilities of staff and also helps the company adapt to changes in the world as soon as possible [6]. But when using any method, it is necessary to determine the degree of its effectiveness. And knowledge management is not an exception. There are several classifications of methods of measuring knowledge in the company, the authors of the

article "Knowledge Management - a Key Resource in the Knowledge Economy" chose the classification proposed by K.E.Sveib. According to it, methods for measuring knowledge are divided into the method of exchange capitalization, the assessment methods based on the profitability of assets, the method for estimating Scorecard and the method to estimate the intellectual capital. The method of exchange capitalization is the difference between the market capitalization of a company and the equity of its shareholders. The essence of the assessment methods based on the profitability of assets is to compare the ratio of the company's average income before taxes to the company's tangible assets with a similar indicator in the whole industry. The method for estimating Scorecard consists of identifying the various components of intellectual capital, as a result of which indicators and indexes are generated and reported in the form of points or graphs. The method to estimate the intellectual capital is based on identification and valuation in money of its individual components. The result is an integral valuation of the company's intellectual capital.

In the work "The Influence of Knowledge Economy Development on Competitiveness of Southeastern Europe Countries" Bojan Krstic, Tanja Stanisic use methods of descriptive statistics, correlation, regression and comparative analysis to argue the necessary of using knowledge economics. During the period of globalization, illustrated by the fast growth of the share of world trade, exports and imports in world GDP, the competitiveness of countries is increasing. Knowledge is the main source of competitive advantage, since the era of industrialization ends and it is replaced by the knowledge economy, which contributes to scientific and technological progress [7].

The authors of the article "The Role of Information System Flows in Fulfilling Customers' Individual Orders" Paula Bajdor, Iwona Grabara are also focused on knowledge, namely, the implementation of information systems in the enterprise [8]. Their research can serve as an example of the practical use of the developments of other writers whose works are described above. In the studied company the use of information systems is an integral part of the production process and takes place throughout all its stages: acceptance of an order, execution and delivery to customers. Most processes are automatic and do not require enormous personnel labor. In addition, the use of information systems includes quality control to help identify shortcomings and errors. By following the process of the organization, it is possible to conclude the important role of information systems in the functioning of the enterprise. Paula Bajdor, Iwona Grabara highlight the advantages and disadvantages of using information systems. The strengths include: high speed of work, real-time updating of information, improved quality of products, the ability to preserve a large amount of information, the creation of new jobs and the ability to work around the clock, the possibility of access from anywhere in the world. In addition, there are disadvantages in the use of information systems. These include the cost of developing and implementing an information system, possible failed systems, the need to know PCs, the introduction of an information system, can lead to a reduction in jobs and cause an increase in unemployment. However, in terms of the company's efficiency, the advantages are superior to the disadvantages. In addition, the implementation of the information system provides a link between the management system and the output of products allows to respond quickly to changes in the external and internal environment and also contributes to the development of competitive products.

Scientists Hoth and Wienand have developed a fairly promising way of planning. The above approach used an assessment system: 10 factors of influence on products, process, organization or personnel are identified [9]. Each of the factors is divided into subcategories. For example, staff qualifications are divided into qualified personnel with work experience, qualified personnel without work experience, laborers with work experience and laborers without work experience. Each company can evaluate the impact of factors and choose the appropriate planning model. The disadvantage of this method is its

use only in the enterprises of the metalworking industry. Based on the experience of their predecessors and the results of surveys conducted, A. Kampker, P. Burggraf, Y. Baumers conclude that it is necessary to develop and implement a method for determining the degree of depth of economic planning in each particular situation. From two types of existing methods - based on experience and related to the influence of factors - the authors choose the latter due to the insolvency of the former in the event of the emergence of a new type of product. However, the chosen method requires updating factors and adapting to the current situation.

3 Results and discussion

In improving the organization of production and management, it is important not forget the inherent factor of improving competitiveness, such as improving the quality of planning. If a company wants to make the most of its profits at the lowest cost, it needs to plan its production. But how to determine how detailed this planning should be so as not to spend unduly high efforts? Indeed, in the case of detailed planning of each individual product, savings may be insignificant or completely absent. If it is not difficult to determine planning costs, since they consist of time, planning tools and personnel costs, then identifying the benefits of planning is not so easy. You cannot unambiguously determine whether the benefit was a result of the quality of planning or the impact of the environment. After studying the literature, the authors of this study concluded that there are 2 approaches to assessing the quality of planning: the first is focused only on reducing costs, the second is based only on an analysis of the parameters described in the planning situation. However, they cannot fully reflect the impact of factors on the depth of planning. Prior to the development of a suitable planning system, preliminary studies have been carried out to determine its characteristics. First, they surveyed 43 companies on the depth of planning. Most of them (56%) plan the whole product without dividing it into types. The main reasons for this selection are the lack of a suitable way to determine the required depth of planning on a case-by-case basis, as well as the difficulty in determining the revenue and costs of the planning process. But the used method is effective only in the case of a constant set of products for a long period. If a new product appears, this fact cannot be taken into account due to fundamentally new technological characteristics. It is important to note that most respondents agree that the depth of economic planning depends on the case.

Within the framework of this issue, the MERITIUM project should be considered, the essence of which is the measurement of intangible assets for identification and improvement of innovative management [10]. According to this model, intellectual capital is divided into: human (part of intangible assets that is retained only during the working day), structural (part of intangible assets that remains after the end of the working day) and relative (the value of the company's relationship with the various economic and social agents with which it interacts). The MERITIUM model also identifies 3 phases of intelligent capital management: identification, measurement and control. Firstly, the task is to identify intellectual capital that meets the strategic goals of a company. Secondly, intangible assets are measured by means of certain indicators for significance and reliability. As a result, an intelligent capital management system is created, which plays a far less than last role in the overall enterprise management system. In addition, the model identified 4 types of knowledge resources:

- employees, including their motivation, willingness to adapt and commitment to the company;
- clients whose factors are loyalty and satisfaction;
- processes, that is, knowledge must be understood and systematized;
- technology - technological support for other elements (IT-systems, intranet).

In the near future, intangible assets, such as knowledge, will supplant tangible and will be the main source of profit. To this end, an internationally accepted model for measuring and managing knowledge resources remains to be developed [11].

The planning system should be tailored to the specific situation for each company and at the same time be suitable for any industry and company, take into account the possibility of new products, the influence of factors on the depth of planning and the depth of planning on the tasks and used methods. The methodology should be developed in three stages: description, explanation and solution. Initially, no analysis is carried out: factors, tasks and depth of planning are considered separately. Then the relationship between them is determined and as a result all aspects of the methodology are accumulated, division into suitability for certain groups occurs. This method allows optimizing planning costs without sacrificing quality.

The integrated enterprise planning and management information system envisages the initial preparation of enterprise resources for the automation process by creating a system of standardized processes. It consists of a set of modules designed to automate processes in a particular business area, such as supply chain management, production distribution planning, demand planning, sales planning, warehouse management, and material requirements planning. The implementation of this module block allows automating the processes of inventory accounting and control in the warehouse, movement management, optimization of logistics and processes of warehouse accounting of products. Thus, the set of necessary modules and their characteristics should depend on the specifics of the enterprise. The company independently selects the necessary set of subsystems for the system formation and implementation by answering the proposed questions in order to identify the specifics of the activity (industry, accounting features, strategic goals, types of products, organizational structure, etc.). In this case, the vendor must provide the enterprise with detailed instructions for setting up and administering the system, which will avoid the additional cost of training users.

4 Conclusions

The main factor in the stable existence of the company in the market and the increase in its value is good management, the result of which is the creation of its high value and the attraction of customers for a long period. The competitive advantage is a synthesis of two factors: the organization of efficient production, which can be created as a result of the application of the knowledge economy and more efficient use of resources, as well as the choice of an appropriate planning method. Such an approach will be most optimal in the conditions of modern economic development. The analysis of theoretical and practical developments made it possible to determine the main shortcomings of the current system of management accounting and financial planning in industrial enterprises. Based on this, the authors developed practical recommendations for its modernization, based on an integrated approach. The use of a corporate information system is an effective tool for planning the company's activities, which allows to achieve a positive financial result and competent resource management.

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