Strategic development and increasing the efficiency of construction expertise institution in Russia

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Abstract. Design documentation assessment of compliance to technical regulations and building codes requirements in the Russian Federation is carried out through the institution of construction expertise. Elaboration and expert examinations of design documents and the results of engineering surveys are some of the most important stages in the implementation of investment and construction projects, as they allow reducing technical, legal and financial risks of the construction manager. This activity is important for all participants in investment and construction activities, which makes it necessary to study the construction expertise institution in order to determine its main development directions. The article presents the internal and external environment analysis results of construction expertise institution in the Russian Federation. Strategic tools made it possible to identify strengths and weaknesses, threats and opportunities, to determine the main strategic development directions for the institution of construction expertise in the Russian Federation, in accordance with the Draft Strategy for construction industry development in the Russian Federation until 2030. The strategic directions for the development of the construction expertise institution provided by the roadmap included improvement of regulations in organization and production of construction expertise, digital environment development of the construction expertise institution, transition to construction engineering, improvement of educational activities and training for institutions carrying out expert activities, knowledge building. To assess the implementation of strategic directions we identified expected target indicators for three main development scenarios of the construction expertise institution in the Russian Federation.

1. Introduction
Activities in the field of organizing and carrying out expert examinations of design documentations in construction are some of the main activities in the framework of investment and construction projects, which indicates the need for transformation and development of the construction expertise institution.

The purpose of the study is to identify problems and main strategic directions for construction expertise institution development.

The object of the study is construction expertise institution.

The subject of the study is strategic management of construction expertise institution development.

The object and the subject of the study determined the list of tasks, namely:
• to evaluate the construction expertise institution by analyzing its internal and external environment;
• to determine strategic directions and to develop a roadmap for construction expertise institution development;
• to form the target indicators for construction expertise institution development.

2. Literary review and development of the hypothesis

At the present stage, in the expert community, the directions of construction expertise institution development have been little studied, since the development of the research object is directly related to the legislative and regulatory framework.

Nevertheless, at each stage of development, scientists and practitioners have been studying this issue within the framework of general principles, features, examination experience of design work studies: E P Shatalova, A P Krasovsky, V L Asanov, Z A Akhmedova, A Yu Butyin, I M Lebedev, A V Sokolov, E B Stativa, etc.

Certain scientific works have a technical focus with the identification of dependencies between the examination of design documentation and directly finished object of capital construction (V A Akristiny and D A Zharkov [1]). The implemented methods analysis of design documentation construction and technical expertise is presented in the works of scientists A Yu Bocharov, O A Mamaeva, and M V Serdyuk [2]. The transition to digital technologies, their advantages, features and difficulties are presented in the works of such authors as E A Antonovskaya and V O Petrov [3], V V Erkenova [4].

The analysis of the implemented methods for design documentation examination and (or) the results of engineering surveys are devoted to the works of V A Akristiny, D A Zharkov [1], D V Topchy [5], Yu S Yurgaitis [6], A D Popova [5] and others.

It should be noted that most of the studies consider highly specialized issues of design documentation expert examination, for example, in the work of I Zaychenko, A Borremans and S Gutman [7], the main emphasis is on the importance of design documentation and its expertise in high-rise construction, in the work of A V Mironov [8] examination of design documentation was considered for special-purpose facilities.

Foreign experience in the design documentation examination is presented in the works of E A Stupnikova, E P Shatalova [9].

Thus, we can conclude that the construction expertise institution has not been sufficiently studied due to its specifics (dependence on the object type), strong dependence on legislative and regulatory changes, as well as on the economic situation in the country.

Developed in accordance with the Order of the Russian Federation Government dated August 16, 2018 No 1697-r, the draft Strategy for the Construction Industry Development in the Russian Federation until 2030 [10] makes it possible to determine the benchmarks within the framework of the research in terms of formation, definition and substantiation of the main development directions of the construction expertise institution. At the same time, the draft strategy does not indicate specific measures for the development of the construction expertise institution, which determines the relevance of the study.

3. Data and research methods

For assessment and strategic planning of construction expertise institution development, taking into account external and internal factors, the authors used the methods of PEST and SWOT analysis, as well as road mapping technology.

The external factors that have the greatest impact on the construction expertise institution development (table 1) include the following:

• the activities of federal and regional authorities that carry out legislative regulation of expert activities;
• intensive development of digitalization in the construction and urban planning industry;
• development of requirements for professional activities in construction.
Table 1. PEST analysis of construction expertise institution.

| Factors                                                                 | Effects                                                                 |
|------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Imperfection of the current legislation in terms of power distribution between the examination bodies (Urban Planning Code of the Russian Federation, Resolution of the Russian Federation Government dated March 05, 2007 No 145, Resolution of the Russian Federation Government dated March 31, 2012 No 272) | A significant amount of expert activity belongs to the exclusive competence of state expertise bodies |
| Implementation of the institution for expert projects support (Federal Law dated June 27, 2019 No 151-FZ) | Procedures simplification related to the review and assessment by expert organizations changes made to design documentation during the implementation of a capital construction project |
| The institution for modified design documentation is excluded from the Urban Planning Code of the Russian Federation | Exclusion of the service of issuing an opinion on modified design documentation |
| Inclusion of the procedure for verifying the reliability of estimated cost determining for construction in the subject of state examination of design documentation | Changing the order and calculation of the cost of examination of project documentation |
| Changing and updating budget-normative base in construction, also through development of the Federal Government Information System Digital Network | Creation of an effective cost management system for a capital construction object within the framework of construction expertise institution |
| Restrictive measures caused by the spread of coronavirus infection COVID-19 | The need to ensure distant functioning of expertise organizations |
| Implementation of professional standards and qualifications | Development of the expert staff of construction expertise organizations |
| Insufficient professionalism and educational level of specialists in the construction industry | Changing the requirements for certification and recertification of experts – individuals who have the right to prepare expert opinions on design documentation and (or) engineering surveys |
| Digitalization of the construction industry, implementation of information modeling technology for capital construction objects | Development of a unified digital environment of expertise institution, integrated with state information systems for urban planning activities and a unified information system for housing construction of JSC “DOM.RF” |
| Typification of construction by using standard design solutions mainly based on information modeling technologies for objects with budget funding | Reduction of term for examination, prompt coordination of changes to design documentation of capital construction objects |
| Automation of calculations verification, reliability of standardized indicators determination, reducing the number of errors during the examination | Automation of calculations verification, reliability of standardized indicators determination, reducing the number of errors during the examination |
| Reduction of term the and cost of the examination | Reduction of term the and cost of the examination |

To work out a development strategy for construction expertise institution the authors performed a SWOT analysis. The analysis results are presented in table 2.

Table 2. Ways of development of construction expertise institution.

| Strength                                                                 | Weaknesses                                                                 |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Development of construction engineering system throughout the objects life cycle; | Creation of a system for experts’ development of state and non-state |
Creation of a digital environment for construction expertise institution; Creation of an effective cost management system for a capital construction object within the framework of construction expertise institution.

**Threats**

- Formation of knowledge bases, provision of best practices
- Creation of a competitive environment in expert activities;
- Conducting additional professional education programs for experts and workers in the construction industry;
- Interaction with construction universities;
- Reducing the number and duration of mandatory procedures by automating expert activities;
- Formation of knowledge bases, provision of best practices.

Establishment of uniform requirements and rules for monitoring the activities of expert organizations.

Increasing the experts’ competence in terms of the use of remote work tools, production automation; Leaving the market of non-state expertise organizations that do not meet the requirements; Implementation of a quality control system and responsibility for entering erroneous data into the Unified State Register of Expertise Conclusions; Support for organizations affected by the spread of the coronavirus infection COVID-19.

Thus, the main strategic directions for the development of construction expertise institution, determined on the basis of PEST and SWOT analysis, indicate the need for a qualitative transformation of expert activity.

**4. Findings and analysis**

The strategic directions for development of construction expertise institution can be presented in the form of a roadmap (table 3).

**Table 3. Roadmap for development of construction expertise institution (fragment)**

| Strategic directions | Complex of measures |
|----------------------|---------------------|
| **I Improvement of legal regulation of construction expertise organization and performance** | 1. Development of a modern model of construction expertise organization and performance in the Russian Federation 2. Legal base formation for creation and maintenance an information model of a capital construction object at all stages of its life cycle 3. Legal base formation for development of existing and creation of new state information systems that provide support for business processes, government functions and services in the framework of expert activities using information modelling technologies 4. Legal base formation for conversion of the requirements contained in technical standard documents, individual documents as part of initial permit documentation, design assignments into a digital machine-readable format, establishing a procedure for maintaining a register of digital technical standard documents in construction |
| **II Digital environment development of construction expertise institution** | 5. Development of the subsystem of the State Information System of the Unified state register of expert opinions on design documentation for capital construction projects, which provides “reception, storage and access to information models of capital construction objects that have received a positive conclusion” [10] 6. Introduction to continuous operation of this subsystem 7. Implementation of standard models of “life cycle management systems for capital construction objects” [10] using information technology 8. Creation and development of digital assistant expert |
| **III Transition to construction engineering** | 9. Implementation of comprehensive expert support 10. Creation of an effective cost management system for a capital construction object |
IV Improving educational activities and personnel training for organizations carrying out expert activities

11. Identifying the need for personnel for organizations carrying out expert activities

12. Updating educational programs of higher and additional professional education, taking into account modern requirements for an expert, including competencies of using digital models

13. Systematic advanced training of experts, heads of expert organizations, customers, developers

V Knowledge bases formation through the constant data accumulation and management

14. Creation of a knowledge base containing a document register used in the examination of project documentation and (or) the results of engineering surveys

To control the implementation of strategic development ways of construction expertise institution, we will formulate expected target indicators (table 4) for three main development scenarios: inertial (scenario of severe resource constraints); basic (scenario of moderate resource constraints) and optimistic (scenario of soft resource constraints).

Table 4. Expected target indicators changes depending on the scenario.

| Target indicator                                                                 | Inertial | Basic | Optimistic |
|--------------------------------------------------------------------------------|----------|-------|------------|
| Share of expert organizations integrated into digital environment development of construction expertise institution, % [10] | 0 10 45 0 25 90 0 30 93 |       |            |
| Share of projects with comprehensive expert support provided, % [10]           | 10 20 35 10 50 70 10 60 75 |       |            |
| Share of documentation submitted for examination and developed using information models, % [10] | 5 12 25 5 30 50 5 35 60 |       |            |
| Percentage of projects cost based on life cycle cost, %                        | 0 8 25 0 20 50 0 25 60 |       |            |
| Share of projects implemented through budget funding, developed on the basis of standard design documentation, % | 10 16 35 10 40 75 10 50 85 |       |            |
| Percentage of experts, heads of expert organizations with advanced training in the current year, % | 15 16 30 15 40 60 15 50 70 |       |            |
| Term of design documentation examination and engineering survey results, days [10] | 42 42 42 42 38 30 42 35 30 |       |            |

5. Conclusion
Strategic planning methods were used as a practical tool for working out and formulating of strategic directions for construction expertise institution development.

The study showed that it is rational to ascribe to the main strategic directions of construction expertise institution development digital environment creation for the construction expertise institution; construction engineering system development throughout the life cycle of objects; creation of an effective cost management system for a capital construction object within the framework of construction expertise institution; development of the experts’ competencies on the basis of professional education, continuous professional and advanced training of personnel; knowledge bases formation.

The measures developed within the roadmap are aimed at management system formation for expert activities in construction, based on a qualitatively and technologically new level of interaction between participants in investment and construction activities, which provides the transition from document
management to data management, optimization of the number and terms of administrative procedures of design documentation examination and engineering surveys results; creation of a digital environment for construction expertise institution, ensuring the accumulation and exchange of data, their reliability and relevance at all stages of the life cycle of an investment and construction project.

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