USING OF THE MECHANISM OF THE PROCEDURE OF THE DYNAMIC SYSTEMIC ANALYSIS FOR THE UNCERTAINTY MANAGEMENT IN THE HOUSING AND PUBLIC UTILITY SECTOR

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Abstract. The article demonstrates the importance of the modernization and development of the housing and public utility (HPU) sector in terms of sanction restrictions. Was substantiated the appropriateness of the representation of this area as a complicated dynamic system, within frames of which are woven together interests of many agents, representing more than twenty kinds of economic activities and implementing its production functions in terms of uncertainty. Were revealed main sources and factors of the uncertainty. Was offered the new mechanism for the uncertainty management in economic activities of HPU agents – by means of procedures of the dynamic systemic analysis. Was offered the short description of its functioning. The opinion was made that the offered mechanism can be considered as a flexible instrument, providing for the formation and implementation of programs for the modernization and development of the HPU of a certain municipal entity, while taking into consideration uncertainty factors, as well as in the form of sanction restrictions, impacting economic activities of agents of this area.

Keywords: housing and public utility, uncertainty factors, sanction restrictions, mechanism of the management.

All levels of the development and implementation of strategies’ management and of programs of the economic development of branches of Russian economics with the clear orientation to the import substitution caused the implementation in the period of since 2014 till the present time of various “packages” of sanction restrictions against our country as a whole, as well as against certain legal entities and individuals [7]. In such conditions such branches of economics, which are less dependent from the impact of such external factors as sanction restrictions became of paramount interest for investments of the Russian private business. To such branches can be referred the HPU sector, as the impact of sanction restrictions almost does not show on its functioning or its impact is minor. In fact, provided that more than 80% of the population of the our country have already became homeowners [5], the demand for the quality dwelling and due quality housing and utilities services (HUS) for many years remains stably high and stably predictable. In other words, in the current context it is difficult to find another area with such a huge potential for the investment, the high probability of its return and of the obtaining of the additional profit. It can therefore be said that HPU sector becomes rather attractive for private investors due to its minimal vulnerability for sanction restrictions, as well as to its step by step transformation to the large scale and permanently growing market, where additional profit can be gained.

Nowadays HPU sector can be considered as a sophisticated dynamic system, within which frames are woven interests of many agents, representing more than twenty kinds of economic activities and implementing its production functions in terms of uncertainty. The uncertainty is created by the simultaneous influence on HPU sector agents of numerous undetermined factors, which appearance does not depend on activities of agents itself, as well as by the variety of interests of its economic activities in this area, caused by the aiming to the additional profit. In this juncture it seems expedient to drill down uncertainty factors in order to offer existing or to develop new mechanisms of its consideration in activities of economic agents in the field of HPU sector.

Materials and methods
As it has been mentioned above, HPU sector is a sophisticated dynamic system, functioning under the simultaneous influence of a huge number of external and internal uncertainty factors [2].

To external uncertainty factors we will refer such, which HPU sector economic agents cannot influence independently. The main source of appearance of external factors is, on the one hand, in the unfinished process of the market transformation of the national economics’ structure, and, on the other hand, that HPU sector economic agents comprise more than twenty branches of economics. So, economical activities of HPU sector economic agents are simultaneously influenced, on the one hand, by the mass of factors of the general social & economic instability, which appearance has been caused by continued processes of the market transformation of the structure of the national economics, and, on the other hand, - the mass of factors, referred to branch peculiarities of the functioning of agents from this area. Such influences usually stipulate the transfer from the scheduled to chaotic development of any economic systems, including HPU sector. With that most managerial solutions are online ones and the strategic vision of prospects of the HPU sector development is out of the question. As an example of main sources of the external uncertainty factors can be highlighted the instability of the tax legislation, as well as different branch innovations, hiding poorly substantiated overflows of financial resources between different levels of budgets. The influence of external uncertainty factors on the HPU sector mainly shows by the restriction of the budget financing of different development programs.

To another group let’s refer internal uncertainty factors, taking place inside the HPU sector itself and mainly referred to contradictions of interests in activities of its economic agents. In fact, provided that HPU sector economic agents comprise more than twenty branches of economics, it does not seem possible to establish the whole set of cause-effect relations of its interaction with the provision of the total functioning of the whole HPU sector. The large number of members drastically enhances the influence of the so called behavioral factor as a source of the internal uncertainty. Naturally, in terms of market economics each economic agent of the HPU sector enjoys almost full freedom at the selection of prospects for its development. This circumstance stipulated the growth of the uncertainty in methods of economical activities of HPU sector economic agents, its motivation level in such or such managerial decisions, as well as in the substantiation of its expedience [1].

So, uncertainty reasons are referred both to the influence on the HPU sector of numerous undetermined factors, as well as to the insufficient knowledge of relations and dimensions of managerial solutions in the course of activities of its economic agents. This opinion allows us two highlight two kinds of uncertainty:

1) uncertainty, caused by chance factors, or probabilistic uncertainty;

2) uncertainty, caused by the lack of the information, characterizing relations and dimensions of the interaction of HPU sector economic agents, or determined uncertainty.

There are no material differences between mentioned kinds of uncertainty, everything depends on a certain situation and on the information, disposed by the administrative apparatus of such or such economic agent for decision making.

Such or such factors are referred to chance ones, if for it is applied the main term of the applicability of probability methods – statistic stability. In practice that means that events, which result has not been determined beforehand, if terms of its implementation are repeated, will show the trend to the stabilization near some value of the frequency of such kind of events. In other words, an event can be referred to chance ones, if at numerous repeating of terms of its occasion the frequency of the obtained result will aim to a certain limit. Such statistic stability allows to apply to chance event the mathematic calculus of probability and allows to obtain results of calculation, acceptable for the reality. That means that the uncertainty itself of a result of such or such event cannot serve enough reason to consider such event as a chance one. Methods of calculus of the probability can be
used only if a statistic stability can be applied to an uncertain event [4].

If there is no statistic stability or if there is no data to check its presence, uncertainty factors should be considered as determined ones. With that the same factor can in certain conditions be considered as chance one and in other – as uncertain one, everything depends on the information, disposed by the economic agent’s administrative apparatus for the decision making.

Notwithstanding different sources of the appearance of uncertainty factors, the result of its influence is the same. The uncertainty, caused by both external and internal sources, causes the incompleteness and the incorrectness of the information on terms of the function of HPU sector and of its economic agents, real relations and dimensions of its interaction within frames of the system. That’s just why the ignoring of the influence of uncertainty factors often causes negative results.

Results and discussion

Processes of HPU sector modernization and transfer to market principles of economical activities of its economic agents are accompanied by the high level of instability and uncertainty of obtaining of final results. To take into account the uncertainty in activities of economic agents of HPU sector it is offered to use the mechanism of the procedure of the dynamic systemic analysis. In terms of uncertainty the non-stop mechanism of this procedure allows to evaluate the current status of the HPU sector of a certain municipal entity and generate rather promptly solutions, allowing to adapt the process of the modernization and of the development of the HPU sector to the achievement of certain strategic goals. As the mechanism of the procedure of the dynamic systemic analysis is based on the broad use of probability technologies, it will allow to form managerial solutions, optimal in the sense of probability, in terms of the a priori uncertainty.

The mechanism of the procedure of the dynamic systemic analysis is based on the model of the HPU sector functioning in market conditions, imitating the interaction of its economic agents with municipal management authorities, provided the implementation of development programs and of environmental influence factors [6].

The basic idea of the use of the dynamic systemic analysis procedure for the uncertainty management in activities of HPU sector economic agents is as follows:
- use of methods of the modeling of interactions of HPU sector economic agents;
- operative management of the HPU sector, based on the formation of systemic regulators;
- constant measurement and analysis of results of the current status of HPU sector reforming;
- synthesis of managing and regulating influences and the evaluation of its efficiency.

The mechanism of the procedure of the dynamic systemic analysis of the uncertainty management in activities of HPU sector economic agents has got two levels.

The first level corresponds to the interaction of municipal authorities in the field of HPU sector modernization by the determination of the set of dimensions, characterizing the level of its current development. The measurement of these dimensions through time is caused by the implementation of different HPU sector strategic development programs, provided the influence of external uncertainty factors, of which many cannot be objectively controlled.

The analysis of the current development of the HPU sector of a certain municipal entity is carried out in the block of the real efficiency evaluation (REA). As quite many dimensions are used to characterize the level of the current HPU sector development, such task as aggregation of such dimensions is solved first in the REA block. For these purpose all dimensions are divided into groups, in which a consolidate dimension is determined. The so determined set of consolidate dimensions allows to form the totality of the criteria, determining resulting characteristics of municipal programs for the HPU sector development and modernization [3].

The REA block, included in the mechanism of the procedure of the dynamic systemic analysis of HPU sector economic agents, is an important element for the uncertainty management, allowing to considerably decrease its level. Just this block accumulates
the information on the interactions of economic agents and environmental influence factors, as well as in the form of sanction restrictions. This allows to detail dimensions’ values, to reveal new interrelations between it, as well as to take into consideration external uncertainty factors. With that, in results, obtained with the mechanism of the dynamic systemic analysis procedure, it is also necessary to consider the present residual uncertainty.

The second level of the mechanism of the dynamic systemic analysis procedure is designed for the operative and strategic management of the development and modernization of the HPU sector of a certain municipal entity. It is based on the functional dimensional model of the HPU sector functioning, allowing to imitate its reactions on the implementation of such or such development programs, so forecasting expected consequences of its implementation. This model is designed for the description of the process of the HPU sector development and modernization in time and space. With that it allows to take into consideration the influence of different factors on the development of the HPU sector of a certain municipal entity, as well as to take in consideration its interaction. This circumstance allows to reveal different kinds of systemic effects and features, typical for separate subsystems within frames of the HPU sector dynamic system model.

To reflect uncertainty factors it is expedient to use the probabilistic uncertainty model, assuming a certain complex of chance events, taking place in similar conditions. That’s why in the mechanism of the dynamic systemic analysis procedure is formed the probabilistic model of the management of uncertainty factors within frames of the dynamic stochastic system of the HPU sector of a certain municipal entity.

The block of formation of programs for the HPU sector development of a certain municipal entity and the block of formation of systemic regulators are of huge importance for the second level of the mechanism of the dynamic systemic analysis procedure. HPU sector development programs of a certain municipal entity usually plan expected indices in physical terms. Besides that, it fixes the functional purpose of activities of HPU sector economic agents, its power characteristics and scopes of production. The implementation of these programs is sourced partially from the municipal budget and partially from extrabudgetary financing sources, attracted from potential investors.

In the block of systemic regulators is formed the set of rules of functioning and carrying out of economical activities by HPU sector economic agents within frames of a certain municipal entity. The set of these rules also can be broad enough, that’s why it is expedient to aggregate it by five basic groups: legal and regulatory, budgetary and fiscal, land, organizational, contracted. Such aggregation does not establish strict borders between groups, but only traces its functional purpose. The basic purpose of systemic regulators is the search for the compromise between the resource and financial procurement of all programs for HPU sector development and modernization in a certain municipal entity. With that systemic regulators itself most of all act as some restrictions, determining admissible diapasons, but without strict definition. The combination of development programs and of systemic regulators in the mechanism of the dynamic systemic analysis procedure serves as instrument for the management of the influence of uncertainty factors on activities of HPU sector economic agents.

The block for the correction of dimensions of programs for HPU sector development and modernization is the important element of the mechanism of the dynamic systemic analysis procedure. It is necessary to make periodic correction in basic dimensions of these programs, as in the course of its implementation such or such subsystem can get principally new features, which have not been earlier taken into consideration in the initial model. In such cases, in order to bring the initial model of the HPU sector development to the condition, adequate to the objective reality, basic dimensions of its development programs are being corrected.

**Conclusion**

As a result of the performed research it was established that HPU sector can be considered as a complicated dynamic subsystem,
within frames of which are woven interests of many agents, representing more than twenty kinds of economic activities and implementing its production functions in terms of uncertainty. Were revealed reasons of HPU sector attractiveness for private investors. Were determined main sources, kinds and factors of uncertainty, which should be considered at the evaluation of the efficiency of the development and modernization of HPU sector in whole and of its economic agents in particular. Was offered the mechanism of the uncertainty management in activities of HPU sector economic agents with the short description of the essence of functioning of its components.

So, the offered mechanism of the dynamic systemic analysis procedure can be considered as a flexible instrument, providing for the formation and implementation of HPU sector development and modernization programs for a certain municipal entity, while taking into consideration uncertainty factors, permanently influencing activities of economic agents in this area.

References
ИСПОЛЬЗОВАНИЕ МЕХАНИЗМА ПРОЦЕДУРЫ ДИНАМИЧЕСКОГО СИСТЕМНОГО АНАЛИЗА ДЛЯ УЧЕТА НЕОПРЕДЕЛЕННОСТИ В СФЕРЕ ЖИЛИЩНО-КОММУНАЛЬНОГО ХОЗЯЙСТВА

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Аннотация. В статье показана важность модернизации и развития сферы жилищно-коммунального хозяйства в условиях действия санкционных ограничений. Обоснована правомерность представления этой сферы в качестве сложной динамической системы, в рамках которой переплетены интересы множества агентов, представляющих более двадцати видов экономической деятельности и реализующих свои производственные функции в условиях неопределенности. Выявлены основные источники, виды и факторы неопределенности. Предложен новый механизм учета неопределенности в экономической деятельности агентов сферы ЖКХ — через процедуры динамического системного анализа. Представлено краткое описание его функционирования. Сделан вывод о том, что предложенный механизм можно рассматривать как гибкий инструмент, обеспечивающий формирование и реализацию программ модернизации и развития сферы ЖКХ конкретного муниципального образования с учетом факторов неопределенности, в том числе и в форме санкционных ограничений, которые оказывают негативное влияние на экономическую деятельность агентов этой сферы.

Ключевые слова: жилищно-коммунальное хозяйство, экономические агенты, факторы неопределенности, санкционные ограничения, механизм управления.