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Article

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DEVELOPMENT OF A RISK MANAGEMENT METHOD FOR DEVELOPMENT PROJECTS OF PROVIDERS OF HOUSING AND UTILITY SERVICES

The object of research in the work is the processes of anti-risk management of projects for the development of providers of housing and utility services (PHUS). Particular attention is required to limit the management of the activities of the PHUS, related to the specifics of the housing and utility services sector. They have a significant impact on the need for the PHUS to constantly adjust the direction of efforts. They force companies to constantly monitor the progress of their projects and redirect resources. The priority should be development projects with the highest and fastest financial results with minimal risks. An essential lever for improving the effectiveness of anti-risk management in the projects for the development of PHUS is the possibility of adjusting the priorities for the implementation of these projects as much as possible in real time.

This study developed a method of anti-risk management of development projects for housing and utility services providers, which consists in integrating such approaches into a single process, such as the implementation of management automation and decision-making algorithms. As well as the implementation of a process approach in risk management and decision making; implementation of benchmarking; and building a dynamic organizational structure for managing development projects.

The scheme of the method of anti-risk management of projects for the development of housing and utility services providers includes the following steps:

– formation of a register of projects for the development of providers of housing and utility services;

– identification of limitations of projects for the development of providers of housing and utility services;

– implementation of automation of management and algorithmization of decision-making in the management of projects for the PHUS development;

– application of a process approach in risk management and decision-making in the management of projects for the PHUS development;

– building a dynamic organizational structure for managing development projects;

– implementation of benchmarking in the management of projects for the PHUS development;

– adjusting the PHUS priorities for the implementation of development projects in real time;

– increasing the effectiveness of anti-risk management by directing the main resources to the PHUS development projects with minimal risks and the most significant economic result.

The integration of all the above blocks into the anti-risk management of PHUS development projects makes it possible to increase the efficiency of managing these projects by directing the main resources to them with minimal risks and the most significant economic result. This, in turn, will improve the performance of providers of housing and utility services in terms of increasing income and reducing costs.

Keywords: *project approach, development projects, providers of housing and utility services, anti-risk management, integrated assessment.*

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1. Introduction

The success of management of projects for the development of housing and utility services providers depends on timely and high-quality anti-risk management. Based on the results of studies conducted in [1], the features of management of development projects for providers of housing and utility services were identified. The papers [2, 3] developed conceptual, functional, mathematical and informational models of anti-risk management of projects for the development of providers of housing and utility services, taking into account the identified features of managing these projects.

Anti-risk management of projects for the development of providers of housing and utility services should help improve the efficiency of managing these projects through the implementation of:

– automation of control and algorithmization of decision-making [4, 5];
– prototyping of possible alternative solutions [6, 7];
– A/B testing and selection of the best solution [8, 9];
– implementation of a process approach in risk management and decision-making [10–12];
– building a dynamic organizational structure for managing development projects [13, 14];
– implementation of benchmarking [3, 15, 16].

Therefore, the development of models of anti-risk management of projects for the development of housing and utility services providers is an urgent task.

The aim of research is to develop a method of anti-risk management of development projects for providers of housing and utility services.

2. Materials and Methods

The object of research in the work is the processes of anti-risk management of development projects for providers of housing and utility services.

The conceptual model of anti-risk management of projects for the development of housing and utility services providers [2] is the basis for further research on improving the PHUS efficiency.

Particular attention is required to limit the management of the PHUS activities, related to the specifics of the housing and utility services sector. They have a significant impact on the need for the PHUS to constantly adjust the direction of efforts. They force companies to constantly monitor the progress of their projects and redirect resources. The priority should be development projects with the highest and fastest financial results with minimal risks.

An essential lever for improving the effectiveness of anti-risk management in the projects for the PHUS development is the possibility of adjusting the priorities for the implementation of these projects as much as possible in real time [2, 3], which, in turn, will improve the performance of providers of housing and utility services in terms of increasing income and reducing costs.

In the context of increasing revenues, PHUSs are overwhelmingly focused on two directions – the development of sales technology and the development of new products. Sales technologies are understood as distribution channels, advertising strategy, customer communication technologies (contact center, website, mobile applications, chat bots, etc.). New products may include new services, tariff plans, equipment, etc.

In terms of cost reduction, PHUS is also quite predictable. This includes the development of work with personnel, the implementation of the latest technological solutions, the development of accounting and document management.

The development of work with personnel includes a constant search for promising employees and training of personnel (mastering new technologies, reducing errors in work, increasing the efficiency in everyone's work, interaction, life safety).

The implementation of new technological solutions is most often aimed at reducing the cost of work. It consists in increasing the productivity of technical personnel, improving the quality of work, which significantly reduces claims and warranty cases.

The development of accounting and document management for PHUS also has its own specifics. This area usually includes the conclusion of contracts with subscribers, the establishment of seals for serious reporting, accounting for meter readings, etc.

Optimization of logistics in PHUS includes routing orders for masters, delivery of necessary equipment to subscribers, distribution of paper documents (invoices, contracts), etc. Constantly require attention and resources to meet the modern requirements of customers.

3. Results and Discussion

In this study, a method of anti-risk management of projects for the PHUS development is proposed, the scheme of which is shown in Fig. 1. Let's consider a step-by-step scheme of the method of anti-risk management of projects for the PHUS development:

1. Formation of a register of projects for the development of providers of housing and utility services. This register can be formed using the example of the main directions of development projects shown in Fig. 2.

2. Identification of the limitations of development projects for providers of housing and utility services, which is carried out in accordance with the approximate list given in [2]. In particular, the limitations of the SCPP may include the following:

– budget programs are significant in the structure of income;
– slow decision-making along the leadership vertical;
– geographical disunity of structural divisions;
– depreciation of the material and technical base;
– administrative pressure from the state;
– a high level of formalities;
– strong state regulatory policy;
– violation of the rhythm of financing;
– obsolete material base;
– import dependence;
– shortage and flow of personnel;
– inability to deploy a full-fledged project approach.

3. Implementation of automation of management and algorithmization of decision-making in the management of projects for the PHUS development. Algorithmization is the process of compiling algorithms for solving applied problems. The advantage of the algorithm is the certainty property of a finite number of iterations. The scheme of the process of automating management and algorithmization of decision-making in the management of projects for the development of the PHUS decision-making of the PHUS with minimization of risks and uncertainty in a general form is shown in Fig. 3.

Fig. 3 shows that the rational process of solving problems and tasks [4, 5] includes certain stages (if necessary) performed simultaneously, in parallel, iteratively, with a return to the previous stages.

The process of automation of management and algorithmization of decision-making in the management of projects for the PHUS development includes the following steps:

Step 1. Initiation of projects for the PHUS development. At this step, the project team initiates the implementation of the projects for the PHUS development, previously included in the register, taking into account their limitations.

Step 2. Filling in the information base for managing development projects. This step allows to determine all historical information about the implementation of previous projects and information about current projects in order to include it in the management information base.

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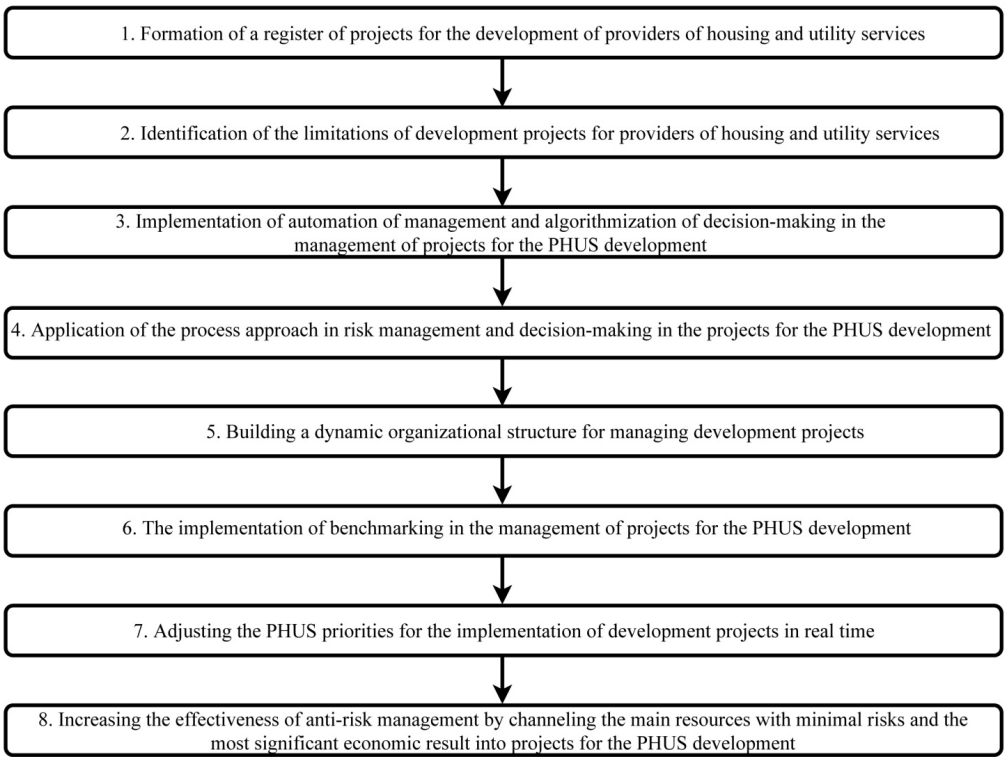

Fig. 1. Scheme of the method of anti-risk management of PHUS development projects

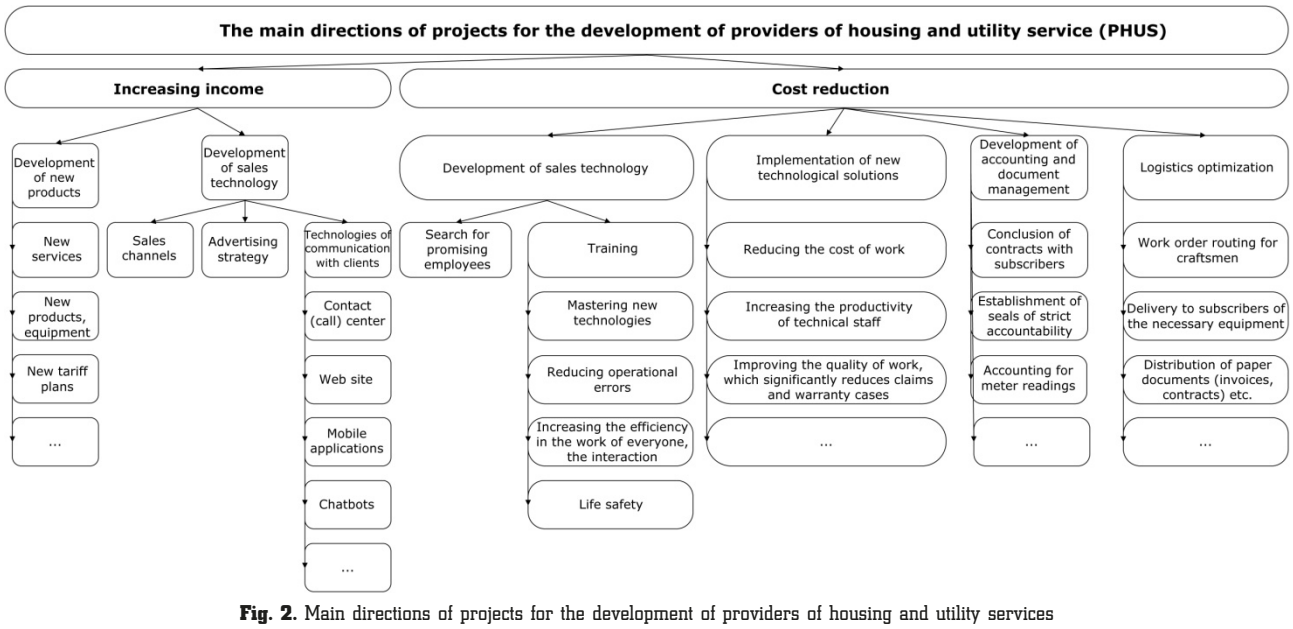

Fig. 2. Main directions of projects for the development of providers of housing and utility services

Step 3. Identification of problems and setting goals. At this step, it is necessary to identify all the problems associated with the planning and implementation of development projects, as well as determine the goals for their elimination.

Step 4. Finding the right information. Before making any decision, it is necessary to collect as much information as possible on the actual problem, including from the information base for managing development projects. If it is not enough, then it can be obtained from stakeholders, other people from the Internet or books, from other extraneous sources. This will expand the vision of the problem, highlight the details and subtleties of the issue that were not noticeable at first, and make the understanding of the situation more objective. It will be possible to evaluate all the pros and cons of the available options.

Step 5. Prototyping possible alternative solutions. This is the stage of product/service development in order to check the suitability of the proposed alternative solutions for use, as well as to provide information about them to the customer in the early stages of the development process [6, 7]. Allows getting feedback from future users when it is most needed: at the beginning of the project – when there is an opportunity to correct design errors with almost no loss. The prototyping process usually consists of the following steps:

1) determination of initial requirements; development of the first version of the prototype;

2) studying the prototype by the customer and end users, receiving feedback on the necessary changes and additions;

3) reworking and improving the prototype, taking into account the comments and suggestions received, both the specifications and the prototype are changed, after which the last steps can be repeated.

Prototyping has the advantage of reducing development time and cost by allowing prototype evaluation to identify inadequacies or nonconformities at an early stage. The later changes are made, the more expensive they are, because the cost of making changes to the product increases non-linearly over time, so clarifying «what users/customers really want» in the early stages of development reduces the overall cost.

Prototyping is widely used in projects with a significant IT-component, and their component in PHUS is becoming more significant, for which the corresponding special software tools have been developed. The involvement of the customer in the development process also plays a psychologically important role. Working with a prototype allows users of future services to see how they will look like and influence the functionality in a timely manner, which reduces disagreements between PHUS and HUS users. The same applies to situations where customers are internal divisions.

Step 6. Formation of decision evaluation criteria. At this step, it is necessary to describe in more detail the results for each possible alternative solution, as well as develop a system of criteria for their evaluation, in particular, within the framework of the designations «normal» or «bad», and also financially characterize «included in the budget» or «too expensive», but other evaluation criteria may be used.

Step 7. Development of indicators and criteria for monitoring the implementation of decisions. This step should also be devoted to the development of indicators and criteria for monitoring the implementation of decisions.

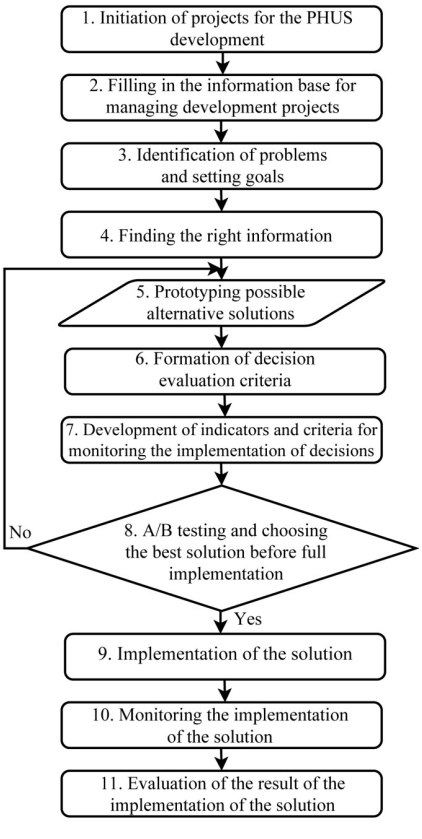

Fig. 3. The process of automation of management and algorithmization of decision-making in the management of projects for the development of providers of housing and utility services

Step 8. A/B testing and choosing the best solution before full implementation. The essence of A/B testing [8, 9] is that the control group of elements is compared with a set of test groups in which one or more indicators have been changed. To understand what changes improve the target. Thus, the test compares option A and option B, and the goal is to determine the best of the two options. The development and testing of A/B testing hypotheses allows to solve the following tasks: to understand the real needs, habits, behavior of users and the objective factors influencing them; reduce the risks associated with the influence of the subjective perception of the developer on the decisions made; properly allocate resources using effective solutions.

The following elements are often tested using this method: text content (content, structure, volume, font); design, dimensions, location of conversion buttons and forms; logo and other corporate identity elements; design and layout of web pages; product price, various discounts and promotions; unique selling proposition; product images and other visual materials.

A/B testing steps:

1) definition of goals;
2) definition of the metric;
3) development of hypotheses;
4) preparation and conduct of the experiment;
5) analysis of results, conclusions.

The described approach makes it possible to test/adapt services for PHUS subscribers: after all, the logic of the service provider may not always be clearly perceived by users. Often, improvements are required during A/B comparisons. In the business activities of PHUS, this most often concerns promotional materials, package offers, contact center scripts, etc.

If the solution is suitable, then go to *Step 9*, otherwise go to *Step 5*.

Step 9. Implementation of the solution. In the case when the decisions are approved, the PHUS development project team proceeds to their implementation.

Step 10. Monitoring the implementation of the solution. In this step, the development project team monitors the implementation of the proposed solutions.

Step 11. Evaluation of the result of the implementation of the solution. This step is dedicated to evaluating the results obtained from the implementation of the proposed solutions.

Therefore, the process indicated in Fig. 3 combats many of the factors that can lead to bad decisions, such as wrong assumptions. Helps to minimize risk and uncertainty.

4. Application of the process approach in risk management and decision-making in the projects for the PHUS development. Given that all projects, including development projects, exist in environments with varying degrees of uncertainty [10, 11, 17]. Hidden behind uncertainty are threats and opportunities that project teams explore, evaluate, and decide what to do about them. In the process of planning and implementing projects for the PHUS development, when making decisions taking into account the impact of risks, it is necessary to perform the following steps [10, 12, 14]:

1) *definition of the problem (uncertainty or risk)*. The problem lies in some deviations from the expected course of events. The process of identifying a problem is to find it. Problem identification is the process of realizing that some kind of problem exists. Sources from which a manager may become aware of the existence of a problem include personal review, analysis of data and documents of the

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PHUS, as well as public opinion (including the opinion of service users and their comments). The opinion of managers and their subordinates is also an important source of problem identification. Managers often begin to grasp the core of a problem from two or more sources;

2) *goal setting*. The definition of the problem is followed by the setting of goals, which are the basis for the future solution. The manager should ask itself the question: «What do I hope to achieve with this decision? And what is meant by it?»;

3) *development of alternative solutions*. This process is carried out in order to find the best possible solution, taking into account all the factors influencing the decision-making process. This helps prevent choosing the first solution. Instead of being considered separately from each other, the solutions are considered together;

4) *choice of alternative*. At this point, the manager should ask itself a question about each alternative: «Is this solution better?». To answer this question, the manager must carefully assess the breadth of the alternatives. The expected effect of each option should be listed, along with an estimate of the likelihood that this effect will occur. The positive and negative outcomes of each alternative must be foreseen. At this stage, such well-known tools as: SWOT-analysis, PEST-analysis, decision tree construction, brainstorming method, peer review method, etc. can be used;

5) *implementation of the alternative*. The choice of an alternative presupposes its implementation, that is, the implementation of the decision. Many factors are involved in the implementation of the decision, in particular: the declaration of an alternative; issuance of the necessary orders; assignment of specific tasks; allocation of resources; monitoring the implementation of the decision; making subsequent decisions taking into account current ones;

6) *evaluation of the results of the decision*. Once a solution is implemented, managers must evaluate its effectiveness. Has the solution reached its goal? Was it cost effective? Has it opened the horizons of growth for a higher education institution? Do subordinates agree that this is a productive decision? What difficulties did you encounter in solving it? If the decision is judged to be ineffective, the manager may be faced with the choice of another alternative or create a new list of alternatives. If the solution is judged to be effective, the manager must review the elements that made it so. The experience of making and implementing each decision becomes an invaluable part of managerial experience. It will be reused for future decision making. Particularly difficult decisions require more effort than thinking about doubts and risks. In this case, a decision tree will help, showing the essence of the decision and the relationship of choice with doubts.

5. Building a dynamic organizational structure for managing development projects. At this stage, it is proposed to improve the method for the formation of a dynamic organizational structure for managing projects for the PHUS development, which includes the following stages (Fig. 4) [14, 18, 19].

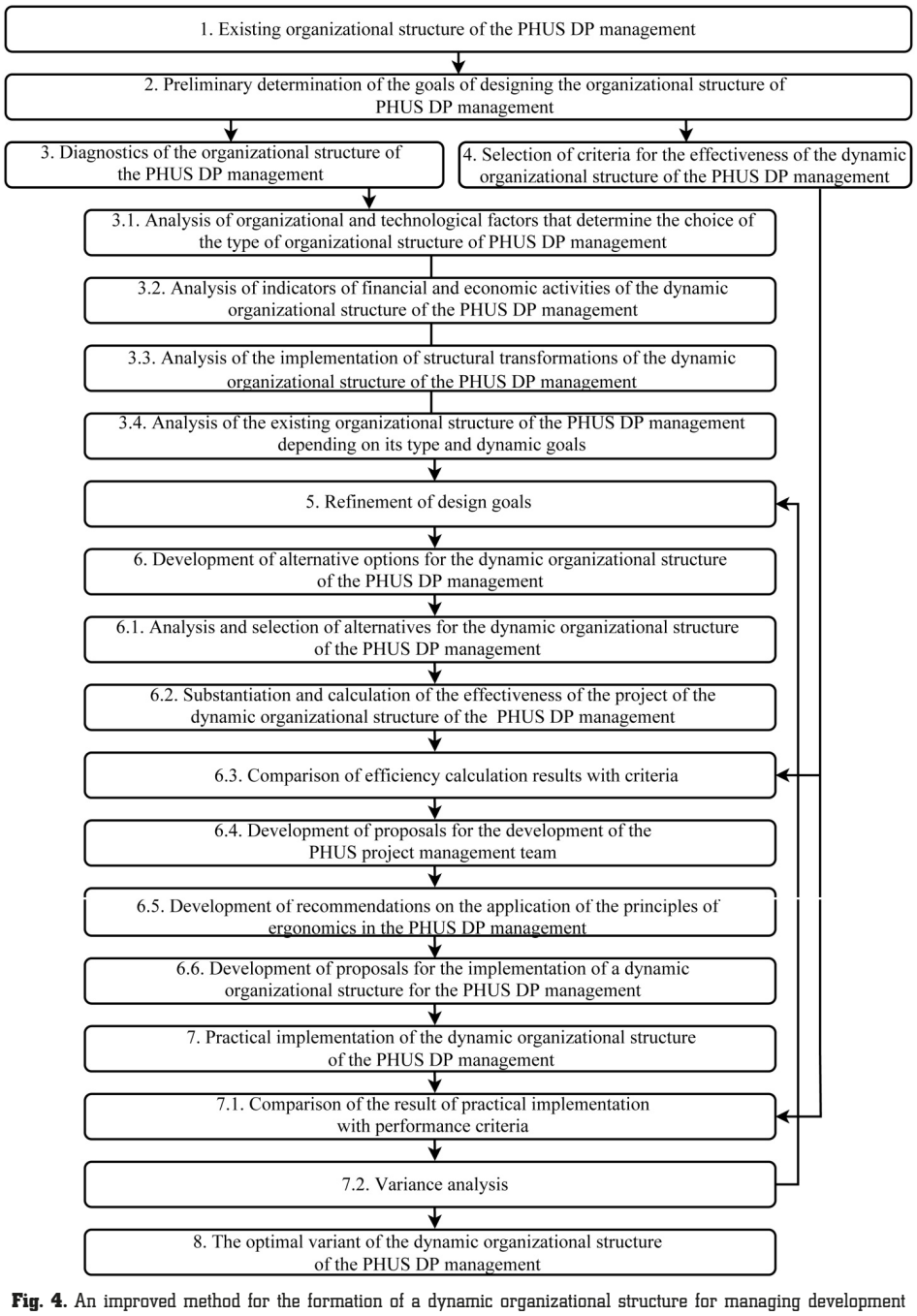

Fig. 4. An improved method for the formation of a dynamic organizational structure for managing development projects for providers of housing and utility services

6. The implementation of benchmarking in the management of projects for the PHUS development. The algorithm for the implementation of benchmarking in the management of projects for the development of providers of housing and utility services is shown in Fig. 5 [15, 16, 20].

7. Adjusting the PHUS priorities for the implementation of development projects in real time. At this stage, the author proposes the use of a mathematical model of anti-risk management of projects for the PHUS development, which is given in [3] by calculating the integral assessment of the *i*-th project using the formula:

$$Int_i = \frac{Inc_i}{Inv_i + Risk_i}, \text{ provided that } Int_i \to \max,$$

where Int_i – the integral estimate of the *i*-th project; Inc_i – the possible income of the PHUS from the implementation of the *i*-th project; Inv_i – the investment component of the *i*-th project; $Risk_i$ – the total possible losses from the occurrence of the risk of the *i*-th project.

The result of this stage is the adjustment of priorities based on the models and methods developed by the author for anti-risk management of projects for the PHUS development [3].

8. Increasing the effectiveness of anti-risk management by channeling the main resources with minimal risks and the most significant economic result into projects for the PHUS development. This stage consists in the redistribution of resources in the projects for the PHUS development, taking into account the minimum impact of risks on them and obtaining the most significant economic result.

Thus, the development of a method of anti-risk management of projects for the development of providers of housing and utility services has shown its promise. The developed integrated approach to the management of projects for the PHUS development will allow the managers of these projects, through their implementation in practice, to increase the efficiency of their management. Particular attention is required to study the PHUS activities in order to identify their features and limitations, which in the future will make it possible to develop the correct strategy for planning and implementing development projects.

4. Conclusions

This study developed a method for anti-risk management of development projects of housing and utility services, which consists in integrating the following approaches into a single process:

– implementation of management automation and decision-making algorithms;
– implementation of a process approach in risk management and decision-making;
– implementation of benchmarking;
– building a dynamic organizational structure for managing development projects.

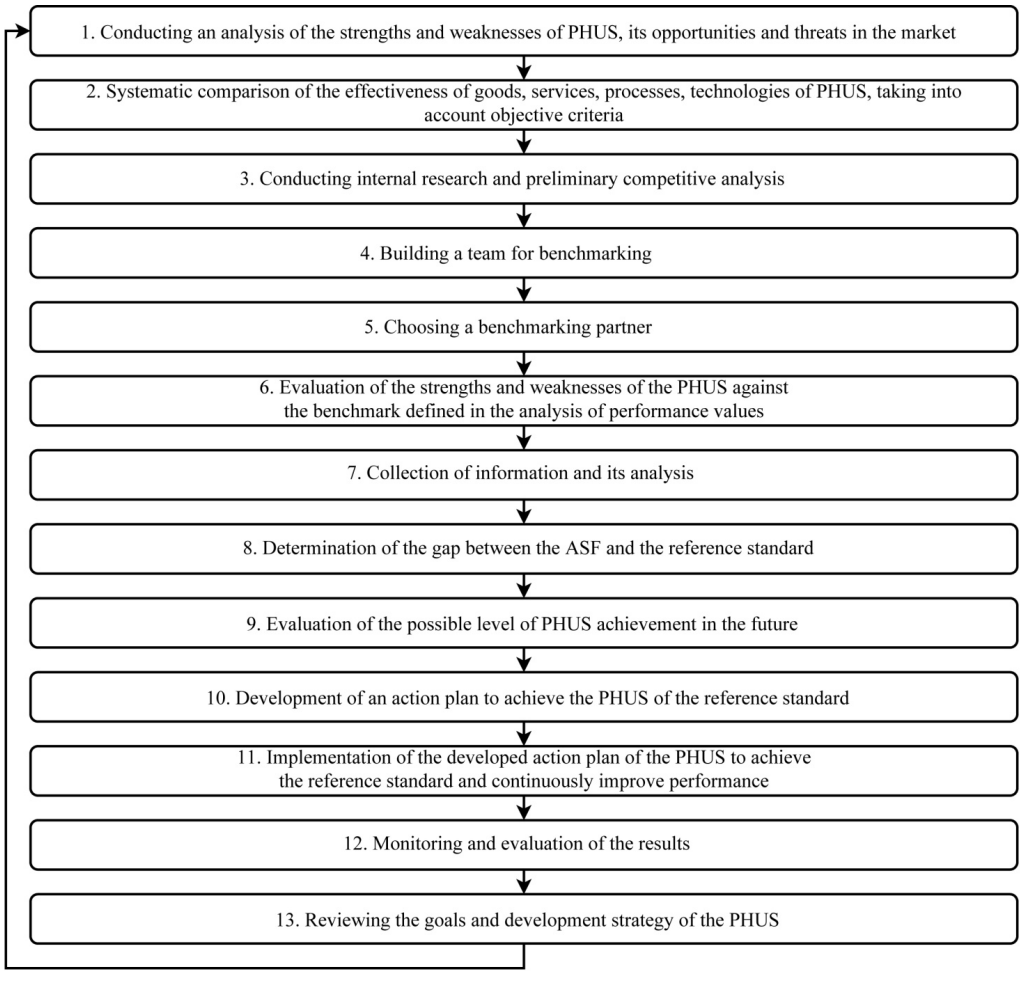

Fig. 5. Algorithm for the implementation of benchmarking in the management of development projects for providers of housing and utility services

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The integration of all the above blocks into the anti-risk management of PHUS development projects makes it possible to increase the efficiency of managing these projects by directing the main resources to them with minimal risks and the most significant economic result, which, in turn, will improve the performance of providers of housing and utility services in terms of increasing income and reducing costs.

Conflict of interest

The authors declare that there is no conflict of interest regarding this study, including financial, personal nature, authorship or other nature that could affect the research and its results presented in this article.

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Data availability

Data will be provided upon reasonable request.

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