



Violeta KERŠULIENĖ

**DETERMINATION OF THE RATIONAL
METHOD OF SOLUTIONS IN DISPUTES
BY THE CONTRACTOR AND CLIENT
BASED ON THE GAME THEORY**

**Summary of Doctoral Dissertation
Technological Sciences, Civil Engineering (02T)**

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Vilnius  **LEIDYKLA
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VILNIUS GEDIMINAS TECHNICAL UNIVERSITY

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VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS

Violeta KERŠULIENĖ

**UŽSAKOVO IR RANGOVO RACIONALIAUS
GINČŲ SPRENDIMO BŪDO NUSTATYMAS
LOŠIMŲ TEORIJS METODAIS**

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1. General Characteristic of the Dissertation

Relevance of the Work. Recently, in countries of both general and continental traditions of law one can note increasingly active interest of researchers in alternative methods of dispute resolution. Application of these methods is especially relevant for solution of disputes among participants of construction process, and for several reasons: first of all, solution of disputes between participants of construction process frequently requires integrated knowledge of law, technologies, engineering, economics, etc.; then, disputes among participants of construction process often stop development of construction projects, where time is of special value, and thereby increase construction costs; thirdly, in modern society, completion of construction process is not any more linked with completion of construction works, since a builder is responsible for warranty elimination of defects and for damage to third persons due to construction works performed, and therefore for participants of construction process it is very important that their disputes have minimal impact on preservation of friendly relations in future.

Participants of construction process, who select a proper method for solution of specific dispute, not only would save much time, avoid emotional stress and unwanted publicity of problems, but would also often avoid large financial costs related to litigation in courts and would not preclude further cooperation, without which successful implementation of construction projects is not possible.

For solution of various legal, technological, management etc. tasks, solution support systems are globally and successfully employed already for several decades; these systems help users analysing possible versions of solutions and suggesting the best (most rational) solutions. For selection of the most rational method to solve a dispute among participants of construction process, the solution support systems can also be used. For solution of this task it is necessary to determine possible methods to solve a specific dispute, to create methodology for assessment and comparison of these methods, and to suggest a possible operation model of the solution support system.

Implementation of the said task would open ways for installation of computer technologies not only when selecting most rational way to solve a dispute among participants of construction process but also when solving their disputes.

Topicality of the problem. Selection of rational way to solve disputes among participants of construction process requires adequate decisions of construction process management, for making of which the parties of

dispute themselves often lack legislative knowledge, and lawyers representing them lack engineering way of thinking, supporting the formalism of presentation of legislative knowledge, and because of that it remains unclear for them how the problem solution variants suggested by legislative support systems that were created on the basis of these formalities can be approved and legitimized.

There are quite many researches dedicated to application of Internet solution support systems for solution of various tasks of construction process, but there is a lack of feasibility studies and practical application to solve legislative tasks of participants of construction process. Computerisation of solution of these tasks could contribute to solution of disputes of participants of construction process with the least time, financial, emotional, etc. costs. An equally important but less researched factor is application of computer technologies for solving disputes of construction process participants in virtual space (in *online* mode).

Object of Scientific Researches. The object of the research comprises methods to solve disputes between a customer and a contractor as most typical participants of construction process, and opportunities to use the solution support systems for selection of rational solution method.

Scientific Novelty of the Work. Disputes among construction process participants can be boldly considered an integral part of construction process: various disputes, often evolving into larger conflicts, are common to all the major construction projects [Chleboski, 2001; Harmon, 2003; Vaaland, 2004]. Moreover, the specific of these disputes is to strongly influence implementation of construction projects. Therefore it is not by accident that many authors examine them as a separate type of disputes [Arditi and Tokdemir, 1999; Castell, 2003; Cheung, 1999; Chleboski, 2001; Harmon, 2003; Iyer and others, 2007; Odeh and Battaineh, 2002; Assaf and Ai-Hejji, 2006; Jannadia and others, 2000; Chen and Hsu, 2007].

Though the research works may offer many recommendations on how participants of construction process could avoid the threat of disputes [Wong and Cheung, 2004; Wong and others, 2008; Cheung and others, 2003; Odeh and Battaineh, 2002], often they are not avoided. And therefore the parties standing in front of a conflict are forced to decide on the best solution: to entrust the dispute to a court, to attempt settling it by negotiations, or maybe there are some other ways of dispute solving that are not known to them? Dispute settlement procedures are closely related to regulation by national legislation: in order that a dispute is settled in courts or that a decision on dispute settlement reached by other methods has a legal power, a State, using legislative acts, establishes a rules valid in its territory and governing the system of proceedings having the purpose to

solve a dispute [Mikelėnas, 1997]. In works of Lithuanian researchers, only recently topics emerged that examine alternative (non-judicial) methods of dispute solving [Uscila, 2001; Tvaronavičienė, 2008; Jurkšaitytė, 2001; Simaitis, 2004; Simaitis and Kurgonaitė, 2007], but these works lack a deeper analysis of what specific methods of dispute solving would maximally satisfy interests of construction process participants in each particular case.

In order to answer this question, it is expedient to look at the analysed problem from economist's or engineer's perspective and to benefit from possibilities of game theory and multi-criteria solution support systems based on its methods. Application of solution support systems for solution of various legal issues was analysed in works of numerous foreign authors [Arditi and Tokdemir, 1999; Baird and others, 1995; Belucci and Zeleznikow, 1995; Castell, 2003; Li, 1996; Pople, 1993]. Possibilities to apply the game theory in law received large attention from Baird and others, 1995; Miceli, 2000; Miceli, 2004; Hylton, 2002; Main and Park, 2002. In spite of this, there is a lack of scientific research that could substantiate decisions of construction process participants when selecting the most rational way of dispute solving. In works of Lithuanian authors, the application of solution support systems is also directed towards solution of other economic or construction process management problems [Ginevičius and others, 2004; Kaklauskas and Urbanavičienė, 2005; Merkevičius, 2005; Merkevičius and others, 2005; Mitkus and Dėjus, 2000; Mitkus, 2001; Zavadskas and Kaklauskas, 1996; Zavadskas and others, 1999; Zavadskas and others, 2001; Zavadskas and others, 2002; Zavadskas and others, 2003; Zavadskas and others, 2004 a; Zavadskas and others, 2004 b; Zavadskas and others, 2004 c; Zavadskas and others, 2005; Ustinovičius, 2004; Ustinovičius and Barvidas 2007; Banaitienė and others, 2008].

Purpose of the Work. The purpose of the work is analysis of possibilities to apply Internet solution support systems, based on game theory methods for selection of rational solution of disputes among customer and contractor as most typical participants of construction process, also assessment of possibilities to transfer solution of customer-contractor disputes by means of alternative methods to virtual environment (*online mode*).

Tasks of the Work. For achievement of the defined purpose, the following tasks were raised in the work:

1. Analysis of present legislative regulation of customer to contractor relations and of possible reasons of emergence of conflicts between customer and contractor.

2. Substantiation of possible instruments for reduction of risk of conflicts.
3. Comparative analysis of possible methods to solve disputes between customer and contractor.
4. Assessment of possibilities to apply methods of game theory when selecting economically beneficial method to solve disputes between customer and contractor.
5. Analysis of possibilities to apply solution support systems in order to find a rational method to solve disputes between customer and contractor.
6. Analysis of alternative possibilities of solution of disputes between customer and contractor in virtual (*online*) environment.
7. Preparation of suggestions for determination of rational method of solution of disputes between customer and contractor with the help of solution support systems based upon methods of game theory, and for transfer of dispute solution to virtual (*online*) environment.

Research Methodology. To examine the research problem and to determine research structure and possibilities to reduce the dispute risk, court practice when solving disputes between customer and contractor was applied, just as empirical analysis of research made by other authors. For selection of economic method of dispute solving, methods of game theory were applied. For determination of a rational method to solve disputes between customer and contractor according to numerous indices, calculations were made using a game theory based solution support system LEVI 3.0.

Practical Significance of the Work. The work examined solutions methods applicable to disputes between customer and contractor as most typical participants of construction process, their comparative analysis was conducted.

Economic calculations are provided showing when it is expedient for customer and contractor to settle a dispute by means of alternative (non-judicial) methods, if the main criteria determining selection of dispute solution manner for the parties is the price of litigation.

The LEVI 3.0 solution support system allowed performing multi-criteria assessment of customer-contractor dispute solution methods and determining degree of their expediency.

Suggested architecture of online alternative dispute resolution (hereinafter also referred to as *online* ADR) can be applied in practice when realising alternative solution of customer-contractor disputes in *online* environment.

Approval of Work Results. The statements examined in the thesis were presented and discussed in one international and three national conferences and in six scientific publications. On this topic, one publication was published in the edition included in the ISI list of scientific publications, two articles were published in academic magazines included into databases approved by the Science Council of Lithuania, also in three proceedings of conferences.

Structure and Scope of the Work. The work consists of introduction, four chapters, conclusions and suggestions, also a list of sources. Scope of the work – 119 pages.

2. Analysis of Conflict Situations between Customer and Contractor

Survey of legislative acts governing the construction process proves that their abundance and frequent amendments are among the reasons determining emergence of disputes between customer and contractor. It was also determined that the most favourable media for arising of disputes between customer and contractor is created by large number of organisations participating in construction process, the existing complicated structure of making contracts, and unique non-standard works, also large scopes of works.

Various disputes are a natural and, one may claim, integral part of social relations. In the construction process, for avoidance of conflicts with possible severe consequences it is necessary to understand efficient ways to monitor and solve conflicts, to timely interfere into a developing conflict, so that it does not grow into structural, i.e., multilayered and multilateral one, where solution would require huge time costs, material and human resources. Thus the dispute prevention constitutes an important factor influencing the course of construction process. As the main levers precluding possible future disputes between customer and contractor undoubtedly should be held the civil liability insurance of contractor, qualified preparation of construction contracts, their proper implementation, and cooperation of the said participants of construction process both in contractual and pre-contractual issues.

3. Methods of Solving Customer-Contractor Disputes

The range of dispute settlement methods fluctuates from informal negotiations to formalised processes, such as arbitration of judicial litigation. Alternative dispute resolution methods (ADR) existing in addition to the judicial method as common in today's society emerged

immediately when courts became the only institution dispensing justice in the State. In practice alternative methods of dispute resolution are known, one of the most popular in world being mediation and arbitration.

Comparative analysis of dispute resolution methods allows stating that mediation and arbitration are reliable ways to solve a dispute between parties and to protect from attention of outsiders their trade secrets and the very fact of dispute existence. Results of comparative analysis of disputes also show that regulation of dispute between customer and contractor by one of alternative methods of dispute resolution provides the parties with an excellent opportunity while solving the dispute to avoid limiting themselves with knowledge of lawyers exclusively and to expediently and economically employ entire set of knowledges necessary for dispute solving – skills and experience of construction specialists, psychologists, professional negotiators and other competent persons.

In each particular case analysis of negative and positive features of various dispute resolution methods allows evaluating the perspective of judicial litigation and application of other dispute resolution methods. Such knowledge allows reasonably and deliberately select the most suitable method for dispute solving – litigation in court, arbitration, mediation, etc.

4. Selection of Economically Most Beneficial Method of Dispute Resolution

Customer or contractor, between which a dispute arose, in order to determine, which method of dispute resolution is most expedient, unavoidably encounters the resolution selection procedure. Since making of legal decisions is usually based on logical analysis of circumstances and facts related to a dispute, mathematical calculations can successfully be applied for substantiation of these decisions.

The game theory can be applied when we can foresee possible variants of customer and contractor activities, and moreover, they have information on activities of the other party and game results, obtained when using a variant of each party of the dispute (a player). The game theory would help recommending to customer and contractor a rational dispute resolution method, when the principle is observed that the other participant of the game is not less rational and makes all the efforts to achieve that the adversary's prize is minimal.

If lack of information is encountered when selecting a rational dispute resolution method (when forecasting changes of market prices of object under construction, duration of construction works, date of making decision by court, litigation expenses, etc.), decisions must be made without having

sufficient information. In this case, application of statistical solution theory method can be quite successful.

In order to assess if it is expedient for a customer (or a contractor) to apply to courts for dispute resolution, let's mark the possibility of the customer to win the judicial procedure as assessed by itself as L_i , and L_a will denote the customer's possibility to win the dispute as assessed by the other party of the dispute – the construction contractor (in other words, L_a is the contractor's assessment of its possibilities to lose the judicial dispute). P will denote the monetary amount that would be awarded by court for the benefit of contractor if it wins the judicial dispute, and B_i and B_a will respectively denote litigation costs of the customer and the contractor.

Using the above variables we can calculate expected value of customer's litigation ($L_iP - B_i$), if the amount awarded to it by court decision exceeds the litigation costs. If forecasted value of litigation is positive, the customer will certainly always seek for judicial litigation, if the dispute could not be resolved amicably after employing all the possibilities. When we know these forecasts of the customer, we may claim that it would be satisfied by any suggestions from the contractor S for amicable resolution of dispute, when $S \geq L_iP - B_i$.

At the same time, the contractor's forecasted litigation price is $L_aP + B_a$. Thus the contractor would be satisfied by an amicable agreement with the amount of $S \leq L_aP + B_a$. From this it follows that amicable agreement between parties of construction contract is possible when there exists such amount of suggestion S that meets the following condition:

$$L_iP - B_i \leq S \leq L_aP + B_a, \quad (1)$$

From this it follows that when parties have equal confidence concerning possibility to win the dispute, an amicable agreement is always possible, because the parties have a common interest to avoid litigation costs, and the amicable regulation of dispute is not guaranteed if any of the parties firmly believes that

$$(L_i - L_a)P \leq B_a + B_i. \quad (2)$$

In this case difficulties of negotiation will be proportionate to the difference between their beliefs on outcome of the case.

But contractors who do not have the information available to customers cannot foresee specific type of the other party of the dispute, i.e., the customers (though contractors may know that a few types of contractors exist). Let's say that a describes abundance of 'high-possibility' customers.

In this way a contractor can calculate average possibilities of customers to win proceeding:

$$L_{vid.} = aL_d + (1 - a)L_n. \quad (3)$$

From this it follows that the price of judicial litigation with a random customer as expected by contractor is $L_{vid.}P + B_a$. Just as in previous model of probabilistic calculations, amicable agreement would be possible if this case if contractor is able to offer to the customer such a monetary amount P that would be rather accepted by the customer instead of litigation.

If a contractor first of all offers to customer the amount that is higher than or equal to litigation value of ‘high-possibility’ customer, i.e., $L_dP - B_i$, customers of both types will agree with such offer and the dispute will be settled without judicial litigation. Let’s say that a contractor attempts such a game strategy, with the help of which, aiming to satisfy customers of both types, he suggests an amount equal to $S_d = L_dP - B_i$, corresponding to the lowest amount after receipt of which the customer would not apply to courts. Under this strategy, the contractor loses an amount equal to $L_dP - B_i$, and the dispute fails to reach the stage of judicial litigation.

A contractor, however, may attempt reducing the lost amount using various strategies. Let’s suppose he offers an amount $S_n = L_nP - B_i$. A customer with low possibilities to win the proceedings will agree with such offer, but a customer with high possibilities to win judicial dispute will reject such an offer and will apply to a court with lawsuit. This strategy of division of customers into a few types determines individual negotiations of contractor with each customer separately (a ‘low-possibility’ customer will end the dispute amicably, and a ‘high-possibility’ customer will apply to courts). When a contractor is not aware of the type of customer he is offering money to as compensation for inflicted losses in order to end the dispute amicably, his expected expenses will be

$$a(L_dP + B_a) + (1 - a)(L_nP - B_i). \quad (4)$$

Third possible strategy would be that a contractor offers an amount lower than S_n , and in this case customers of both types would reject the offer, and the dispute of parties would most probably reach a court.

A contractor, after calculating average possibilities of customers to win a proceeding, will aim amicable agreement without exceeding expenses that are $L_{vid.}P + B_a$. It is not difficult to understand that this price will be acceptable to customer of L_n type, but not to ‘high-possibility’ customer. Such strategy can be acceptable to contractor as well, since for him it is

usually cheaper to satisfy interests of a customer of at least one type, since it allows him saving costs for litigation with that type of customer.

The conducted calculations prove that in case of optimistic model contractor and customer always has the possibility to end a dispute amicably, if their forecasted assessment concerning outcome of proceeding is equal. A contractor who selects the model of asymmetric information to assess expediency of litigation, most often will reach amicable agreement only with 'low-possibility' customer.

5. Selection of Rational Method for Customer-Contractor Dispute Resolution with Application of Internet Solution Support Systems

Since, in case of a dispute, parties usually have opposite goals, and moreover each of the parties simultaneously strives for not a single but multiple goals (expediency, economic value, confidentiality, etc.), then for selection of dispute resolution manner the methods should be applied that are suitable to solve tasks with multiple target functions. This condition is met by methods of multiple criteria decision making (MCDM).

In order to assess dispute resolution methods of customer and contractor economically, socially and/or from other point of views, it is necessary to apply methods for assessing solutions according to multiple indices. For this purpose one can apply the LEVI 3.0 solution support system. With the help of the LEVI 3.0 solution support system, a user can obtain essential data and information and then to analyse in detail the problem to be solved in various (desired) aspects. The said system evaluates possible solution alternatives from various sides: it performs analysis of separate solution alternatives under numerous indices, determines rank (priority) and selects the most efficient versions, thus allowing the user to make a rational decision.

For selection of rational method to solve a customer-contractor dispute, the author suggests making calculations only according to 10 most significant indices as specified by respondents.

For determination of rational method to solve a customer-contractor dispute with the help of LEVI 3.0 solution support system, it is necessary to create a primary decision making matrix and a linearly normalised decision making matrix, for creation of which the author suggests using formulas of linear normalisation.

Calculation results show that for determination of rational method for a customer-contractor dispute resolution one can apply the Bayes, Laplace and Hodges-Lehmann rules that take into consideration the weights of indices describing dispute resolution methods. In all the three versions it

was found that when a dispute amount is 100 000 Lt and when parties are ready to litigate in two judicial areas, the most rational solution for customer and contractor is to choose dispute resolution by means of mediation.

Taking into consideration the fact that when a conflict arises between customer and contractor the parties often are not able to settle the dispute constructively because of emotions and weak abilities to present their positions in reasoned manner, the dispute resolution can be assisted by negotiation-type solution support systems that allow solving a customer-contractor dispute in virtual environment (*online* mode).

Conclusions and Recommendations of the Work

1. The conducted survey of legislative acts governing the construction process proves that their abundance and frequent amendments are among the reasons determining emergence of customer-contractor disputes.

2. In order to ensure that legislative basis governing requirements towards buildings is transparent and clear and that builders can become aware of what requirements must be complied with already before submitting applications for obtaining conditions, it would be expedient and logical to stipulate in the Law on Construction that the list of mandatory normative requirements towards buildings is exhaustive, and the requirements must be formulated in such a way that no conditions for different interpretations emerge.

3. Taking into consideration the policy implemented by the European Union in the area of dispute examination, also the recommendations of the European Council of Ministers on use of alternative methods of dispute examination, it may be concluded that mediation and arbitration will gain popularity in Lithuania.

4. It was found that in each specific case, after analysis of negative and positive features of various dispute resolution methods, it is possible to assess the perspective of litigation in court and application of other dispute resolution methods. Such knowledge allows reasonably and advisedly selecting the most suitable method for solving a specific dispute – litigation in court, arbitration, mediation, etc.

5. It is mathematically proved that for a customer who does not use legal help it is always more beneficial economically to seek for amicable dispute resolution.

6. Conclusion should be reached that methodology for calculation of usefulness of possible strategies could be employed when creating

specialised legislative solution support systems that will allow selecting a rational method for customer-contractor dispute solving more accurately.

7. It is proved that for successful selection of rational method for customer-contractor dispute resolution the LEVI 3.0 solution support system can be applied. Multi-criteria alternative assessment made with the help of this system according to determined significance of indices, mediation should be considered the most beneficial way for customer-contractor dispute resolution.

8. Suggested architecture of *online* ADR system can be used when practically implementing alternative methods of customer-contractor dispute resolution in virtual environment.

9. Conclusion should be reached that in order to grant a mandatory impact to dispute solutions achieved by means of mediation, a court approval and issue of executive document should be legitimised for such solutions, or legislative acts should stipulate a possibility for the parties to apply to notary public or bailiff for certification of the reached agreement. This would strengthen actuality and reliability of performance of solution reached by means of mediation.

10. It should be suggested to the Information Society Development Committee under the Government of the Republic of Lithuania to consider the possibility to initiate adoption of governmental decree that would clearly recognise and specifically promote the services of virtual dispute resolution by alternative methods in Lithuania.

List of Published Works on the Topic of the Dissertation In the reviewed scientific periodical publications

1. KERŠULIENĖ V. The legislation approach of the third party liability insurance for construction designers and contractors. *Ūkio technologinis ir ekonominis vystymas*, ISSN 1392-8619, Vol 11, Nr. 3, 2005, p. 190-196 (in Lithuanian).

2. KERŠULIENĖ V. Possibilities of clients and contractor's disputes settlement at the pretrial stage. *Ūkio technologinis ir ekonominis vystymas*, ISSN 1392-8619, Vol XIV, Nr. 2, 2007, p. 139-143 (in Lithuanian).

In the other editions

3. KERŠULIENĖ V., URBANAVIČIENĖ V. Selection of economy based methods for resolution of disputes originated between the client and contractor. 9th International Conference: Modern building materials, structures and techniques, Vols 1-3, 2008, p. 287-292 (Thomson ISI Proceedings).

4. KERŠULIENĖ V. The issues of legal reglamentation of international commercial agreements. Iš *Verslas, vadyba ir studijos* '2002. Vilnius: „Technika“, 2003. ISBN 9986-05-638-1, p. 226-229 (in Lithuanian).

5. KERŠULIENĖ V. Possibilities of client and contractor's disputes settlement at the pretrial stage. Iš 9-osios Lietuvos jaunųjų mokslininkų konferencijos *Mokslas – Lietuvos ateitis*, Vilnius: „Technika“, 2006, ISBN 9955-28-047-6, p. 379 – 384 (in Lithuanian).

6. KERŠULIENĖ V., URBANAVIČIENĖ V. Alternative resolutions for client – contractor disputes. 10-osios Lietuvos jaunųjų mokslininkų konferencijos *Mokslas – Lietuvos ateitis*, Vilnius: „Technika“, 2007 m., p. 348 – 353 (in Lithuanian).

About the autor

Violeta Keršulienė was born in 1967 in Klaipėda (Lithuania). In 1991 she graduated from the Civil Engineering Faculty at Vilnius Gediminas Technical University. In 1999 she acquired the lawyer's qualification at Vilnius University, Law Faculty. Since 2002 she has been working as a Director of Legal Affairs Department, and since 2007 as a lecturer at the Law Department of VGTU.

UŽSAKOVO IR RANGOVO RACIONALIAUS GINČŲ SPRENDIMO BŪDO NUSTATYMAS LOŠIMŲ TEORIJS METODAIS

Darbo aktualumas. Statybos proceso dalyviai tarpusavyje yra susieti įvairių visuomeninių ryšių, reikalaujančių bendradarbiauti bei koordinuoti laiko, finansines bei žmogiškųjų resursų sąnaudas. Tik sėkmingo bendradarbiavimo atveju galime kalbėti apie sklandų statybos projektų vykdymą. Priešingu atveju, statybos proceso dalyviams neužkirtus kelio galintiems kilti ginčams, pastarieji gali tapti užsitęsusių statybos darbų, įvairių didelės apimties teisinių dokumentų rengimo, netinkamo statybos projekto įgyvendinimo ar didžiulių finansinių nuostolių priežastimi. Konfliktai taip pat sąlygoja priešišką statybos pramonės subjektų požiūrį į konfliktuojančias šalis, o tai turi įtakos statybos proceso dalyvių dalykinei reputacijai ir jų verslo sėkmei.

Pastaruoju metu tiek bendrosios, tiek kontinentinės teisės tradicijos valstybėse pastebimas vis aktyvesnis mokslininkų susidomėjimas alternatyviais ginčų sprendimo būdais. Šių būdų taikymas yra ypač aktualus ginčų, kylančių tarp statybos proceso dalyvių, sprendimui dėl kelių priežasčių: visų pirma, statybos proceso dalyvių ginčų sprendimas neretai reikalauja kompleksinių teisinių, technologinių, inžinerinių, ekonominių ir

kt. žinių; antra, statybos proceso dalyvių ginčai dažnai stabdo statybos projektų vystymą, kur ypač branginamas laikas, taip didindami statybų kaštus; trečia, statybos proceso pabaiga šiuolaikinėje visuomenėje nebėra siejama su statybos darbų pabaiga, nes statytojas yra atsakingas už garantinį defektų šalinimą, už žalą, atsiradusią tretiesiems asmenims dėl atliktų statybos darbų, todėl statybos proceso dalyviams ypač aktualu, kad jų ginčai turėtų minimalią įtaką draugiškų tarpusavio santykių palaikymui ateityje.

Statybos proceso dalyviai, pasirinkę tinkamą konkretaus ginčo sprendimo būdą, ne tik galėtų sutaupyti daug laiko, išvengti emocinės įtampos, nepageidaujamo problemų viešinimo, tačiau neretai išvengtų ir didelių su bylinėjimusi teismuose susijusių finansinių išlaidų bei neužkirstų kelio tolimesniam bendradarbiavimui, be kurio neįmanomas sėkmingas statybos projektų įgyvendinimas.

Įvairiems teisiniams, technologiniams, valdymo ir kt. uždaviniams spręsti pasaulyje jau ne vieną dešimtmetį sėkmingai naudojamos sprendimų paramos sistemos, padedančios vartotojams analizuoti galimus sprendimų variantus bei siūlančios geriausius (racionaliausius) sprendimus. Statybos proceso dalyvių ginčų sprendimo racionaliausiam būdai parinkti taip pat galėtų būti panaudotos sprendimų paramos sistemos. Šio uždavinio įgyvendinimui būtina nustatyti galimus konkretaus ginčo sprendimo būdus, sukurti šių būdų vertinimo ir lyginimo metodiką bei pasiūlyti galimą sprendimų paramos sistemos veikimo modelį. Minėtosios užduoties įgyvendinimas atvertų kelią kompiuterinių technologijų diegimui ne tik renkantis racionaliausią statybos proceso dalyvių ginčų sprendimo būdą, bet ir sprendžiant jų tarpusavio ginčus.

Mokslo problemas formulavimas. Racionalaus statybos proceso dalyvių ginčų sprendimo būdo parinkimas reikalauja adekvačių statybos proceso vadybos sprendimų, kuriems priimti pačioms ginčo šalims dažnai trūksta teisinių žinių, o juos atstovaujantiems teisininkams – inžinerinio mąstymo, padedančio teisinių žinių vaizdavimo formalizmui, dėl to jiems lieka neaišku, kaip galėtų būti aprobuoti ir įteisinti tų formalizmų pagrindu sukurtų teisinių sprendimų paramos sistemų siūlomi problemos sprendimų variantai.

Tyrimų apie internetinių sprendimų paramos sistemų pritaikymą įvairiems statybos proceso uždaviniams spręsti yra gana daug, tačiau stokojama šių sistemų galimybių tyrimo ir praktinio pritaikymo statybos proceso dalyvių teisiniams uždaviniams spręsti. Šių uždavinių sprendimo kompiuterizavimas galėtų prisidėti prie statybos proceso dalyvių ginčų išsprendimo mažiausiomis laiko, finansinėmis, emocinėmis ir kt. sąnaudomis. Tokiu pat svarbiu, tačiau mažai ištirtu veiksniu yra

kompiuterinių technologijų pritaikymas statybos proceso dalyvių ginčų sprendimui virtualioje erdvėje (*online* režimu).

Mokslinių tyrimų objektas. Tyrimų objektą sudaro užsakovo ir rangovo, kaip tipiškiausių statybos proceso dalyvių, ginčų sprendimo būdai bei sprendimų paramos sistemų panaudojimo galimybės racionaliam sprendimo būdai parinkti.

Mokslinis darbo naujumas. Statybos proceso dalyvių ginčus drąsiai galima laikyti neatsiejama statybos proceso dalimi: įvairūs ginčai, neretai peraugantys į stambesnius konfliktus, yra būdingi visiems didesniems statybos projektams [Chleboski, 2001; Harmon, 2003; Vaaland, 2004]. Be to, šie ginčai turi specifika stipriai įtakoti statybos projektų įgyvendinimą. Todėl neatsitiktinai daugelis autorių juos nagrinėja kaip atskirą ginčų rūšį [Arditi ir Tokdemir, 1999; Castell, 2003; Cheung, 1999; Chleboski, 2001; Harmon, 2003; Iyer ir kiti, 2007; Odeh ir Battaineh, 2002; Assaf ir Ai-Hejji, 2006; Jannadia ir kiti, 2000; Chen ir Hsu, 2007].

Nors mokslininkų darbuose galima rasti nemažai rekomendacijų, kaip statybos proceso dalyviai galėtų išvengti ginčų grėsmės [Wong ir Cheung, 2004; Wong ir kiti, 2008; Cheung ir kiti, 2003; Odeh ir Battaineh, 2002], dažnai to pasiekti nepavyksta. Ginčų sprendimo procedūros yra glaudžiai susiję su nacionaliniu teisiniu reglamentavimu: siekiant, kad ginčas būtų nagrinėjamas teisme, arba kad kitais būdais priimtas sprendimas dėl ginčo sureguliuojamo turėtų juridinę galią, valstybės teisės aktų pagalba nustato savo teritorijoje galiojančias taisykles, reglamentuojančias procesinių veiksmų sistemą, kurios tikslas – ginčo išsprendimas [Mikelėnas, 1997]. Lietuvos mokslininkų darbuose tik pastaruoju metu atsirado temų, nagrinėjančių alternatyvius (neteisminius) ginčų sprendimo būdus [Uscila, 2001; Tvaronavičienė, 2008; Jurkšaitytė, 2001; Simaitis, 2004; Simaitis ir Kurgonaitė, 2007], tačiau šiuose darbuose trūksta gilesnės analizės, kokie konkrečiai ginčų sprendimo būdai maksimaliai tenkintų statybos proceso dalyvių interesus kiekvienu konkrečiu atveju.

Norint atsakyti į užsiduotąjį klausimą, tikslinga į analizuojamą problemą pažvelgti ekonomisto ir inžinieriaus akimis bei pasinaudoti lošimų teorijos ir jos metodais pagrįstų daugiakriterinių sprendimų paramos sistemų galimybėmis. Sprendimų paramos sistemų taikymą įvairių teisinių klausimų sprendimui savo darbuose analizavo nemažai užsienio autorių [Arditi ir Tokdemir, 1999; Baird ir kiti, 1995; Belucci ir Zeleznikow, 1995; Castell, 2003; Li, 1996; Popple, 1993]. Lošimų teorijos taikymo galimybėms teisėje nemažai dėmesio skyrė Baird ir kiti, 1995; Miceli, 2000; Miceli, 2004; Hylton, 2002; Main ir Park, 2002. Nežiūrint į tai, trūksta mokslinių tyrimų, kurie galėtų pagrįsti statybos proceso dalyvių sprendimus renkantis racionaliausią ginčų sprendimo būdą. Lietuvos mokslininkų

darbuose taip pat sprendimų paramos sistemų taikymas nukreiptas į kitų ekonominių ar statybos valdymo problemų sprendimą [Ginevičius ir kiti, 2004; Kaklauskas ir Urbanavičienė, 2005; Merkevičius, 2005; Merkevičius ir kiti, 2005; Mitkus ir Dėjus, 2000; Mitkus, 2001; Zavadskas ir Kaklauskas, 1996; Zavadskas ir kiti, 1999; Zavadskas ir kiti, 2001; Zavadskas ir kiti, 2002; Zavadskas ir kiti, 2003; Zavadskas ir kiti, 2004 a; Zavadskas ir kiti, 2004 b; Zavadskas ir kiti, 2004 c; Zavadskas ir kiti, 2005; Ustinovičius, 2004; Ustinovičius ir Barvidas 2007; Banaitienė ir kiti, 2008].

Darbo tikslas. Darbo tikslas – lošimų teorijos metodais pagrįstų internetinių sprendimų paramos sistemų pritaikymo galimybių analizė užsakovo ir rangovo, kaip tipiškiausių statybos proceso dalyvių, racionaliam ginčų sprendimo būdai parinkti, taip pat užsakovo ir rangovo ginčų sprendimo alternatyviais ginčų sprendimo būdais perkėlimo į virtualią aplinką (*online* režimą) galimybių įvertinimas.

Darbo uždaviniai. Darbe išskelti šie uždaviniai:

1. Užsakovo ir rangovo santykių esamo teisinio reglamentavimo, tai pat konfliktų tarp užsakovo ir rangovo atsiradimo galimų priežasčių analizė.
2. Galimų konfliktų rizikos mažinimo priemonių pagrindimas.
3. Užsakovo ir rangovo ginčų sprendimo būdų lyginamoji analizė.
4. Lošimų teorijos metodų taikymo renkantis ekonomiškai naudingą užsakovo ir rangovo ginčų sprendimo būdą galimybių vertinimas.
5. Sprendimų paramos sistemų pritaikymo galimybių siekiant rasti racionalų užsakovo ir rangovo ginčų sprendimo būdą analizė.
6. Alternatyvių užsakovo ir rangovo ginčų sprendimo virtualioje (*online*) aplinkoje realizavimo galimybių analizė.
7. Siūlymų racionalaus užsakovo ir rangovo ginčų sprendimo būdo nustatymui bei ginčų sprendimo perkėlimui į virtualią (*online*) aplinką parengimas.

Tyrimų metodika. Mokslinei problemai ištirti, tyrimų struktūrai bei ginčų rizikos mažinimo galimybėms nustatyti buvo naudojama teismų praktikos sprendžiant užsakovo ir rangovo ginčus, taip pat kitų autorių atliktų tyrimų empirinė analizė. Ekonominiam ginčų sprendimo būdo parinkimui taikyti lošimų teorijos metodai. Racionalaus užsakovo ir rangovo ginčų sprendimo būdo nustatymui pagal daugelį rodiklių buvo atlikti skaičiavimai naudojant lošimų teorijos metodais pagrįstą sprendimų paramos sistemą LEVI 3.0.

Praktinė darbo reikšmė. Darbe išnagrinėti užsakovo ir rangovo, kaip tipiškiausių statybos proceso dalyvių, ginčams taikytini sprendimo būdai ir atlikta jų lyginamoji analizė.

Pateikti ekonominiai skaičiavimai, parodantys, kuomet užsakovui ir rangovui ginčą tikslinga išspręsti alternatyviais (neteisminiais) būdais, jeigu pagrindiniu kriterijumi, lemiančiu ginčų sprendimo būdo pasirinkimą, šalys laiko bylinėjimosi kainą.

LEVI 3.0 sprendimų paramos sistemos pagalba atliktas daugiakriterinis užsakovo ir rangovo ginčų sprendimo būdų vertinimas ir nustatytas jų naudingumo laipsnis.

Pasiūlyta ginčų sprendimo alternatyviais būdais virtualioje erdvėje (toliau tekste - *online Alternative Dispute Resolution* arba *online ADR*) sistemos architektūra gali būti panaudotas praktiškai realizuojant užsakovo ir rangovo ginčų sprendimą alternatyviais būdais *online* aplinkoje.

Darbo rezultatų aprobavimas Disertacijoje nagrinėjami teiginiai išdėstyti ir aptarti vienoje tarptautinėje ir trejose respublikinėse konferencijose. Darbo tema paskelbtos 6 publikacijos, iš jų 1 publikacija išspausdinta leidinyje, įtraukta į ISI mokslinių leidinių sąrašą, 2 - mokslo žurnaluose, įtrauktuose į Lietuvos mokslo tarybos patvirtintas duomenų bases.

Disertacijos struktūra ir apimtis. Darbą sudaro įvadas, keturi skyriai, išvados ir pasiūlymai, literatūros šaltinių sąrašas. Darbo apimtis – 125 puslapiai.

Darbo išvados ir rekomendacijos

1. Atlikta teisės aktų, reglamentuojančių statybos procesą, apžvalga, įrodo, kad jų gausa bei dažnas keitimas yra viena iš priežasčių, lemiančių ginčų tarp užsakovo ir rangovo atsiradimą.

2. Siekiant užtikrinti, kad teisinė bazė, reglamentuojanti reikalavimus statiniams, būtų skaidri bei aiški ir kad statytojai dar prieš teikdami paraišką sąlygoms gauti galėtų žinoti, kokius reikalavimus jie privalės įvykdyti, būtų tikslinga ir logiška Statybos įstatyme įtvirtinti nuostatą, kad privalomų norminių reikalavimų statiniams sąrašas turi būti baigtinis, o patys reikalavimai turi būti suformuluoti taip, kad nesudarytų prielaidų interpretacijoms.

3. Atsižvelgiant į Europos Sąjungos vykdomą politiką ginčų nagrinėjimo srityje, taip pat į Europos Tarybos Ministrų komiteto rekomendacijas dėl alternatyvių ginčų nagrinėjimo būdų naudojimo, galima daryti išvadą, kad Lietuvoje populiarės mediacija ir arbitražas.

4. Nustatyta, jog kiekvienu konkrečiu atveju išanalizavus neigiamas ir teigiamas įvairių ginčų sprendimo būdų savybes, galima įvertinti bylinėjimosi teisme ir taikant kitus ginčų sprendimo būdus perspektyvą. Toks žinojimas leidžia argumentuotai ir sąmoningai rinktis tinkamiausią konkretaus ginčo sprendimo būdą - bylinėjimąsi teisme, arbitražą, mediaciją ar pan.

5. Matematiškai įrodyta, kad užsakovui, kuris nesinaudoja teisine pagalba, visuomet yra ekonomiškai naudinga siekti taikaus ginčo išsprendimo.

6. Darytina išvada, kad galimų strategijų naudingumo skaičiavimo metodika galėtų būti panaudota kuriant specializuotas teises sprendimų paramos sistemas, leisiančias tiksliau parinkti racionalų užsakovo ir rangovo ginčų sprendimo būdą.

7. Įrodyta, kad racionaliam užsakovo ir rangovo ginčų sprendimo būdai parinkti sėkmingai gali būti taikoma LEVI 3.0 sprendimų paramos sistema. Šios sistemos pagalba atlikus daugiakriterinį alternatyvų vertinimą, pagal nustatytą rodiklių reikšmingumą užsakovo ir rangovo ginčams spręsti naudingiausiu laikytinas mediacijos būdas.

8. Pasiūlyta ginčų sprendimo *online* ADR sistemos architektūra gali būti panaudota praktiškai realizuojant užsakovo ir rangovo ginčų sprendimą alternatyviais būdais virtualioje aplinkoje.

9. Darytina išvada, jog norint suteikti ginčų sprendimams, pasiektiems mediacijos būdu, privalomą šalims poveikį, reikėtų šiems sprendimams įteisinti teismo patvirtinimą ir vykdomojo dokumento išdavimą arba teisės aktuose numatyti šalių galimybę kreiptis į notarą arba antstolį, kad šie paliudytų, jog pasiektas susitarimas. Tai sustiprintų mediacijos būdu pasiektą sprendimo vykdymo realumą ir patikimumą.

10. Informacinės visuomenės plėtros komitetui prie Lietuvos Respublikos Vyriausybės siūlytina apsvarstyti galimybę inicijuoti priėmimą Vyriausybės nutarimo, kuriuo būtų aiškiai pripažįstamos ir konkrečiai skatinamos virtualios ginčų sprendimo alternatyviais būdais paslaugos Lietuvoje.

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**DETERMINATION OF THE RATIONAL METHOD OF
SOLUTIONS IN DISPUTES BY THE CONTRACTOR AND CLIENT
BASED ON THE GAME THEORY**

**Summary of Doctoral Dissertation
Technological Sciences, Civil Engineering (02T)**

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