

12-18-2020

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Recommended Citation

Kuznetsova, Victoria; Dovletova, S.B.; Raximov, Mixriddin; Muxtorova, Gulnora; and Yelena, Kim (2020)

"THE ALGORITHM PROJECT RESEARCH AND MODELING OF INFORMATION SYSTEMS," *Bulletin of TUIT: Management and Communication Technologies*: Vol. 3 , Article 3.

Available at: <https://uzjournals.edu.uz/tuitmct/vol3/iss2/3>

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THE ALGORITHM PROJECT RESEARCH AND MODELING OF INFORMATION SYSTEMS

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Abstract: Pre-project research is a strategic stage of the object design process, based on the results of which a decision is made on the level of competitiveness, development prospects, setting a task for the project, labor intensity and feasibility of creating a system in general.

The existing methods of pre-project research have a high degree of generalization and are practically not formalized in any way. The disadvantage of these methods is that they consider only specific individual prototypes and are aimed at finding solutions to current problems and eliminating individual shortcomings of a particular prototype. Thus, it is concluded that it is necessary to create a new cognitive technology for pre-project research in order to obtain the most complete information for this stage.

The article describes an algorithm for conducting pre-project research and modeling of information systems. The implementation of this algorithm is required to solve the current scientific problem of improving the effectiveness of pre-project work on the creation of information and technical systems. The list of basic procedures necessary for carrying out pre-project work at the stage of conceptual design of information systems is defined.

The proposed methodology will increase the effectiveness of the modeling process and pre-project work when creating information systems by implementing a systematic approach to their analysis and synthesis.

INTRODUCTION

With the development of modern information technologies, they lead to a constant increase in the complexity of information systems (IS) created in various areas of the economy. Modern large projects-scale IP projects are characterized, as rule, by the following features:

The complexity description complexity (a sufficiently large number of functions, processes, elements and data elements and complex relationships between them), which requires careful modeling and analysis of data and processes;

The presence of a set of closely interacting components (subsystems) that have their own local tasks and purposes functioning goals (for example, traditional applications, related to processing transaction processing and solving routine tasks, and

Applications analytical processing applications (decision support solutions) that use unregulated data note requests large-volume data);

- lack of direct analogues, which limits the possibility of using any standard design solutions and application systems;
- the need to integrate existing and newly developed applications;
- operating in a heterogeneous environment on multiple hardware platforms;
- disunity and heterogeneity of individual groups of developers by skill level and established traditions of using certain tools;

In the design of information systems use 2 kinds of models: models "as is" ("as-is") reflect existing at the beginning of modeling the situation in the environment in which to implement the system; designers should understand how the organization operates, using the information system, to identify bottlenecks; the model of "how it should be" ("as-to-

be") propose measures to optimize the current situation. In the process of working on the model of IP tasks are solved with the help of more specific kinds of models: the Functional model describes the principles of operation of the serviced system, its structure, connections within it; Event-driven model reflects the information processes in the system: its state and the transition from one to the other, the conditions for such transitions, the sequence of events; Visual models graphically show the structure of the system, sequence of processes, the relationship between used inside the IP data.

The following types of models are used in domain modeling structured, weakly structured, formal, unstructured, and data models [4].

Instructured models, the regular structure of the subject area is distinguished. Here, entities of the same type with the same set of properties are selected, and binary and nary relationships are built between different types of entities. An example of such an approach in modeling is object-oriented, which allows you to visually model not only the structure of the subject area, but also all the processes of interaction of certain types (in object programming, all operations with representatives of various classes or types of objects are called methods).

When using a structured approach, there are two levels of models: domain intensity and extension.

The initial stages of any project to create new objects of technology, such as prototype analysis and project concept development, related to the search for solutions to practical problems, to technical creativity, are currently called conceptual system design. Conceptual stages are characterized by low structuring of subject areas, multi-aspect processes, lack of sufficient quantitative information about their dynamics, vagueness, inconsistency, and variability of processes over time, which causes great uncertainty in the development of design solutions. Now the intellectual component in scientific and engineering training needs more attention, and the system

implementation of intelligent technologies should be based on the problem of novelty of the solutions being created [1]. Today, excellence cannot be achieved by importing high-quality technologies. It is implemented when new technologies are based on their own new ideas. Only in this case will our country be able to become a leader in the export of technologies, which will ensure its advantage in the knowledge economy.

By intelligent technology, we will understand a set of methods and tools for generating ideas, building conceptual solutions based on them, researching these solutions, and designing innovative products with protectability based on them protection capacity.

The implementation of such products should ensure their competitiveness in practical use.

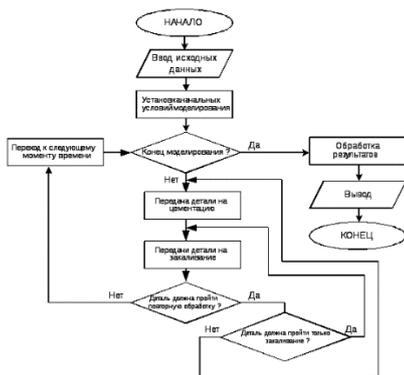
The purpose of this work is to compile a list of basic procedures for conducting pre-project research in the design of information systems, determine their specifics, and create tools for conceptual design of information systems.

The existing methods of pre-project research [2] have a high degree of generalization and are practically not formalized in any way. In particular, a vivid example is the description of GOST 34.601-90. The disadvantages of existing methods include the fact that they consider only specific individual prototypes and are aimed at finding solutions to current problems and eliminating individual shortcomings of a particular prototype they rely on a subjective definition of goals and problem setting. As a result, there is no complete analysis of trends in the development of a class of systems, which is reflected in the complex shortcomings of existing prototype systems for the current state of technology.

Thus, it was concluded that it is necessary to integrate the advantages of each of the considered approaches in order to increase the effectiveness of pre-project research procedures in relation to the subject area of information systems design and development.

Technical and information systems belong to the class of artificially created objects that perform one main and many additional functions, are multi-element and hierarchical. To determine the structure and functioning of such systems, there are many schemes and methods [3-5]. The use of system analysis in the construction of information systems makes it possible to select a list and indicate the appropriate sequence of interrelated tasks that allow us not to lose sight of important aspects and connections of the studied object of systematization. The developed methodology of pre-project research and modeling was based on a conceptual description of technical systems made by the following authors Polovinkin A. I.[3]: main useful function, functional structure, operating principle, technical solution, parametric Solution:

Figure 1. Generalized algorithm for conducting pre-project research solution.



However, for the conceptual design of information systems, a group of necessary definitions should be proposed.

Information system – a software and hardware system designed to automate the purposeful activities of end users, providing, in accordance with the processing logic embedded in it, the ability to receive, modify and store information.

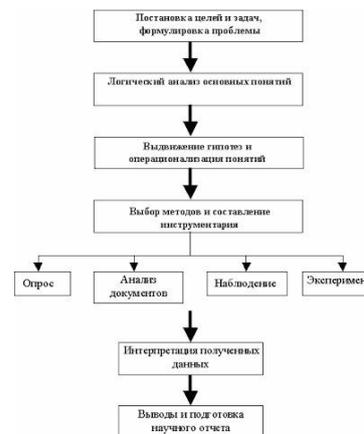
The main useful function, or need – is the Central function that the information system is designed to perform.

Functional structure – a set of descriptions of functional requirements and procedures for allocating functional software for information system systems.

Operating principle – a sequence of actions based on transformations of data flows that ensure the required functioning of the system.

A technical solution is a semantic description of an information system with an indication of its functional structure and functioning algorithm.

Figure of unoq. 2. Description of the analysis and research stage



Prototypes A generalized algorithm for conducting pre-project research and modeling of information systems, which includes a recurrent sequence of events shown in figure 1, was developed for the development of prototypes of these definitions.

Based on the above generalized algorithm, a description of the prototype analysis and research stage was developed, which is shown in figure 2.

Based on the proposed algorithms, you can create a tuple of design levels to which they are applicable: $K=(T, E, R, S)$, where T is the concept for the main function; E is the concept for the functional structure; R is the concept for the principle of operation; S is the concept for the technical solution.

Thus, to determine the trend in the development of pre-project research stages, it is necessary to use the proposed algorithms for each research object. The practical value lies in the fact that tools for conducting pre-project research have been developed.

The General sequence of actions when designing an information system in accordance with the selected stages was tested on the example of the design and development of a number of computer complexes and systems for which certificates of registration of programs in the Internet were obtained Uzpatent: №№ 0010617432, 21106121, 3010682050, 05011615113, 20216164, 2020614137 etc. For example, the program of psycho semantic analysis and visualization of sound, which corresponds to Federal law No. 217 "on the protection of children from information harmful to their health and development" (SVID. № 202016441) [4].

The proposed concept of a new methodology for pre-project research and modeling of information systems meets current trends in education, providing a modern level of training of specialists.

CONCLUSION

Among other things, the proposed methodology makes it possible to increase the

effectiveness of the modeling process and pre-project work when creating information systems by implementing a systematic approach to their analysis and synthesis.

The presented sequence of actions for the conceptual design of information systems differs from the known ones by the presence of a hierarchical recurrent set of logical-heuristic procedures with an iterative nature of actions that use methods for synthesizing new solutions. If this algorithm is implemented, it is possible to solve the actual scientific problem of increasing the effectiveness of pre-project work on the creation of technical systems by implementing a systematic approach to the synthesis of a conceptual scheme. The expected results can significantly supplement the technologies of designing and implementing information and technical systems with relevance.

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