

CHOICE OF ORGANIZATIONAL FORMS FOR CONSTRUCTION OF RESIDENTIAL OBJECTS TAKING INTO ACCOUNT INTERESTS AND ABILITIES OF DIFFERENT PARTICIPANTS

Tytok Victoriya Viktorovna, Assistant Prof.

Chair Of Construction Organization And Management,
The Kyiv National University of Construction and Architecture, Ukraine

Abstract

The great value has the choice of organizational forms for construction management at organization of construction production. Choice of any organizational form to perform particular project depends on number of factors: customer`s and investor`s wishes, contractor`s abilities, specific character of construction object.

Keywords: Organizational form, customer, general contractor, designer, professional construction management, expert evaluations

Introduction

Construction production is very complex technological and organizational process. Present situation into economic and political spheres make fundamental changes into functioning of Ukrainian investment process in construction. List of participants has been changed and extended, as a result the principles of their interaction became more complicated, key points and goals are also changed (Zeltser, 2012).

The efficiency of creation process of final construction object significantly is defined by application of modern construction technologies, high-quality materials, decreasing expenses of man-hours, materials, energy resources etc. on unit of construction production. Another influence factors are: decreasing of procedures bureaucratization and minimization of shadow economy influence on orders distribution, also precise and coordinated interaction of numerical participants of investment process in construction: investors, customers, project and construction organizations, materials and equipment suppliers and so on (Tytok, 2013).

Un-cooperation and discrepancies between the participants could lead to increasing of construction cost, deadline failure for start of object`s

operation, decreasing of works quality. Hence, the success of construction object creation, improvements of cost indexes, terms and quality of construction depend on efficient organization of participants' interaction and careful thoughtful organizational-technological developments on all stages of investment process in construction.

Nowadays it is not enough the existent researches on analysis of different types contracts efficiency and organizational forms of construction management from the viewpoint of different participants. At the same time, reasonable choice of any organizational management form, that takes into account wishes of customer, investor, real abilities of different participants and specific character of construction object allows to choose the most efficient way of distribution the functional roles, rights, responsibilities between the construction participants, to balance their interests and to decrease the number of probable discrepancies between them. All factors mentioned above help to increase the efficiency of their interaction.

I.

The list of construction participants' identification, distribution between them roles and responsibilities mostly define the efficiency of investment process in construction. The investor or customer (as construction initiator), the owner and investments manager take the main roles in decision-making.

The interaction scheme between the participants of investment process in construction and their relation structure regulating by contract between customer and contractor defines the organizational form of construction.

The problem of choice the most advantageous organizational form has very complicated and multidimensional character for customer. There are a lot of factors influencing on choice of customer or investor: customer abilities, his previous experience, his advantages, specific character of object and abilities of contractors and suppliers.

The most considerable factors taking into account by customer at choice of organizational form of construction could be divided into:

- 1) Objective factors that characterize object and represent the real abilities of different participants;
- 2) Subjective factors that reflects the wishes and advantages of customer and investor.

Among objective factors are such as object complexity, its cost, presence of possible executors (contractors), customer experience, his financial abilities and project presence.

Among subjective factors are: possibility of reduction the investment expenses, cost determination, decreasing of construction terms, quality

increasing, providing the control on work progress from the customer`s side, risks minimization, concentration of responsibilities.

At choice of organizational form the customer should establish own priorities, evaluate the influence of each factor and on the base of such combination select organizational form corresponding to his state and wishes.

Each organizational form is characterized by different possibilities in increasing the construction efficiency by terms, cost, quality, reliability and other factors (Bobylev, 2003).

Let`s define the term «organizational form of construction» before comparison.

Organizational form of management is a form of interaction`s and interrelation`s organization between the main participants of investment process in construction: customer, designer, general contractor and subcontractor.

Organizational form of management defines the list of participants and distribution of functional roles between them, regulated by requirements of building contracts.

Let`s consider the main organizational forms of construction, that are the commonly used in native and foreign practice and provide comparative analysis.

Nowadays the most commonly used are such organizational forms of construction management as: project management, huge project management, professional or centralized management. The fundamental schemes for different organizational forms of construction management in present-day conditions are shown in fig. 1-6.

In native and foreign practice the most commonly used are the next organizational forms:

- traditional system of contract relations (fig.1), when customer divides designing and construction works between specialized contractors with particular contracts on designing and construction of object;
- organizational form of «customer-contractor» type (fig.2) is used in proprietary construction, when customer performs the great part of works by powers of own project and construction departments and the contracts are made only on individual particular works;
- system «turn-key ready» (fig. 3-4), when customer making a project-construction contract establish contract relations with one contractor, that is responsible for performing all investment cycle works, including designing, construction and putting object into operation;
- organizational form «professional construction management» (fig. 5-6) is very popular in developed industrial countries, especially into USA and European countries the last 15-20 years. The customer within

mentioned form gives his functions concerning construction management and coordination of contractor`s actions to specialized managing firm.

During research, that has performed by interview the representatives of different Kiev construction firms, it was established the following: 91.7% have the experience of traditional system usage, 58.3% - use the system «turn-key ready», 41.7% - the system «customer-contractor» and 66.7% - the system «professional construction management». At the same time the respondents consider the system «turn-key ready» as the most advantageous organizational management form (75%).

We will consider in detail the efficiency analysis, advantages and disadvantages for three organizational forms of construction: traditional, «turn-key ready» and «professional construction management».

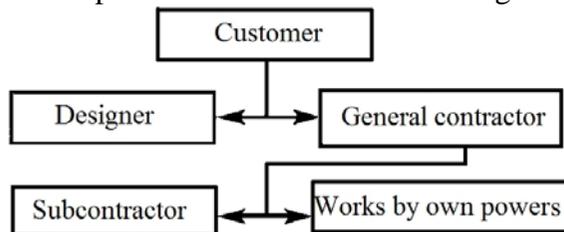


Fig. 1. Traditional system of subcontractor relations

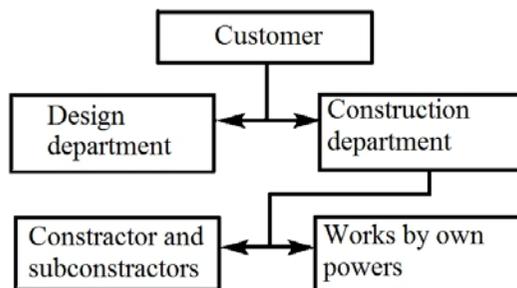


Fig. 2. Organizational form of “customer-contractor” type

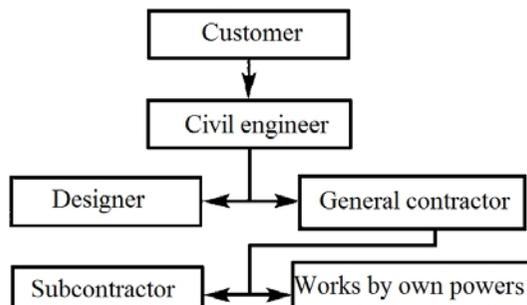


Fig. 3. «Turn-key ready» system. The first modification: «designing-construction»

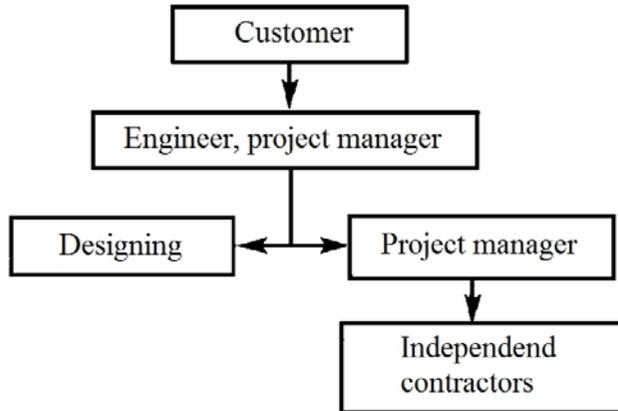


Fig.4. «Turn-key ready» system. Second modification: «designing-management»

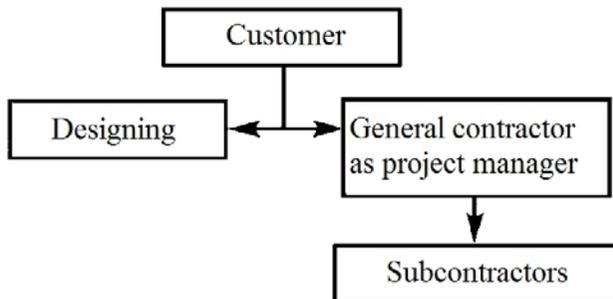


Fig. 5. Organizational form «professional construction management». The first modification: «General subcontractor»

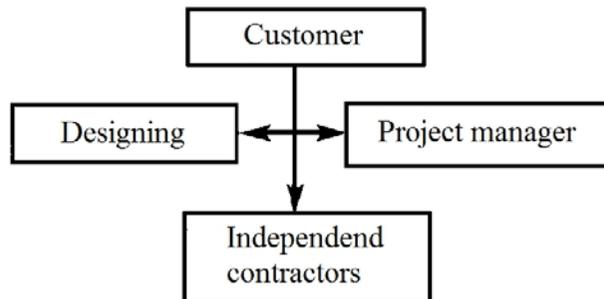


Fig. 6. Organizational form «professional construction management». Second modification: «Construction manager»

The form of construction organization by traditional contractor method – the object construction is performed by constantly working special construction and assembly organizations (contractors) according to contracts with customer.

As a rule, traditional form is bounded by price fixation. It's guaranteed to customer the project fulfillment in time within the limits of specified (estimated) cost. However fixed price means the high risk to

contractor, that should foresee all possible difficulties and deviations that could arise during project fulfillment.

Within the limits of traditional contractor method of construction a customer as a rule gives to contractor construction site, in time gives him approved project-estimated documentation, provides financing, supplies technological, power and other types of equipment, provides complex equipment tests with interested participants, provides contract supervision, performs the adjustment of technological process and together with general contractor provide putting into operation of manufacturing facilities and construction object. What is more, within the construction process a customer carries out technical supervision, monitors the compliance with the actual capacities, costs and quality of performing works. He also ensures acceptance and pays for completed projects and individual work stages, pays to general contractor for accepted completed construction production.

Thus, the customer as a rule is a linking unit. In fact, the customer takes the managing functions on himself, that allows him to influence actively on a process of project realization and to introduce corresponding changes if it is necessary.

The main disadvantage of this contract type is that different work stages (preinvestment, project and construction) are parted both organizationally and in terms. Thus, the project decisions become out-of-date, that significantly appears in construction of great objects. Within the limits of traditional form of construction organization the customer should perform a lot of additional functions that are: at first, are not specific for his main activity; at second, are connected with risks.

One of the widespread organizational form of efficient interaction for all participants of investment process in construction is so called project management, which is purposeful labour, financial, material and power resources management. These resources are necessary for providing the design, planning, financial and managing processes and control for object construction in terms, within the limits of specified cost and quality.

The separate role in system of project management belongs to special groups (departments), which lead the project head. The systems of project management could be considered from the viewpoint of efficient particular project performance (in narrow sense) as well as rational distribution of scarce highly-qualified labour resources between separate projects within the limits of one country.

This type of contracts is concluded, as a rule, on principle «compensation of expenses »

The disadvantage of such organizational form is the fact that customer is not able to influence actively on project realization process, fully relying on a sub-contractor.

The scientists of Stanford University Chris Tatum and Thomas Korman (Tatum, 1999) have performed the research on the base of construction the series of industrial objects. The research results show the possibilities for significant shortening of investment cycle duration (approximately on 30%) in comparison with traditional form of contractor relations (see Fig.7).

Consequently, the advantages of organizational form of construction management «turn-key ready» are evident, in conditions of market relations it benefits essentially in comparison with form of traditional sub-contractor relations.

The summarizing of advantages and disadvantages for «turn-key ready» construction organization comparing with traditional form of contractor relations for main participants of investment process are shown into table.1.

Notwithstanding the fact that «turn-key ready» organizational form of construction has gained its popularity in this country lately, most of the customers prefer less effective but more traditional contractor method of construction, that does not correspond to modern dynamic management conditions.

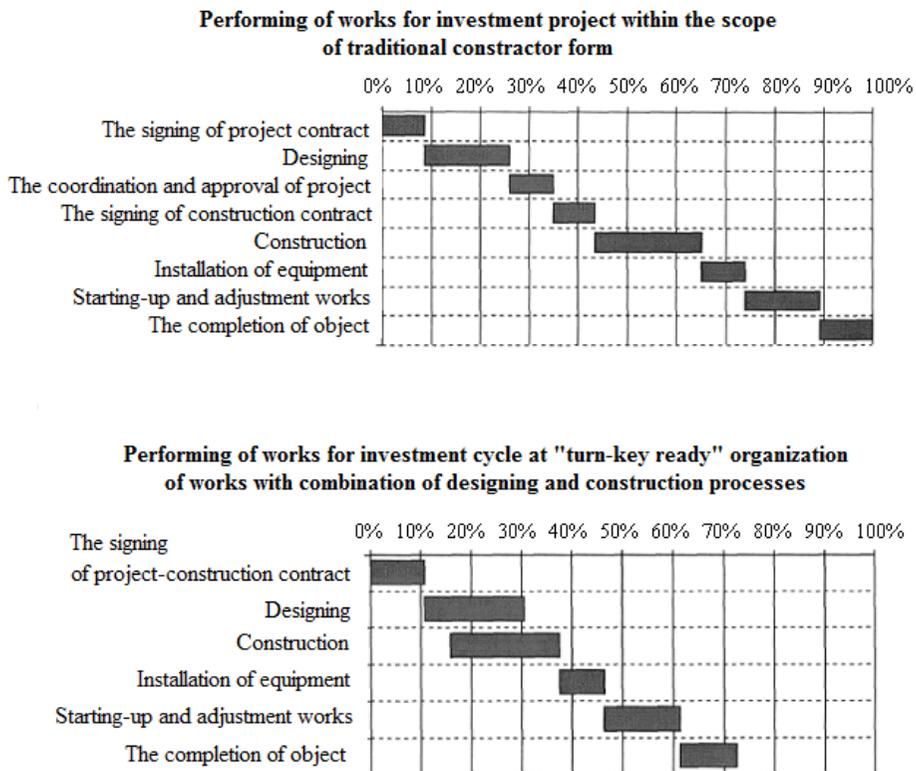


Fig. 7. Comparison of duration for traditional and combined investment processes in construction

Abroad in construction environment the application of «turn-key ready» construction organization is a characteristic of high professionalism for all firm staff, criterion of management system efficiency and significant competitive advantage on investment-construction market.

This fact confirms the necessity of transition to more progressive form of interaction organization between the construction participants on the base of project-construction contracts. From the other side the widespread application of such type relations gives absolutely new requirements to all participants of investment process and first of all to sub-contractor organization. This fact once more approves the urgency of researches in such direction.

Table 1. Advantages and disadvantages of «turn-key ready» organizational form of construction.

Participants of investment process in construction	Advantages	Disadvantages
Customer	<ol style="list-style-type: none"> 1. The reduction of investment cycle 2. The enhancement of investments efficiency 3. Additional profit from early object management 4. Less duties 5. Getting the object entirely completed for operation 	<ol style="list-style-type: none"> 1. The reduction of possibility to take part in construction 2. Variation of object cost 3. The risk increasing 4. Possibility of increase in object cost
Subcontractor	<ol style="list-style-type: none"> 1. The reduction of construction terms 2. Growing significance, more rights and free hand 3. The possibility to raise the prestige and competitive ability 4. Less coordinations of project 	<ol style="list-style-type: none"> 1. Very serious responsibility 2. The intensive working schedule
Designer	<ol style="list-style-type: none"> 1. Less responsibility 2. Less coordinations of project 	<ol style="list-style-type: none"> 1. The reduction of creative independence 2. The intensive working schedule

The idea is to attract the wide circle of specialized firms for fulfillment of particular works within the large project. And also in usage of engineering-consulting firms for performing the coordination function and in management of construction process. These ideas found the practical application in managing systems of large projects and later were developed

into organizational form of so called «professional construction management». The main sense of such popular organizational management form is that for fulfillment of functions on management of construction process including the stage of its designing, the customer attracts the firm that provides corresponding services. The last gives the broad specialist from their staff that further will lead the specially created command on project management and will become the project manager.

In a way such form is an evolution of organizational form of construction «turn-key ready». Integration of designing and construction stages, complication of objects, requirements to further speeding-up of construction cause the appearance of new management class «professional construction management» and its particular executors «professional managers»

Implementation of organizational form «professional construction management» gives to customer all the advantages of «turn-key ready» system, i.e. the possibilities of significant shortening of investment cycle owing to joining the designing and construction stages. Additionally he obtains the possibility to control the actions of contractors through the construction manager, due to that the risk of costs over-expenditures is decreasing.

With appearance of additional participant in the person of professional manager, the customer expenses are increased (4-7% from estimate cost). Nevertheless, by experience, these expenses are compensated a lot by benefit, obtained from implementation of this organizational form. It allows decrease the investment cycle up to 45% and save up to 15% of customer investments.

By analysis, the different organizational forms have various possibilities to increase efficiency of particular parameters. Moreover, in certain conditions the effect from implementation of this or that form could be increased or decreased.

Method

To formalize the advantage of choice of any organizational form is proposed the next methodical approach that use the principles of points evaluation and include 4 stages.

Method of choice the organizational form of construction:

1. Evaluation of subjective factors influence, which reflect the advantages for customer and investor:

1.1. Expert rating of organizational forms by possibility to meet the requirements of customer;

1.2. Arrangement by customer of his own priorities (factors evaluation on 5-point scale - the most important factor);

1.3. Computation of summary point esteem for each organizational form.

2. Evaluation of objective factors influence:

2.1. Expert definition of influence coefficients for each objective factor on efficiency of organizational form implementation;

2.2. Value definition of objective factors and corresponding coefficients for object;

2.3. Computation of general correction coefficient for each organizational form.

3. Computation of summary point for each organizational form including subjective and objective factors.

4. Choice of organizational form that has obtained the maximal point.

On the first stage the evaluation of subjective factors influence is carried out. To evaluate the subjective factors at research process the each subjective factor in expert way was rated by advantage of this or that organizational form implementation. Three organizational forms were compared: the traditional contractor, «turn-key ready» and «professional construction management» form.

For example, we have found out that for decreasing investment expenses the better possibilities gives the implementation of «professional construction management», it has rank 3. Then follows the form «turn-key ready» - rank 2 and the lowest perspectives in this regard has the traditional form of contractor relations - rank 1, since the fixed price is established and the customer should pay it in any way.

Analogically the other factors were ranged (see table 2).

Now, the customer to evaluate his benefits needs to define the value of each factor in points on scale from 1 to 5. The most significant factor obtains 5 points.

Summary point of benefits evaluation for customer of each organizational form is calculated by the formulae:

$$P_n = \sum_{i=1}^m P_i R_i$$

where P_i - number of points that customer gives to i-th factor on 5-point scale;

R_i - rank of evaluated organizational form on i-th factor;

m - number of factors (in specified example $m = 7$).

The maximal point, that has obtained one of the organizational forms testifies its highest possible correspondence to benefits and wishes of customer. Nevertheless, the obtained summary evaluation of benefits for customer should not be considered as the alternative of choosing any organizational form.

Table 2 Evaluation of customer and investor benefits

Evaluation criteria	Point	Traditional	«Turn-key ready»	«Professional construction management»
1. Shortening of investment expenses		1	2	3
2. Cost definiteness		3	2	1
3. Shortening of construction terms		1	3	2
4. Quality increasing		1	2	3
5. Monitoring of work process from the customer side		3	1	2
6. Risks minimization		3	1	2
7. Responsibility concentrations		2	3	1
The sum				

Despite the customer wishes, the efficiency of any organizational form implementation also is defined through the objective factors. As for example, if the customer has the developed project, the construction experience and at the same time the object is typical and the customer is restricted in finances it is uneconomic for him to attract the project-construction firm or to pay for professional manager. It is easier for him to organize the tender and by criterion of minimal cost choose the contractor.

In other words, the presence of certain objective factors intensify or reduce the effect from implementation of any organizational form.

Evaluation of objective factors influence is carried out on second stage of methodology. To evaluate the influence of specified factors on customer`s choice, at presence of any objective factor for each organizational form the multiplying coefficients were determined in expert way.

The results of efficiency analysis for each mentioned above organizational form of construction management also have been used. Let us suppose, that customer already has the developed project, it gives plus for implementation of traditional form of contractor relations. If he doesn`t have any experience, it`s better for him to make a contract with project-construction firm or to give the part of his function to professional manager.

The influence of objective factors on customer choice is reflected in table 3.

The value of summary coefficient for any organizational form is determined by the formulae:

$$C = 1 + \sum_{j=1}^n c_j$$

where c_j - - the coefficient of j -th factor for specified organizational form;

n - number of objective factors (in specified example $n=5$).

Table 3. Evaluation of objective factors influence

Factor	Traditional	«Turn-key ready»	«Professional construction management»
Object complexity:			
typical	0,2		
unique		0,2	0,2
Object cost:			
up to 5 mln. dol.	0,2		
from 5 up to 25 mln. dol.		0,2	
more than 25 mln. dol.			0,2
Presence of financial reserve:			
present		0,2	0,2
absent	0,2		
Customer experience:			
present	0,2		0,2
absent		0,2	
Presence of project:			
present	0,2		
absent		0,2	0,2

The maximal sum of coefficients for each organizational form is recommended to establish on level 100%. In this case if all objective factors will be for the benefit of one form, but the customer wishes will conform to other form, in sum the benefit will be given to that form that is defined by objective factors.

The multiplying coefficients for each particular factors could be define more exactly, in introduced methodology is recommended to establish it on level of 20%.

The total evaluation based on subjective and objective factors is determined by the formulae:

$$P = P_n \times C$$

where P_n - the point of customer evaluation of benefit for organizational form;

C - the general multiplying coefficient, caused by action of objective factors.

Conclusion

The variety of organizational form of construction management stimulate the increasing of investment process efficiency, allowing for customer and investor to choose the most corresponding forms, taking into account the influence of any factors.

At the same time, for customer and investor, if they don't have the corresponding experience in construction sphere is rather difficult to orient and define such organizational form of construction management that will correspond to their wishes as well as to real possibilities of different participants and to specific character of construction object.

Comparative analysis of efficiency for different organizational forms of construction management shows the significant benefits of «turn-key ready» and «professional construction management» forms. Since they allows to significantly shorten the investment cycle for creation the final construction production owing to joining the designing and construction stages.

To decide the choice issue for organizational form of management is proposed the methodological approach, based on usage of points esteem method, that allows to take into account the influence of objective and subjective factors.

There is need to mention that with increasing the number of participants in investment process and complication of interaction between them, the improvement of management methods is also necessary. So for successful realization of construction project, except the organizational changes in management structure are essential the corresponding managing methods, that would provide the efficient interaction of participants on all stages of investment process in construction.

References:

Abramov, S.I. (1999). The organization of investment - construction activities. Moscow, Russia: Center for Economics and Marketing.

- Bobylev, V.V. (2003). Effectiveness of organizational forms of management of capital construction. Moscow, Russia: State University of Management
- Lytvyn, B.M. (2007). Economic relations in investment and construction industry. Ternopil: Economic thought.
- Polishchuk, E.A. (2011). The role of functional participants in the investment process. Bulletin KNEU Getman name, 1, 170-184.
- Shtub, A., Bard, J.F.; Globerson, S. (2004) Project Management : Processes, Methodologies, and Economics. NJ :Prentice Hall PTR.
- Tatum, C. B., Thomas Korman, (March, 1999). MEP Coordination in Building and Industrial Projects, Working Paper 54, Center for Integrated Facility Engineering, Stanford University.
- Tian RB, Pavlov ID, Golovkova LS (2006) Project management in production systems. Zaporozhye, Ukraine: University for the Humanities, Zaporozhye Institute of State and Municipal Management
- Tytok, V.V. (2012) Model combining different stages of investment and construction process. Effective construction in the emerging market economy. Collection of scientific works, 26 ,117-122.
- Tytok, V.V. (2012) Organizational and technological creation model building project from the standpoint of the customer. Research Institute building industry. Scientific and Technical Collection,53, 40-45
- Tytok, V.V. (2013) Manage creating lasting residential building project. Effective construction in the emerging market economy. Collection of scientific works, 29, 137-141.
- Zeltser, R.J., Pohoreltsev, V.M., Zeltser, E.R., Trofymovych, V.V. (2012) The organization of the investment process and construction activities. Kyiv, Ukraine: Kyiv National University of Construction and Architecture .