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## Intercompany Relations of Stakeholders of Investments and Projects

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**Abstract:**

*The article is devoted to questions of identification of the factors influencing the establishment of high-quality intercompany relationships between stakeholders within the framework of the investment and building project.*

*The problems arising at the developer by the transfer of part of construction works to the contractor. As the major factors influencing the establishment of high-quality intercompany relationship we consider the specificity of capital of the developer, the size of the enterprise, the level of uncertainty and the trust of the developer to other participants.*

*In each group of factors the analysis is using the components' method to allocate those which exert the greatest impact. A logit-model was constructed and the calculation for it was carried out allowing to estimate a contribution of each component to results.*

*The model integrates a concept of trust with the main variables of the transaction cost theory. It is estimated on the selection basis of the construction organizations from the Ural Federal District of Russia. As a result, the authors conclude that the trust influences the developer's decisions about transfers of part of construction works to the contractor within the framework of an investment project.*

**Keywords:** *Trust, transaction costs, opportunism, investments and projects, developer, contractor.*

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## **1. Introduction**

Construction belongs to one of the most dynamically developing branches of Russian economy. Consequences of the economic crisis have led to a considerable reduction of construction in 2010, however, despite the slow rise, the industry continues to remain one of the most attractive for private investments. At the same time, during the crisis period shortcomings of the market environment in the form of various barriers and restrictions caused by the market factors, legal framework, administrative bodies and opportunistic behavior of participants of the investment complex in the construction industry were sharply shown (Todorova, 2016). As a result, according to the ratings of the Austrian consulting company Global Property Guide, the level of transaction costs in Russia is the highest, among the European countries.

Management practice of the investment project in the construction industry, in essence, depends on the actions of its certain participants that collectively interact as a project team for the achievement of the common goal (Lechler, 1998). Within the framework of the investment and building project the following groups of participants interact: investor, customer, developer, contractor, design and surveying organizations, insurance companies, banks and many others (Shindina, 2016a). The objects of this research are the relationships in the developer-contractor system. The level of these relations will directly affect the speed and the quality of construction.

The developer owns a certain land plot and raises financial means of participants of the shared-equity construction for the purpose of construction of inhabited or any other real estate objects on the basis of the official construction license available. The developer is responsible to the customer in full compliance with the terms of the contract, the project, the requirements of building norms and rules, stipulated by the cost. At the same time, the problem of interaction with the design organizations, public authorities, and suppliers of resources lays down on the developer.

In the conditions of multitasking the developer faces a choice to transfer a part of works on the construction of the facility to the contractor or to perform all the works with forces of own divisions. On the one hand, the transfer of works to the contractor allows the developer to optimize business processes and reduce construction cost by that. On the other hand, there is always a risk of opportunistic behavior of the contractor that increases the risks for the developer because the developer is responsible for the quality and terms of work performance to the customer.

At the same time, it should be noted that in spite of the fact that both the developer and the contractor are the participants of one investment and building project, they pursue different aims. The developer is interested in the the object to be built in the specified terms and without excess of estimated cost (Shindina, 2016b). In turn, the contractor, by contrast, is interested in increasing the cost of construction and

thereby obtaining higher pay for work. Along with it, if each of the participants of these relations behaves honestly and does not break the contractual relations, then it pushes the developer to the transfer of bigger number of works to the contractor. Therefore, studying the factors promoting the establishment of effective relations between the developer and the contractor has a key value for the successful implementation of the investment and building project.

## 2. Literature Review

Literature review within the research of transaction costs confirms considerable interest from researchers in the identification of the effect of the main components of transaction cost theory for vertical integration and completeness of contracts.

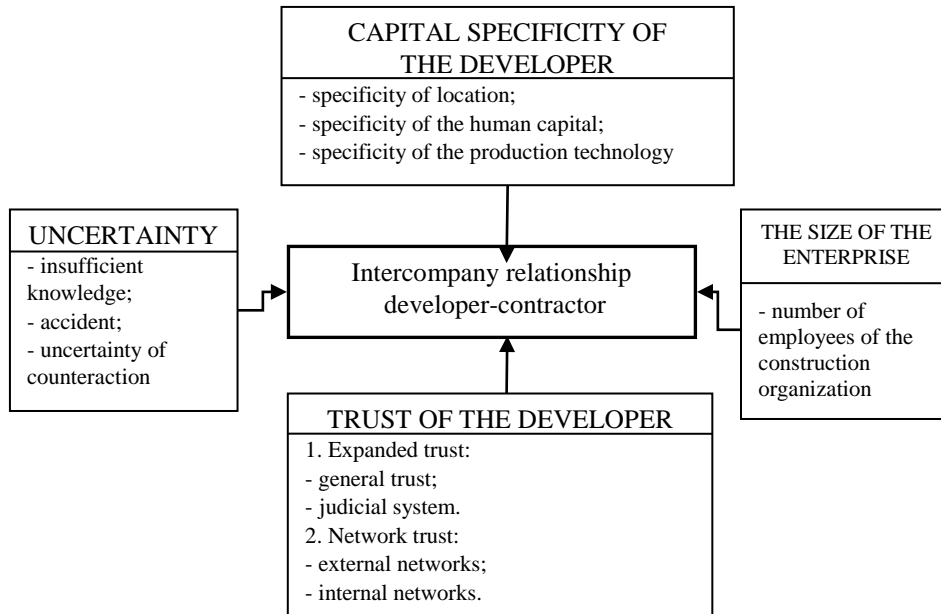
Anderson and Schmittlein (1984) leaning on the theoretical background of the transaction cost theory, formulated the model of logistic function of reaction which has been used for forecasting of the firm's decision concerning whether it will use independent intermediaries or rely on the own sales staff. The assessment of the model parameters was carried out on the basis of the data of the USA branch of electronic components. The model confirms the prerequisites of the transaction cost theory that vertical integration is associated with high levels of specificity of assets and uncertainty.

A number of authors note that in the course of implementation of the investment projects in the construction industry traditional mechanisms for the establishment of the relations between its participants have negative effect on the results of the project in general (Shmaliy and Dushakova, 2017; Bondarenko *et al.*, 2017). The sources of negative impact are unrealistic tender pricing (Rahman and Kumaraswamy, 2004) and the use of weaknesses in contract documentation (Mosey, 2003). As a result, there are disputes, mistrust and conflicts between the participants of the investment projects in the construction industry (Sakal, 2005), judicial proceedings (Yiu and Cheung, 2007), forces are spent for overcoming disagreements, but not for the cooperation establishment (Wood and McDermott, 1999). As a result, the costs of the project grow, the process of construction is dragged out. The trust in classical option does not belong to the factors considered by the transaction cost theory, but its influence can be considerable from the point of view of the relations between the parties of the project and the general success of the project (Pinto *et al.*, 2008). Due to the reduction of probability of opportunism and reduction of the level of uncertainty, the trust softens pressure towards vertical integration.

Literature analysis on the problems of establishment of effective relationship between the developer and the customer allowed to establish that the specificity of capital, the amount of business and uncertainty of operating conditions considered from positions of the transaction cost theory act as major factors influencing the emergence and development of the relations between them (Brewer and Strahorn,

2012) (see Figure 1). Also, as a separate factor the trust of the developer to the participants of investment and construction process is allocated.

**Figure 1.** Factors influencing the creation of intercompany relationships between the developer and the contractor



*Source:* Authors.

The specificity of the capital is defined by the degree in which the capital is adapted for the needs of the specific user and also the degree in which the capital can be used for alternative needs. Williamson (1983) distinguishes the following six types of specificity of capital: specificity of location, specificity of the physical capital, specificity of the human capital, specialized capital, branded capital and temporary specificity. Uncertainty belongs to the extent of the existence of information necessary for the adoption of key decisions and forecasting the consequences of these decisions. At the same time, uncertainty inevitably appears in any design environment (Schwalbe, 2004). Uncertainty is subdivided into three parts:

- insufficient knowledge – ignorance of something that can affect the work progress within the investment project in the construction industry;
- accidents – various casual events influencing the work of the developer and contractor. For example, equipment failure or failure of supply of raw materials;
- uncertainty of counteraction – counteraction of competitors.

Inclusion of the size of the enterprise in the list of the factors influencing the creation of intercompany relationship between the developer and the contractor is based,

mainly, on economies of scale. The bigger the developer is, the higher the probability that for the performance of the work he will use his own workers and the equipment but will not address the contractors for this purpose. The main obstacle for the establishment of effective intercompany relationship between the developer and the contractor in Russia is the lack of trust to business partners and the desire to concentrate the majority of works on the investment project in the construction industry in the uniform company.

Hendley *et al.* (1998) during the study of transactional strategy of the Russian enterprises found out that in the conditions of transitional economy strategies, based on the trust, gain special importance along with the personal relations. Sako (2002) not only considers trust as the alternative mechanism of the organization, but also shows that trust is a background for the successful functioning of business.

Strahorn *et al.* (2015 and 2017), Chan *et al.* (2003 and 2006) and Hartman (2002) wrote in their works about the influence of trust on the management of the investment projects in the construction industry. Considering that trust has universal, cross-disciplinary character, it is logical to believe that, it is described in them in different contextual conditions. There is a set of models of trust which structure first of all depends on the definition of trust accepted in the corresponding research (Mayeret *et al.*, 1995). In a view of the described reasons, it is obvious that there is no uniform model of trust which could provide its universal applicability (Romahn and Hartman, 1999).

However, despite significant amount of differences in the understanding of trust in different researches, the most part of approaches notes the following components of trust:

- trust provides a certain interrelation between two partners;
- trust is a source of the solution for the problems of risk and uncertainty connected with the exchange;
- trust allows to lower or avoid the vulnerability connected with adoption of risk.

Taking into account the literature analysis as well as the practice of the intercompany relations management within the framework of the investment project in the construction industry, two types of trust may be allocated in the research, depending on its influence on the degree and borders of cooperation between the developer and the contractor – they are the network trust and the expanded trust.

The expanded trust is measured on the basis of the variables reflecting the perception of the manager of the investment project in the construction industry concerning the level of development of formal institutes. As the assessment factors of the expanded trust it is offered to estimate the general trust and the trust to judicial system. The general trust reflects nonspecific behavior for the specific subject of the relations;

the trust to judicial system reflects the perception of reliability of legal institutes by firm at present. Network trust is the trust arising owing to the friendly or related relations, the information obtained from the former employees or partners, business associations or public institutions.

In our opinion, it is necessary to understand the expectation of nonopportunistic behavior of the partner, expectation of the observance of rules and terms of the contract as trust. The term “opportunistic behavior” was introduced by Williamson (1983). That is called unfair behavior violating terms of transaction or aimed at obtaining unilateral benefits to the detriment of the partner. Under this heading go various cases of lie, deception, etc. The expenses of this type are connected with the difficulties of exact assessment of post-contract behavior of another participant of the transaction. In essence, these are the same expenses of measurement, but only belonging not to the results but to the process, not to the transferred products but to the behavior of contractors according to the transaction. This form of expenses can be shown in the form of performance refusal of obligations for the contract, after receiving an advance payment, or in the form of extortion from the contractors. Such belief can evolve from the personal relations on the one hand and trust to legal and public institutes on the other.

In both cases trust represents the mechanism which facilitates the relations between the organizations, due to the reduction of fear concerning a possibility of opportunistic behavior of the partner. However, the ability to trust depends, in its turn, on the amount of uncertainty and the risk of opportunistic behavior existence.

### **3. Research Methodology**

For the creation of the model and also for carrying out the factorial analysis by the method of main components, the statistical program SPSS was used. The main advantage of this program is the broad coverage of the existing statistical methods which are successfully combined with a large number of convenient visualization tools of the processing results.

Logistic regression is applied to the prediction of emergence probability of some event on the values of a set of signs. The so-called dependent variable  $y$  accepting only one or the other values – as a rule, it is number 0 (the event hasn't taken place) and 1 (the event has taken place), and a set of the independent variables (which are also called by signs, predictors) –  $x_1, x_2, \dots, x_n$  on the basis of which values it is required to calculate the probability of adoption of this or that value of the dependent variable is introduced.

The assumption that the probability of approach of an event of  $y = 1$  is equal becomes:

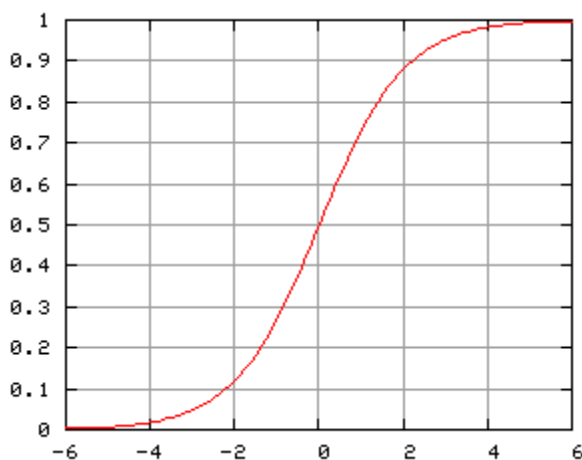
$$\Pr\{y = 1|x\} = f(z), \quad (1)$$

where  $z = \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n$

$x_1, \dots, x_n$  – independent variables  $\beta_1, \dots, \beta_n$  – estimated parameters,

$f(z)$  – logistic function (see Figure 2).

**Figure 2.** Logistic function research



*Source: Buharin et al., 2013, p. 146.*

Logistic function has an appearance as in equation 2:

$$f(x) = \frac{1}{1+e^{-x}}; \quad (2)$$

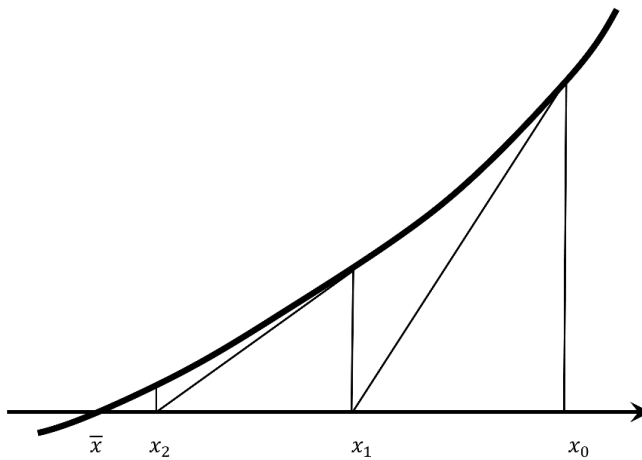
For the selection of parameters  $\beta_1, \dots, \beta_n$  the selection consisting of the sets of values of independent variables and values of a dependent variable  $y$  corresponding to them is formed. Formally, this set of couples  $(x^{(1)}, y^{(1)}), \dots, (x^{(m)}, y^{(m)})$ , where  $x^{(i)}$  of  $\in \mathbb{R}^n$  – a vector of values of independent variables, and  $y^{(i)} \in \{0,1\}$  – the value  $y$  corresponding to them (Orlova et al., 2014).

For finding of coefficients  $\beta$  the method of maximum likelihood is usually used. According to this method such parameters  $\beta$  at which on concrete selection the maximum of function of likelihood is reached are chosen. Maximizing the function of likelihood is equivalent to maximizing it's logarithm:

$$\log L(\theta) = \sum_{i=1}^m \log \Pr\{y = y^i | x = x^i\}; \quad (3)$$

Newton's method was applied to maximizing this function. Newton's method is the iterative numerical method which is applied to finding of zero (root) of any function. Geometrical interpretation of the method is that some initial point near an estimated root of function is chosen, then the tangent to the function in this point is under construction. If the difference between the chosen initial point and a root of the equation of a tangent is more than required accuracy, there is the following iteration. And it is necessary to repeat this until the root of the equation of a tangent doesn't approach sufficiently a root of the studied function (the difference of a root of the equation of a tangent and a point of iteration won't become less or the equal expected accuracy) (see Figure 3).

**Figure 3.** Finding of a root of function by Newton's method



**Source:** Authors.

This or any other method of maximizing function of credibility allows to find such coefficients of mathematical model which allow to put this model into practice with a sufficient accuracy.

#### 4. Results and Discussion

For the purpose of receiving the idea of numerical indicators of quality of the chosen criteria the model has been constructed. For this purpose, the express diagnostics on the basis of the theory of expert estimation at the enterprises of construction industry was carried out. 90 people representing different construction organizations of the Ural Federal District, engaged in practice of construction for not less than 5 years and decision-making in the field of management and having higher education were as experts. At data processing, assessment of experts' competence was carried out ( $K_{kom}$ ), the issue of sufficiency of selection and coherence of the opinion of experts ( $W$ ) was resolved. Likert scale was applied to the assessment of variables. Each



point of the scale has five categories for the answer from “doesn't agree at all” to “completely agrees”.

The Logit-model estimating the parameters and the criteria of the consent for the constructed logit-model is given in Table 1. The quality of model is rather high ( $\chi$ -square is significant at the level of  $p = 0.256$ ); Cox and Snell's R-Square is higher than 0.1; Nagelkerke's R-Square is higher than 0.130; the correct predictions make up nearly 83% of the total number).

**Table 1.** Estimates of parameters and criteria of the consent for a logit-model

Goodness-of-fit	
-2 log likelihood	89,315 (at the level of 0.001)
Goodness-of-fit	10.416
Cox and Snell's R-Square	0.104
Nagelkerke's R-Square	0.139
$\chi$ -square; freedom degree, significance value	
Model	7.726; 6 (0.256)
Block	7.726; 6 (0.256)
Step	7.726; 6 (0.256)
General percentage of the correct predictions	82.9
Amount of selection	
Total number of observations	91
Number of the observations included into the analysis	70

*Source:* Authors.

Results of logit-model are presented in Table 2. The dependent variable is the choice of the form of the organization of intercompany relationships. An example of modeling for one studied field of the company activity is represented in Table 2.

**Table 2.** Example of modeling for one studied field of the company activity

The estimated parameters	Results of modeling
Estimates of parameters	
Constant	7.412
TCT (transaction cost theory) variables	
Specificity of capital	-1.003
Uncertainty	-0.901
Size	-0.0503
Trust variables	
General trust	0.142

The estimated parameters	Results of modeling
Trust to judicial system	0.529
Internal networks	0.114
External networks	0.107

*Source: Authors.*

From Table 2 it is visible that the greatest impact on the choice of transfer of the part of construction works to the contractor is exerted by the factor of specificity of the capital of the firm (has negative influence). Namely, as it was shown the method of the main components, these are confidentiality and specificity of the technologies of the firm. For example, the more unique technologies of the organization, the less likely that there will be a contractor capable to accept its business-process.

Uncertainty exerts negative impact on the decision because the firm needs the presence of the contractors at the market with sufficient experience and technical equipment for effective fulfillment of the process. As the method of the main components showed, casual processes influence the decision a little, therefore it is possible to neglect them and not to take into account.

Introduction of such factor as trust has allowed to convince that not only concrete indicators of the market and firm condition can exert the impact. Trust, as it was shown in Table 2, is an important factor which should be considered. On the third place of its importance after specificity of capital and uncertainty stands trust to the judicial system. The higher it is, i.e. the more a firm is sure of the fact that the law will protect its rights in case of contract breach. Other criteria, as seen from the Table 2, do not exert such a great influence. Judging by the results, the size of the firm practically does not matter.

## 5. Conclusions

The factors influencing the choice of intercompany relationship in the framework of the investment project in the construction industry system are defined: specificity of capital (specificity of location, human capital, specificity of technology and also confidentiality of information) and uncertainty (insufficient knowledge, accident and uncertainty of counteraction).

The concept of trust was introduced into the model containing economic factors and indicators to show and analyse, how big is the influence of the relation between firms, contract organizations, various institutions and judicial system on the choice of the developer.

Trust is seen as an expectation of nonopportunistic behavior of the partner, expectation of obserion of the rules and terms of the contract.

The research has allowed to understand that the trust to the organizations and other subjects of the economic relations existing at the market plays not the last role in the developer's decision to transfer a part of construction works to the contractors.

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