The specificity of forming requirements for the quality of information support of a high-tech enterprise

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Abstract. The level of the current state in the field of information support (IS) of the activities of high-tech enterprises is considered in this paper. The main problems are shown on the way to achieving the required level of IS quality in high-tech enterprises of the country. The need for the formation of a number of standardized requirements for the IS quality of a high-tech enterprise to improve its level is determined. A typical list of requirements for the IS quality is determined and a model of a system for accounting for requirements for the IS quality is developed using the example of Scientific and technological center of unique instrumentation of the Russian Academy of Sciences.

Introduction
The current stage in the development of high-tech industries of the country is characterized by a close dependence of the quality level of manufactured high-tech products on the effectiveness of information support (IS) of the activities of high-tech enterprise’s personnel.
IS is a set of information resources and services necessary for solving managerial, creative and scientific - technical tasks in accordance with the stages of their implementation [1]. The quality of IS, according to GOST R ISO 9000-2015 [2], should be understood as the degree of compliance of the inherent characteristics of IS with the established requirements. The practical implementation of advanced achievements in the field of IS of high-tech enterprises should be aimed at providing continuous information support for the production processes of high-tech products, which becomes possible due to the introduction of advanced achievements of information technologies (IT) in the enterprise.
At present, a significant part of high-tech enterprises of the country is characterized by a number of problems directly related to the insufficient quality level of IS [3]. The most common problems include - the duration and low certainty of information exchange processes between employees; - low degree of implementation of electronic document management; - high risk of irretrievable loss of information when it is repeatedly transmitted; - low efficiency of information resource management processes, etc.
One of the main causes of these problems, in our opinion, is the universally observed phenomenon of uneven, local informatization of individual structural units and production processes of high-tech enterprises. The introduction of various automated control systems (ACS) and design (ADS) into the structure of a high-tech enterprise often does not bring the desired results due to the low consistency and limitedness of these measures within the framework of the exclusively technical side.
Methods

Despite the relative study of problems related to the general issues of informatization management in high-tech organizations [4-6], there are insufficient studies related to the development of methods for assessing and subsequently improving the current level of the IS quality in the context of creating conditions for highly effective information support of the activities of creating high-tech products. There is a general insufficiency of measures aimed at developing effective systems and methods for managing the computerization of science-intensive enterprises. All this allows to conclude that the problem under consideration is systematic within the high-tech industry and determines the relevance of research aimed at finding the implementation of highly effective methods for improving the quality level of IS, based on the application of advanced IT achievements in organizations.

The development of the most effective methods for improving the quality level of IS is possible only on the basis of a comprehensive assessment of the current level of quality. In this case, fundamental importance is given to the establishment of quality requirements based on a comprehensive analysis of the organizational and technical characteristics inherent in a particular high-tech enterprise.

In this regard, as the main object of study to determine the direct requirements to the quality level of IS, «Scientific and technological center of unique instrumentation of the Russian Academy of Sciences» (STC UI RAS) was selected which has a global priority in fundamental and applied research in the field of scientific instrumentation and optics [7].

To determine the basic requirements for the quality level of IS, STC UI RAS was considered as a complex organizational and technical system (OTS) with its inherent set of characteristics and active relationships between them.

Results

As a result of a comprehensive analysis of the external and internal characteristics of the development of OTS by the example of the enterprise under study, the main requirements for the level of quality of IS were identified and the final model of the accounting system for these requirements was built (Fig. 1).

It is established that the totality of all requirements for the quality of IS consists of 2 main groups, classified by degree of origin and level of influence, the quality of IS.

Figure 1. The model of the system for accounting the requirements for the IS quality of a modern high-tech enterprise.
The final integration of groups of indirect and direct requirements finds its final expression in the personnel requirements for the IS quality, since it is personnel that is the main consumer of IS of a high-tech enterprise.

In this regard, it becomes necessary to conduct an accompanying comprehensive study of personnel requirements for the IS quality at workplaces of specific stages, taking into account the specifics of creating high-tech products.

The final set of requirements for the required level of IS was formed as a result of the comprehensive analysis of the current specifics of the production of high-tech products within STC UI RAS, as well as the personnel requirements for the IS quality:

1. A high degree of compatibility between ACS and ADS in the integrated information environment (IIE) of a high-tech enterprise.

In modern high-tech enterprises, a large number of ACS and ADS of various functional and technical purposes are widely sold, the main purpose of which is to ensure the effective work of personnel with the information resources of the enterprise. In this regard, the implementation of this requirement becomes especially important, since the effective creation of high-tech products becomes impossible without a high degree of information compatibility of data on separately executed processes of the organization.

2. High efficiency of information monitoring of technological processes.

Information monitoring allows continuous monitoring of the emergence of new information about the processes of the product life cycle for given information flows in a fixed thematic field for analysis, management, and prediction of its development [8]. Fulfillment of this requirement becomes necessary in the context of the implementation of the ideas of continuous information support for the product life cycle, which is consistent with the main task of IS in modern high-tech organizations.

3. The maximum possible degree of implementation of simultaneous group work of personnel in ACS with large amounts of information.

Ensuring the joint work of personnel during the implementation of research and development works becomes the main factor in reducing time and costs in the development of high-tech products.

4. High speed of obtaining information about created high-tech products at any stage of its life cycle.

The speed, at which information is received by the organization’s personnel, plays a crucial role in determining the competitiveness of an enterprise. The fulfillment of this requirement allows ensuring the effectiveness of the existing material and technical base and information flows in the enterprise involved in the processes of information transfer.

5. The prevailing position of electronic data interchanges in organizations.

The widespread use of electronic forms of documentation and the rejection of paper media is becoming one of the priority areas for the development of information technologies in the modern world [9-10]. The implementation of this indicator will help to form the basis of measures for material and technical equipping of the necessary ACS by the organization, as well as determine the need for organizational measures aimed at training personnel to work with the electronic documentation form.

Conclusion

Thus, accounting of the requirements given above, while informing high-tech industries, can serve as the development of widespread study and solution of existing problems of high-tech organizations’ IS and ensuring the required level of quality of processes for creating high-tech products.

It should be noted the need to develop methods for quantitative assessment of requirements, as well as their possible supplement as further ways of research aimed at improving the quality of IS of high-tech organizations.

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