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STATE REGULATION AS A KEY FACTOR TO STIMULATE INNOVATION IN CONSTRUCTION

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The article considers the issue of stimulating innovative activity in construction. The purpose of our investigation is to study influence of state regulation on innovation activity in construction. The role of construction participants in the innovation process and the reasons for low innovation activity in construction are determined. The tasks of the policy of innovative development, levers of state stimulation of innovative activity were discussed. Counterfeit tenders and corruption have been identified as an important factor hindering innovations in construction. A macroeconomic model of the state's influence on the process of stimulating innovation in construction and a model of logistical relations between organizations for innovation in construction have been developed. The necessity of active realization of organizational, financial, tax, budgetary, legal, information levers of the state policy as the tool of the state stimulation of innovative development in the building sphere is substantiated.

Key words: state innovation policy, construction, public policy, project organization, building contractors, innovative activity.

Introduction. Innovative activity is a key factor in increasing the competitiveness of the industry, sustainable socio-economic development of the country. In the context of insufficient assistance to innovative

development, there is a tendency to reduce innovation activity and, as a result, low competitiveness of the national economy. Therefore, it's important to increase of innovative activity involving state, regional and sectoral authorities.

Statement of the problem and connection with scientific and practical problems. The state regulation of innovation activity in Ukraine, its components and stimulation methods were considered by many researchers, such as Bubenko O.P. [1], Glukhova S.V., Kylnytska E.V. [2], Duka A.P. [3], Esypenko A.D. [4], Zaiats T. A. [5] Kuchma Y.◦V. [6], Sviridova S.S., Odut K. S. [7], Yakymenko O. V. [8], etc. However, still not developed the legal strategy for incorporation of innovations in construction. The specific of this sector of Ukrainian economy is inconsistencies in the legal framework and imperfect conditions for the deployment of active innovation. It's leads to fragmentary use of levers of state regulation of innovations in construction at the regional, state and sectoral levels, so definition of state regulation as a key factor to stimulate innovation in construction is actual problem for Ukrainian economy**.**

The purpose of the article is to study influence of state regulation on innovation activity in construction and development of efforts to stimulate this activity.

Statement of the main material. The inability of market self-regulation mechanism to solve the problem of economic system stable development because of fluctuations in the economic cycle and due to scientific and technological progress make necessary to provide state regulation of innovation activity. To increase the competitiveness of the Ukrainian economy innovation system authorities have to stimulate the generation of new knowledge (the science support), their dissemination (education and training) and implementation of new knowledge, innovation processes and technologies (within technopolises, high-tech industries, innovative

enterprises). It's requires development of the system of levers of macroeconomic regulation and immediate improvement of innovation infrastructure [7, p. 83]. The priority direction of stimulating innovations in construction under conditions of high financial risks is application of adequate methods of the state regulation, organizational maintenance of cooperation of the enterprises of construction sphere for innovative development.

Methods of regulating the innovative development of the construction industry are direct and indirect. Their ratio is determined by the economic situation in the country and the chosen concept of state regulation. Direct methods of state regulation of innovative development of construction are mainly in two forms: administrative-departmental and program-targeted forms. The administrative-departmental form is manifested in the formation of regulatory and legal support innovations all enterprises, including small construction firms. Moreover, the direct state funding of scientific and technical activities in the form of government orders, subsidies; direct budget subsidies to companies, mastered new types of products, the creation of special structures engaged in organizational activities in the field of innovation, the creation of special economic zones, technology parks have to be realized. Program-targeted form of state regulation of innovations involves the development of targeted state, regional, sectoral research programs, their contractual funding from public and private investors. Creating a system of state contracts for construction, providing companies with credit benefits for innovation.

Indirect methods of regulating the innovative development of the construction sector are aimed, both: at stimulating innovation processes and creating a favorable (social, economic, psychological) climate for innovation. Indirect methods include tax benefits and discounts, credit benefits [3, p. 205].

Stimulation of innovative activity could be realized via determination of the tax base and granting of privileges at payment of taxes. It could be realized via:

- definition of the order of the accelerated amortization of intangible assets, cars and the equipment;
- tax credits;
- exemption from the taxation part of profit that is directed on carrying out perspective innovative developments, scientific and technical product;
- exclusion of funds of scientific organizations and universities from the number of taxable income received from the sale of innovative products and aimed at purchasing special equipment and unique devices;
- reduction of value added tax rates, property and land for scientific and technical organizations;
- reduction during a certain period of taxable profit received by enterprises from the use of inventions and other innovations.

Indirect measures of state regulation of innovations, such as credit benefits, namely the provision of loans to construction companies, their associations and potential consumers of the results of innovative developments in the construction sector, can be effective under certain conditions.

The development of innovative activity, both at the level of an individual construction company and at the level of integrated structures and the state as a whole, involves the creation of a well-founded system of incentives based on a system of levers (fig.1).

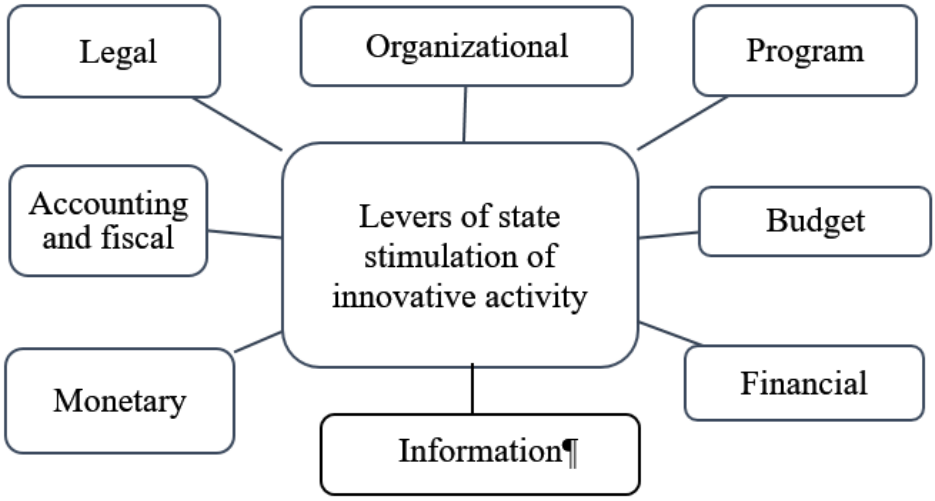

Figure 1. Levers of state stimulation of innovative activity

(Developed by the author)

The development and realization of these levers are related to intervention from the highest state authorities, especially Cabinet of Ministers, in the process of activation of innovative activity in building by co-operation of relevant economic structures of the central government and local authorities in this process. For the development of the innovation system it is necessary to involve structures such as the tax service, banking system, Ministry of Communities and Territories of Ukraine, research institutions, patenting authorities, other relevant organizations and institutions of intersectoral relations and stakeholders in promoting innovation for construction complex. The scheme of possible state influence on all participants of innovative activity in construction is drawn on fig.2.

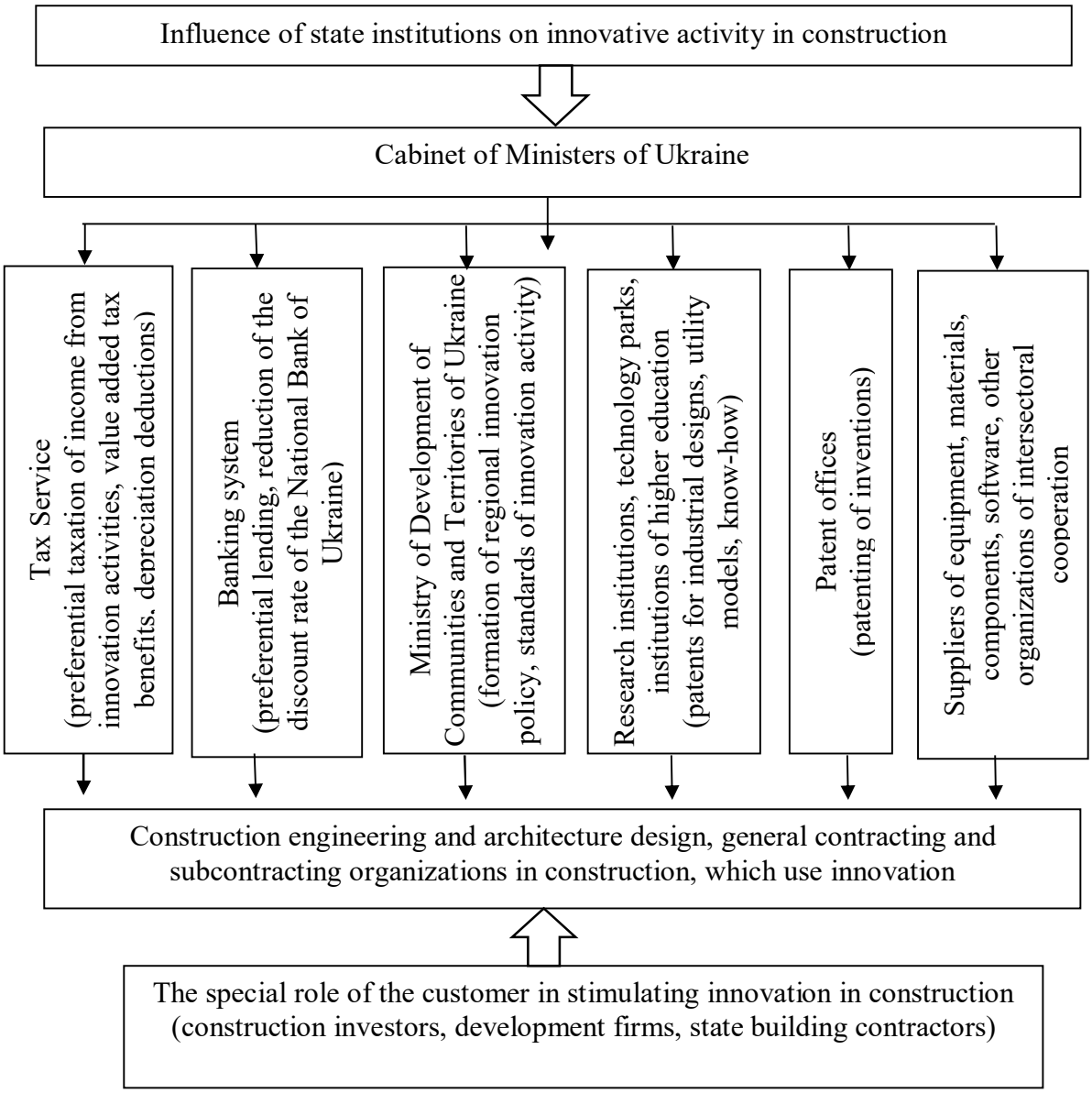

Figure 2. The macroeconomic model of state influence is on the process of innovative activity stimulation in construction

(Developed by the author)

One of the most important factors of the innovation development in economically developed countries is financial, institutional, organizational and administrative state support. However, in Ukraine still not developed an effective strategy to stimulate innovation in construction industry, which would allow companies to approve projects and implement them promptly with state support. One of the ways to solve the problem of intensification of

innovation is the formation of state regulatory policy, which provided opportunities to involve on a partnership basis both government agencies and private enterprises interested in commercializing research, such as financial funds, including venture capital, technology brokers to intensify innovation and participation in international projects. First of all, indirect methods of state regulation should be used. The main recommendations are non-taxation of profits from innovation, exemption from value added tax on fixed assets for innovation, providing preferential lending for innovation measures, and other indirect methods of government regulation.

A wide range of legal entities and individuals is involved in innovative activities in construction, which is due to the specifics of its products and processes. The demand for innovative products is formed by customers (investors) who need innovative architecture design, technological, technical and engineering solutions. Therefore, the role of the customer in stimulating innovation in construction (construction investors, development firms, state building contractors) is most important. The special role of customer in the context of stimulation of innovative activity in building (building investors, development firms, state building contractors) is related with a gap between demand on innovative products which formed by customers (investors) and possibilities of construction enterprises to form innovative project with up-to-date technological, technical and structural decisions. As a result of active European integration processes, the investor often demands on innovation because of changes in environmental and quality standards, safety in production and services [9, p.31]. Accordingly, these changes must be taken into account in the design process of construction or reconstruction. Consumers requirements for durability, climatic and temperature operating modes cause demand for construction products, materials with special properties, such as wear resistance, excessive loads, aggressive environment resistance, that requires

researches, laboratory tests for specific orders of investors. Restriction state budget expenditures on construction of new buildings imposes major financial costs on investors. Therefore, consumers (investors) in construction are permanently involved in innovation activities, performing a triple function in the innovation process - investors, innovators, experts. Customers determine the specific characteristics of construction innovations, they define the criteria and evaluate the usefulness of innovation by their purchases. The special role of the customer in construction is to select design organizations and contractors for the straight construction of facilities, which guarantees consumers a real social and economic effect on the period of the building exploitation.

Stimulation of innovative activity in construction project organizations should be based on solving the issue of fair compensation for the implementation of innovations. In particular, architecture and engineering design organizations should be the main subjects of innovation in construction, because they develop and implement unique design solutions that are formulated by customers. We emphasize that architecture and engineering design are the basis for the formation of innovative products, but the price of these project does not depend on the quality, complexity or uniqueness of design, because it is determined in advance as a percentage of the estimated cost of construction projects.

Therefore, engineering design organizations use of mostly standard construction projects and mainly implemented of small innovative solutions in these typical projects. It does not stimulate the development of innovative potential of the staff of design organizations, which are now interested in participating in high-value projects, their number, rather than in the complexity or innovation of projects.

Utilization of low cost materials and technologies leads to a cost reduction of the construction and installation works and, consequently, a

reduction in the cost of design services, design organizations are not too concerned with innovation and decreasing the duration of construction and installation work. At the same time, it's important for contractors' in construction. Also design organizations are indifferent to the use of energy and resource-saving technologies, in which general contractors organizations and customers are interested in. In addition, changes in the technological process, the implementation of innovations during construction, the use of new structures and materials requires the coordination of structures changes and solutions with the general contractor, the design organization. As a result, the estimated cost of construction work and the duration of construction and installation work increase from several days to months. Therefore, most construction companies are not motivated to implement innovations.

A significant factor that inhibits innovation in construction are tenders by agreement (so called – "fake tenders"), this is especially true when the customer is a government organization.

In economically developed countries, competitive tendering is a progressive tool for the customer to select the best general contractors or design organizations that provide more competitive proposals via implementation of wide range of innovations. But in the current conditions of manager culture in Ukraine (on the basis of irresponsibility for the final results of almost all structures) its brings to increasing of the corruption which realized via systems of tenders. In this case, this progressive method does not contribute to the innovative activities of the main participants in the construction. In this case the tender is won by pre-determined organizations, which specifically underestimate the costs of the tender and at the same time declare implementation of the newest technological innovations, new designs and materials. After winning the tender, during construction, the actual costs increase significantly exactly because of the

lack of constructive or technological innovations in practice. According to the Law of Ukraine “On Public Procurement”, the total cost of additional construction work, not specified in the original project, can reach up to 50% of the cost of the main contract [10]. Thus, “fake tenders” as a product of corruption in public administration significantly hinder scientific and technological progress in construction, and not only in this sector. It is no longer possible to ignore this phenomenon of Ukrainian reality. In this direction, the relevant structures of public administration in the field of construction should develop and implement appropriate activities to counteract the emergence and operation of false tenders.

It is necessary to have a general standard of innovation with a clear definition of the essence of innovation in construction, their varieties and opportunities for their production in construction complex. This general standard, similar to the State Construction Standards, should be mandatory for all design and contracting organizations of the construction industry and be developed by the Ministry of Development of Communities and Territories of Ukraine under the supervision of the Ukrainian government. Royalty conditions of the organization and authors stimulation to implement innovations should be established. Royalty from innovations must be related with the value of the economic or social effect.

In general, the state regulation of innovation in construction from the standpoint of a systemic approach includes the management of innovation stimulation at the microeconomic level. This means: all logistically connected organizations in building process would be stimulated to innovative activity (Fig. 3).

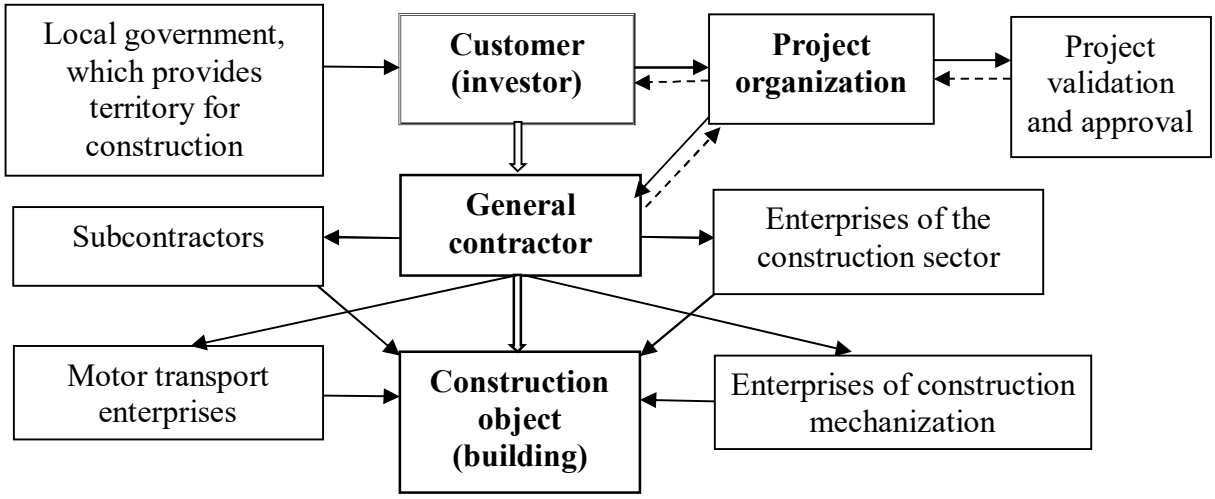

Figure 3. The model of logistic relationships between organizations for the implementation of innovative activities in construction

(Developed by the author)

Thus, the customer is the key member of construction activity which bring the innovative component. The project organization is the brain center of innovation. After receiving the technical task and the main parameters of the construction object from the customer, it determines the main progressive technical parameters of construction products. For non-standard and special construction projects the research organizations could be involved to develop new methods of construction work, building processes and materials. After development stage the innovative products must be tested, certified and agreed with the general contractor and the customer. The contradiction of the situation is that project organizations don't have significant funds that can be used for innovation research and development. The main direction of innovative activity in architectural design in construction is digitalization and automation of design process.

Conclusions. The effectiveness of innovation in construction industry is limited by numerous factors such as: inconsistency of state regulation

methods to market law, limitations of financial resources for innovation and investment activity, insufficient development of construction rationing and standardization systems, inconsistency of the legislative and regulatory framework, imperfection of tax systems, significant budget deficit, lack of clear national priorities for innovation etc.

High cost and capital intensity of construction determines the priority task of development of effective organizational and economic tools to stimulate innovations in construction, which is impossible without organizational, financial, tax, monetary, budgetary levers of public policy.

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