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Assessment of Complexity to design Cloud Software Products

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Abstract: ***This article shows the relevance of assessing the complexity of designing cloud software products for informatization enterprises in the production of market software products. A classification of cloud software products is proposed depending on the complexity of their design. The distribution of methods for assessing the complexity of designing cloud software products by design stages is recommended. The features of the approach to assessing the complexity of software product design taking into account the requirements of cloud computing and the tasks of the digital economy are formulated.***

Keywords : cloud service, software, cloud products, designing cloud software products.

I. INTRODUCTION

Development digital economy represents a new stage in the informatization of the national economy of the Russian Federation [1].

It is impossible to imagine the modern world without information technologies that have changed and facilitated various areas and opened up new market opportunities. The emergence of new digital infrastructures, the development of computer technology and digital communications give rise to new opportunities in the field of information technology, their implementation in the socio-political and economic life of society, form a new system of international economy - digital. The digital economy is based on the production of electronic goods and services by high-tech business structures and the sale of these products through e-commerce.

The digital economy is an activity in which the key factors of production are the data presented in digital form, and their processing and use in large volumes, can improve the efficiency, quality and productivity in various types of production, technologies, equipment, during storage, sale, delivery and consumption of goods and services.

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The subject of the digital economy is economic relations and laws. Relations are formed in the process of production, exchange, distribution and consumption of scientific and technical information through digital information technologies, and the development of these processes is subject to economic laws.

The relevance of the formation of the digital economy is evidenced by the Project of the program "Digital Economy of the Russian Federation", in which the main tasks of the development of this direction are formulated [2].

Digital economy software is associated with cloud technology and the development of related software products.

Import substitution in this area is associated with the need to intensify the activities of domestic informatization enterprises in the development of cloud software products for the digital economy.

Entering the market for this kind of software products requires an assessment of the complexity of their development. Evaluation of the complexity of designing cloud software products is the basis for calculating the duration of the production cycle and the cost of their design.

Evaluation of the complexity of designing cloud software products for the digital economy involves the classification and analysis of objects for assessing the complexity, as well as the choice of methods for this assessment, taking into account the specifics of the software products under consideration.

These issues are addressed in the proposed article.

II. RESULTS AND DISCUSSION

The digital economy has a huge impact on manufacturing, trade, transportation and financial services, education, healthcare, the media, etc. Technology expand the capabilities of people and organizations in various directions, provide the opportunity to create and disseminate ideas, develop and introduce innovations in commercial activities.

The development of the digital information economy is inextricably linked with the development of the information market. The information market can be described as a system of economic, legal and organizational relations for the purchase and sale of products of intellectual labor on a commercial basis. With the growth of informatization and digitalization of society, the information industry begins to dominate the economy, production is becoming more innovative and knowledge-intensive. The number of people employed in the field of information and communication technologies is growing every year.

The main factor stimulating the informatization of society in recent decades is to increase the availability of hardware and software, the development of network technologies. A significant impact on the dynamic development of the information market was provided by the intensive growth of the software product business.

The development of the digital economy has led to the emergence of a new type of competition - hypercompetition. The systemic elements of hypercompetition are multilevel and multidimensionality, new knowledge (competencies), manageability, dynamism, adaptability, mobility, innovativeness, efficiency, etc., which determine the globalization advantages of world leading countries and technologically advanced multinational companies.

The information market uses special methods of competition for IT structures that perform a narrowly focused function in developing innovative technologies for the production, storage, processing and transmission of information to optimize the business processes of organizations.

At the microeconomic level, information and communication technologies (ICTs) allow enterprises to optimize business processes. At the macroeconomic level, the influence of ICT explains the need to choose new directions for the development of economies of states and regions that take into account trends in the global economy, including using.

The digital economy overcomes a number of limitations inherent in the traditional economy. Digital products can be copied and used by an unlimited number of people, while they do not lose consumer properties, and when used and shared these properties are often improved. At the same time, material products cannot be used simultaneously by several people and are subject to wear during operation. Online stores allow you to avoid restrictions on the area inherent in conventional trading floors, and therefore the breadth of assortment.

With the growing influence of information on company management, additional research is required on the methods of its use. At present, it is becoming increasingly difficult to solve organizational and managerial problems of companies by setting up business processes. The digital economy has made a number of significant changes to the activities of companies:

- The emergence of an informational production factor that has become a significant resource.
- An increase in production costs, since information, like a product and a factor, has a price.
- Lower transaction costs through the use of ICT.
- The growing importance of the human factor in the introduction of ICT-based production.
- Decrease in the significance of the uncertainty factor due to the active use of the information resource.

In the traditional economy, the main role in the relationship between the producer and the buyer was played by the manufacturer, since he owned the generation of the product idea. The buyer made a choice from the list of goods already produced and offered by the manufacturer. In the context of the digital economy, the modern buyer has the opportunity to become a member of the process of creating new consumer value, to generate ideas for new products and services. The move towards closer interaction with the consumer can be described as a logical step of production enterprises to changes in the business environment. Production companies have increasingly begun to cooperate with consumers (creating product designs, custom-made products, developing new product functionality, etc.).

The concept of “open innovation”, developed by G. Chesborough, is also associated with changes caused by the digital economy. Open innovations can be observed in the process of actively involving consumers in the business to participate in the process of creating innovations, when companies use not only internal ideas (ideas of employees), but also external ones (ideas of consumers). In the era of the digital economy, knowledge is a strategically important asset. They play a key role in the sustainable economic development of companies in various industries. In this regard, it is advisable to formulate new approaches to the development of business development strategies.

Classification and functionality of cloud software products for the digital economy.

Cloud platforms of the world leaders in the IT industry provide extensive opportunities for the deployment of various types of cloud software products [3].

Cloud software products for the most part are services focused on solving certain functional problems. The following can be distinguished in large scale: application software (business applications, mobile applications, etc.), cloud data management and storage systems (cloud storage, service model data provision, etc.), business intelligence tools, cloud system software for virtualization, deployment and maintenance integrated solutions.

Recently, the Internet of Things (IoT) technology is gaining popularity. A separate place in the diversity of cloud software products is software for information security.

Distribution of methods for assessing the complexity of designing cloud software products by design stages.

Pricing for a software product project is carried out in accordance with well-known methods: “cost + profit”, with a focus on competitors, with a focus on consumers [4].

Methods for assessing the complexity are based on information that is concretized as the design process moves forward in stages. They differ in their approach to estimating the size of a project.

After receiving an application for designing a cloud-based software product, expert and statistical evaluation methods are used to provide an estimated expected estimate of the size of the work. These include the Delphi expert method, expert assessments of the company’s developer of a cloud software product based on the statistics they collected, and the function point method [4, 5].

Based on the results of the analysis of business processes and the construction of their model, the method of object points can be used, characterizing the size of the cloud software product by the number of screen forms for entering information, the number of reports and an approximate assessment of the associated database tables.

According to the updated data, the method of object points can be used as the basis for assessing the complexity at the design stage. The assessment of the complexity of the design of IP at the programming stage can be done on the basis of refined algorithms for the solved functional problems obtained at the design stage, taking into account the programming of those tasks that are not among the types previously programmed.

As a result of the programming stage, a program code of a certain length is obtained. The length of this code (Lines of Code, LOC) in thousands of lines of code indicates the complexity of designing a cloud software product and is proportional to it.

Program code is the main result of designing a cloud software product presented to a customer, in addition to design documentation.

The length of the program code is used both to assess the total actual complexity of the design and to evaluate the expected assessment of the complexity of the testing phase and implementation stage.

After the completion of the implementation stage, the informatization enterprise should replenish the database of statistical data on the complexity and its structure by the design stages for cloud software products of this class.

Features of approaches to assessing the complexity of designing cloud software products for the digital economy. Features associated with the need to take into account the following requirements imposed by cloud technology [7], including:

- scalability and load balancing;
- information security;
- fault tolerance;
- guaranteed delivery of messages between the components of the software product;
- deploying distributed software product components.

The development of the digital economy in the Russian Federation is at the initial stage, there is a lag behind international best practices by several years [2]. Currently, existing statistics characterizing the assessment of the complexity of designing cloud software products are clearly not enough. It is required to improve telemetry in this area.

At the same time, it should be noted that with the intensification of the work of informatization enterprises, taking into account the results of domestic and foreign studies, as well as the accumulated domestic and foreign experience in the development of cloud software products 19 for the digital economy, there are all prerequisites to bridge the existing gap.

III. CONCLUSION

The article presents the following scientific results:

1. The relevance of assessing the complexity of designing cloud software products for informatization enterprises in the production of market software products is shown;
2. A classification of cloud software products for the digital economy is proposed, which is necessary to assess the complexity of their design;
3. The distribution of methods for assessing the complexity of designing cloud software products by design stages is recommended;
4. The features of the approach to assessing the complexity of software product design taking into account the requirements of cloud computing and the tasks of the digital economy are formulated.

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