VILNIUS UNIVERSITY

DOVILĖ VALANČIENĖ

LEGAL SCIENCE IN THE FACE OF THE PARADIGM OF OLD AND NEW SCIENCE

Summary of the Doctoral Dissertation
Social Sciences, Law (01 S)

Vilnius, 2015

The Doctoral Dissertation was prepared at Vilnius University in 2010–2015.

Scientific supervisor – Prof. Dr. Jevgenij Machovenko (Vilnius University, Social Sciences, Law – 01 S).

The Doctoral Dissertation is defended at the Law Science Council of Vilnius University:

Chairman – Prof. Dr. Dainius Žalimas (Vilnius University, Social Sciences, Law – 01 S).

Members:

Prof. Dr. Vytautas Mizaras (Vilnius University, Social Sciences, Law – 01 S);

Prof. Dr. Arvydas Andruškevičius (Vilnius University, Social Sciences, Law – 01 S);

Prof. Dr. Armanas Abramavičius (Vilnius University, Social Sciences, Law – 01 S);

Assoc. Prof. Dr. Jānis Pleps (University of Latvia, Social Sciences, Law – 01 S).

The Doctoral Dissertation will be defended in the public session of the Law Science Council, on March 27, 2015 at 2:00 p.m., at the Faculty of Law of Vilnius University, JR 2 auditorium.

Address: Saulėtekio av. 9, LT-10222, Vilnius, Lithuania.

The summary of the Doctoral Dissertation was sent out on 27 February, 2015.

The Doctoral Dissertation is available for review at Vilnius University Library and Vilnius University website: www.vu.lt/lt/naujienos/ivykiu-kalendorius.

VILNIAUS UNIVERSTITETAS

DOVILĖ VALANČIENĖ

TEISĖS MOKSLAS SENOJO IR NAUJOJO MOKSLO PARADIGMOS AKIVAIZDOJE

Daktaro disertacijos santrauka
Socialiniai mokslai, teisė (01 S)

Vilnius, 2015

Disertacija rengta 2010–2015 metais Vilniaus universitete.

Mokslinis vadovas – prof. dr. Jevgenij Machovenko (Vilniaus universitetas, socialiniai mokslai, teisė – 01 S).

Disertacija ginama Vilniaus universiteto Teisės mokslo krypties taryboje:

Tarybos pirmininkas – prof. dr. Dainius Žalimas (Vilniaus universitetas, socialiniai mokslai, teisė – 01 S).

Nariai:

prof. dr. Vytautas Mizaras (Vilniaus universitetas, socialiniai mokslai, teisė – 01 S);

prof. dr. Arvydas Andruškevičius (Vilniaus universitetas, socialiniai mokslai, teisė – 01 S);

prof. dr. Armanas Abramavičius (Vilniaus universitetas, socialiniai mokslai, teisė – 01 S);

doc. dr. Jānis Pleps (Latvijos universitetas, socialiniai mokslai, teisė – 01 S).

Disertacija bus ginama viešame Teisės mokslo krypties tarybos posėdyje 2015 m. kovo 27 d. 14 val. Vilniaus universiteto Teisės fakulteto JR 2 auditorijoje.
Adresas: Saulėtekio al. 9, LT-10222, Vilnius, Lietuva.

Disertacijos santrauka išsiuntinėta 2015 m. vasario 27 d.

Disertaciją galima peržiūrėti Vilniaus universiteto bibliotekoje ir Vilniaus universiteto svetainėje adresu: www.vu.lt/lt/naujienos/ivykiu-kalendorius.

CONTENTS

We have now entered a phase in which the times are changing. <...> The law may be moving towards a renaissance. <...> Legal positivism is rooted in many countries, but now the time is for a change (C. Sandgren).

RESEARCH PROBLEM, THE RELEVANCE OF RESEARCH

In the contemporary world[1] there are ongoing changes of paradigms:[2] there is a "battle" between the old[3] – deterministic and mechanistic way of thinking, which is based on pursuit of absolute clarity, certainty and the objectivity – and the new[4] (postmodern, of complex dynamic systems, postclassical, of chaos) science (as maintained by I. Prigogine[5], S. A. Kauffman[6]; S. Strogatz[7]; J. Gleick[8]; J. Elster[9]; J. W. Forrester[10]), which does not overestimate the possibilities of cognition and increasingly realizes that knowing depends not only on the subject's cognitive limitations, but also on the diversity of context, complexity and dynamics of the object, i.e. essential impossibility to know, investigate and understand it absolutely exactly. The paradigm of new science is based on the achievements of the science of complex dynamic systems (for example, J. Gleick[11]; M. Gell-Mann[12]; J. Elster[13]). Complex dynamic system: a) consists of more than two elements which are related by alternating reciprocal relationship, b) is difficult to understand, manage and predict. One of the most important features of complex dynamic systems paradigm is that the behavior of such systems is very sensitive to the external context and the errors of the internal state of the system. In other words, the "little things" can change the direction of behaviour of such a system. Beside global (for

[1] It should be noted that both science in general and legal science are viewed in the context of the Western world.
[2] As to defining science, we could do it as follows: science is the system of the discovery of truth, its validation and prediction, and it depends on the subject's abilities and the complexity of the object. The goal of science is to understand the reality. Science creates knowledge, and knowledge ensures progress. It is an open and dynamic system, which should aim to create and improve, to develop a dialogue in diverse areas (*Declaration on science and the use of scientific knowledge* [interaktyvus. Žiūrėta 2014-07-01]. Prieiga per internetą: < http://www.unesco.org/science/wcs/eng/declaration_e.htm>).
[3] In the dissertation, classical science is deterministic and mechanistic, which has evolved since the seventeenth century and is called the old science.
[4] In the dissertation, contemporary science is the science of complex dynamic systems, which began to develop at the end of the twentieth century, although nucleation of it can be found in the past, it is called a new science.
[5] PRIGOGINE, I. *The end of certainty. Time, chaos, and new laws of nature*. Oxford: The Free Press, 1997.
[6] KAUFFMAN, S. A. *Investigations.* Oxford: Oxford University Press, 2000.
[7] STROGATZ, S. S*ync: the emerging science of spontaneous order.* New York: Hyperion, 2003.
[8] GLEICK, J. C*haos: making a new science*. Viking, 1987.
[9] ELSTER, J. *Explaining social behavior: more nuts and bolts for the social sciences*. Cambridge: Cambridge University Press, 1 edition, 2000.
[10] FORRESTER, J. W. *World dynamics.* Cambridge, Massachusetts: Wright Allen, 1971.
[11] GLEICK, *supra note* 8.
[12] GELL-MANN, M. *The quark and the jaguar: adventures in the simple and the complex.* San Francisco: W. H. Freeman, 1994.
[13] ELSTER, *supra note* 9.

example, J. W. Forrester[14]), social (for example, J. Elster[15]), biological (for example, B. Goodwin[16]) and natural systems (for example, J. Gleick[17]; M. Gell-Mann[18]), complex dynamic systems include law (for example, D. Patterson[19]; G. T. Jones[20]; B. Holz[21]).

We realize that it is necessary first to understand the key features of contemporary science as well as its changes (because science itself and its methodologies also constantly change), and then, to make sure what kind of approach, paradigm is supported by modern scholars, what claims are made by so-called new science (complex dynamic systems, postclassical, postmodern science), whether it has many supporters, how much of the new science is reflected in research; and it is especially important to make sure, that if science experiences serious changes, then if and how the legal science responds to that, and due to its specificity whether it must respond to this in general. We need to emphasize that legal science in the dissertation is the fundamental science of law (general jurisprudence, philosophy of law, legal theory, legal research, in other words fundamental science of law which is the basis for legal science). For the sake of clarity, it should be clarified that legal science is not segmented to parts, it is viewed fundamentally and holistically, thus we do not talk about the science of civil law, criminal law, etc. We realize that, if changes take place in legal science in the fundamental sense, they may still not be seen in other legal sciences, but we believe that they will have an impact on other branches of legal science. Further we believe that the boundaries between legal sciences (branches) will increasingly disappear and legal science will become more united. After becoming united, it could more open up to other sciences. We believe that today's legal science should respond to various scientific developments and their interactions (interdisciplinary approach) because legal science, as well as the complex dynamic system depends on the total context of science paradigm

[14] FORRESTER, J. W. *World dynamics.* Cambridge, Massachusetts: Wright Allen, 1971.
[15] ELSTER, J.*Explaining social behavior: more nuts and bolts for the social sciences*. Cambridge: Cambridge University Press, 1 edition, 2000.
[16] GOODWIN, B. *How the leopard changed its spots. The evoliution of complexity*. New York: Princeton University Press, 2001.
[17] GLEICK, J. *Chaos: making a new science*. Viking, 1987.
[18] GELL-MANN, M. *The quark and the jaguar: adventures in the simple and the complex.* San Francisco: W. H. Freeman, 1994.
[19] PATTERSON, D. *A companion to philosophy of law and legal theory*. Oxford: Blackwell Publishing, 2008.
[20] JONES, G. T. Dynamical jurisprudence: law as a complex system. *Georgia State University Law Review*, 2008, Vol. 24, No. 4.
[21] HOLZ, B. Chaos worth having: irreducible complexity and pragmatic jurisprudence. *Minnesota Journal of Law, Science & Technology*, 2006, No. 8(1).

and the dynamic interaction of many specific sciences (especially social sciences, humanities and biology-life sciences). We understand that the response of legal science, like any other science, should be very responsible, measured and as much as possible based on objective scientific research that are based on logical, heuristic and empirical evidence. It is increasingly evident that with the major changes in society, the legal system faces new challenges, which no longer can be met with internal resources and methods.[22] This is typical of every science which must still update its research methodology, theories or even paradigms. How and to what extent do the ideas of the new scientific paradigm manifest in legal science, in science in general? Can we agree that there is a revolution (changes of paradigms) not only in science in general, but also in legal science? We can see that revolutions constantly go on in the world; humanity constantly changed and changes their views of the world. Today we talk about a new revolution, when we change the view of the world, the world experiences a new state and it is "ruined", "changed", "built", "reinterpreted", "doubted", "criticized" and so on.

How can we improve legal science using the achievements of other sciences and especially the paradigm of complex dynamic systems? Based on the aforementioned arguments we believe that it is appropriate to look for rational and pragmatic integration of legal science with other related and not necessarily related sciences. One example of such integration is neurolaw which combines the achievements of neurosciences (biological sciences) determining the truth and justice in law.[23] These are relevant questions not only for legal theory and but also for practice so that legal science could be open to knowledge and innovation (particularly in other sciences). It is needed for getting more reliable and more objective determination of truth and justice in law. Neurolaw is selected as one of the fairly rapidly developing dialogues, which now can help us see how different areas of science can hold a conversation.

It can be argued that after exhausting the potential of positivist legal paradigm solving a number of complex legal issues, legal science found itself in a deadlock (we have in mind the most the most fundamental branches of legal science). However, this statement does not claim that legal positivist paradigm cannot be successfully applied in solving

[22] MACHOVENKO, J. Modernioji ir postmodernioji Lietuvos teisės istorijos mokslo paradigma. *Teisė*, 2012, t. 83.
[23] For example, ARONSON, J. D. The law's use of brain evidence. *Annu. Rev. Law Soc. Sci.*, 2010, Vol. 6, p. 93-108.; GREENE, J. D.; COHEN, J. D. For the law, neuroscience changes nothing and everything. *Phil. Trans. R. Soc. Lond. B.*, 2004, Vol. 359, p. 1775-1785.

less complex legal problems (in fact, here we come across another problem how to "draw a boundary" between complex and less complex or non-complex legal issues). Scientists in the world are increasingly talking about the influence of postmodernism (and the new–postmodern science, complex dynamic systems, chaos) on legal science (for example, G. T. Jones[24]; B. Holz[25]; D. Patterson[26]; D. Milovanovic[27]).

If at the beginning of the twentieth century we were satisfied with a vision of law as created and a wholly managed mechanism by humans where every detail has a clear purpose, in the early twenty-first century we understand that law has not been and is not completely controlled by the human system–inner laws operate in it, and they cannot be modified by the legislator or the applicator.[28] We cannot overlook the fact that legal science was greatly influenced by the old science which "closed" legal science in the "determinism and positivism shells". This effect is observed in legal science of these days, even though the new legal paradigm began to increasingly move away from the influence of the old science. However, we want to say that we do not name paradigm of old science as bad or worse than the new scientific paradigm or paradigms, but we clearly understand that the efficiency of their applications have different spaces–the old paradigm is more appropriate in dealing with clear, simple problems, and the new–with complex, dynamic problems. The paradigm of new science urges to investigate the reality applying not one, but many methodologies. In the context of legal science, that would mean not only the pluralism of doctrines or schools of law but also the opportunity to look into the legal phenomena taking advantage of the achievements of other sciences, using their methodologies in search for truth. Perhaps the new science encourages a much broader approach that combines not only sciences, but also other types of cognition? Where such a path may lead, what is a possible forecast the development of legal science under the conditions of paradigmatic changes?

[24] JONES, G. T. Dynamical jurisprudence: law as a complex system. *Georgia State University Law Review*, 2008, Vol. 24, No. 4.
[25] HOLZ, B. Chaos worth having: irreducible complexity and pragmatic jurisprudence. *minnesota journal of law, science & technology*, 2006, no. 8(1).
[26] PATTERSON, D. *A companion to philosophy of law and legal theory*. Oxford: Blackwell Publishing, 2008.
[27] MILOVANOVIC, D. Dueling paradigms: modernist v. postmodernist thought. Iš *Critical Criminology Information and Resources* Site [interaktyvus]. 1998 [žiūrėta 2012-03-16]. Priega per internetą: <http://critcrim.org/critpapers/milovanovic_postmod.htm>.
[28] MACHOVENKO, J. Modernioji ir postmodernioji Lietuvos teisės istorijos mokslo paradigma. *Teisė*, 2012, t. 83.

Of the total mass problems, questions, challenges, and insights we want to identify the **key problems**:

1. There is much discussion about the identification of the old and the new science. While the old (deterministic) paradigm of science is dominant (and often it is appropriate) and still does not abandon its position, in legal science the main features of the old (deterministic) science, scientific methodologies and the strengths and weaknesses of their practical application including the development stages of legal science are insufficiently accentuated.

2. There is no clear agreement of what the paradigm is in science in general and in legal science despite the fact that this concept is widely used in the world of science.

3. In the contemporary world, we can often meet people talking about postmodernism, the new science, but in legal science the features of postmodernism and the new science are insufficiently distinguished, and even more, it is not known which concepts and features most represent the new science.

4. It has not been sufficiently researched how and to what extent the new science manifests itself in science in general through research articles, and even more interestingly, if and how it manifests in Lithuanian science. Without researching that it is difficult to have evidence and to argue that the new science certainly exists in the world already. It has not been globally established in what areas of science we could find most features of the manifestation of the new science. In other words, if it was necessary, what science could contribute to the legal science that it could learn the new (nondeterministic) paradigm, methodologies or even principles?

5. Contemporary status of legal science both in Lithuania and in the world has not been clearly ascertained (for example, fragmentary interest in the scientific nature of the legal science; pronounced miscommunication between legal scholars and practitioners), and even more, it is not clear in which cases the positivist paradigm and in which cases the new paradigm of science "operate" better in law. The logical question is to how to reconcile the good parts of these paradigms, if it is possible (or necessary) to do that.

6. Although the neuroscience (a good example is interdisciplinarity between biomedical/biological and social sciences) have made a significant impact on the social sciences over the last years (for example, in 2002 the Nobel Prize was awarded in the field of neuroeconomics), it has not been researched how this integral dialogue of

sciences is prevalent and how it generally manifests through scientific in general and legal science research articles. There is a lack of analysis, how this dialogue may be useful to legal science, or maybe even to both sciences, as in Lithuania this question of the dialogue has not been raised, or raised very timidly. Or maybe this dialogue is completely useless at this stage?

7. Although there is much discussion about the new paradigm of science (postmodern, scientific achievements of complex dynamic systems and chaos), there is no detailed analysis of how and to what extent the new science is manifested in legal science through scientific articles, and even more interestingly, if and how it is manifested in Lithuanian legal science.

8. In legal science there is insufficient demonstration of rational and intuitive/heuristic insights into the evolution of legal science in the future (in the global context), taking into account any relevant changes in other sciences; moreover, it is important to understand both the context of Lithuania and possibilities of legal science trends in Lithuania.

RESEARCH OBJECT

Research object was main advantages and disadvantages of the old paradigm of science; advantages and disadvantages of the new paradigm of science and its representing features revealing themselves through the investigation of the concepts generally in science and in legal science; paradigmatic changes in legal science amidst changes in science; integration possibilities of legal science and neuroscience.

RESEARCH AIM

Research aim–providing insights related to changes in the concept of science in general, to determine how and to what extent the new paradigm of science manifests in science in general and in legal science, and revealing the significance of the new paradigm of science to legal science as well as the contemporary status of legal science, to predict and to provide heuristic/intuitive possible insights/prospects for the future development of legal science on the basis of the most important facts.

RESEARCH OBJECTIVES

Research objectives:

1. Revealing the problem of the identification of the old and new science, to analyse the main features of the old–deterministic science, including key development stages of the legal science.

2. Using the most general arguments and features, to reveal what is a paradigm in the analyses of many sciences, including the legal science.

3. To analyse the concept of postmodernism and the new science–nondeterministic, postmodern, of complex dynamic systems, its main features identifying concepts and features of it that represent it the most as well as their manifestation.

4. To investigate how many research articles with concepts and features representing the new science can be found in general in the selected representative databases in Lithuania and the world. Using the qualitative and conceptual approaches, to investigate how those concepts are generally used (defined, criticized, etc.) in the most cited or the most relevant research papers. Also to investigate in what research areas the concepts and features of the new science mostly manifest.

5. Revealing the main aspects of the links between legal science and the new science, analysing the main problems of contemporary legal science and the changes taking place in it, to determine the status of contemporary legal science and the importance of new scientific ideas to legal science.

6. To analyse the dialogue between law and neuroscience, how neuroscience can help law in response to the question of whether it is an inevitable dialogue or just a temporary fashion looking for ways to more reliably establish the truth and justice. To examine the extent of the research articles where the reflective concepts of the integrity phenomenon of legal science and neuroscience can be found in the most representative selected databases. Using the qualitative and conceptual approaches, to investigate how those concepts are generally used (defined, criticized, etc.) in the most cited or the most relevant research papers.

7. To investigate how many research articles in legal science with concepts representing the new science can be found in general in the selected representative databases in Lithuania and the world. Using the qualitative and conceptual approaches,

to investigate how those concepts are generally used (defined, criticized, etc.) in the most cited or the most relevant research papers.

8. Conceptualizing and summarizing research results, to present more plausible insights/perspectives of the future development of legal science and practical predictions/recommendations for the development of legal science in the context of the challenges of the new science.

RESEARCH METHODS

Dissertation research consists of theoretical (fundamental) and empirical research. The following methods have been applied in the dissertation: theoretical (conceptual, critical, and systematic (reflecting the thematic phenomena of the dissertation) literature analysis, comparison, generalization) and empirical (quantitative and qualitative document analysis) methods.

Theoretical research is fundamental research aimed to analyse the scientific literature, the phenomena, facts, statements, concepts, theories, hypotheses and paradigms described in it related to the topic of the dissertation. The facts, statements, concepts, theories, hypotheses and paradigms are analysed conceptually and critically (understanding the need for a critical look at the changes taking place, what is new, does not have to be good, and what is old–bad), systemically (various phenomena, science are not broken down into specific branches and parts of them, it is perceived systematically, uniformly and widely, but to distinguish the changes taking place in science, issues, legal science should be analysed separately, but we do not specify it and decompose it inside, viewing it as also systematically; perceiving that the whole is more than the sum of its parts, all the elements affect each other and are related by the complex links), phenomena and changes are compared (both in Lithuania and in the world), generalizations are made.

Empirical research. In this research we used quantitative and qualitative document analysis. Qualitative and quantitative analysis of the documents can be broken down into two parts: the study of research articles that used the concepts representative of the new science, and the study of research articles that used the concepts typical of and reflecting the phenomenon of the integrity of legal science and neuroscience. We need to

emphasize one important aspect: we recognize that the scientist using none of the concepts (which we chose for empirical research) is not simply assigned to the old science because of that. A researcher may have new attitudes and adhere to the new scientific ideas even without using exactly these concepts. Our research conception is to explore the occurrence of changes in scientific articles, but we do not investigate the subjective assignment of every scientist the old or the new science.

Results of the separate parts of our empirical study are presented in the separate parts of the dissertation. It should be noted that the search for each concept was carried out separately, ignoring the fact that several different concepts could have been used in the same article. Referring to the qualitative study, it is important to note that the qualitative study reflected not all of the concepts (because those concepts met our criteria not in all articles), so the results are given only of those concepts that were in line with our criteria, while others simply did not fall into the list. Next we will discuss the methodology of each study separately.

The study of research articles using the concept representing the new science. In order to determine what the new science is – the category of the present or of the future, existing or hypothetical thing, reality or fiction – we tried to identify the new science in the current research works. If it exists (at least is partially formed, is emerging, grows out of the old science, etc.), it must be reflected in them. The new science will be identified by its key concepts and their conceptual analysis.

We chose the concepts, taking into account the use of new science concepts in the scientific literature by the new research leaders: "postmodernism", "postmodern science", "postmodern paradigm", "new paradigm", "paradigm", "new science", "holistic science", "complex paradigm", "complex dynamic system", "complex social system", "complex system", "chaos", "indeterminism", "synergetics", "interdisciplinarity", "transdisciplinarity", "multidisciplinarity", "butterfly effect".[29] It

[29] For example, those concepts can be found in: BAK, P. *How nature works: the science of self-organized criticality.* New York: Copernicus, Springer-Verlag, 2006; COLLINS, H.; PINCH, T. The *Golem: what everyone should know about science*. Cambridge: Cambridge University Press, 1993; ELSTER, J. *Explaining social behavior: more nuts and bolts for the social sciences.* Cambridge: Cambridge University Press, 1 edition, 2000; FORRESTER, J. W. *World dynamics.* Cambridge, Massachusetts: Wright Allen, 1971; GIDDENS, A. *Modernybė ir asmens tapatumas: Asmuo ir visuomenė vėlyvosios modernybės amžiuje.* Vilnius: Pradai, 2000; GLEICK, J. *Chaos: making a new science*. Viking, 1987.; PRIGOGINE, I. *The end of certainty. Time, chaos, and new laws of nature*. Oxford: The Free Press, 1999; GOODWIN, B. *How the leopard changed its spots. The evolution of complexity*. New York: Princeton University Press, 2001; KAUFFMAN, S. A. *Investigations.* Oxford: Oxford University Press, 2000; LADYMAN, J. *Understanding philosophy of science.* London, New York.

should be noted that circle of concepts could be further extended, for instance, the concept of non-linear systems, the concept of bifurcation, etc., but chose eighteen of the main concepts. We also want to point out that those concepts will be discussed and the results will be presented in separate sections by the themes. We note that in both foreign and Lithuanian research papers, the study of concepts representing the new science is performed using the same concepts, but in foreign databases they are entered into a search engine in the English language, and in the Lithuanian databases–in the Lithuanian language.

Before proceeding, we moved the question of where we need to look for these concepts. In this case we chose research articles, as in our opinion they are the most appropriate source. They were the preferred source because: 1) they are characterized by scientific nature (novelty, originality, etc.), what you cannot find in conference reports, surveys, reviews, etc.; 2) articles are not large in size, quickly developed (monographs, studies requires much more time) and published in periodicals and publications which appear often enough, so this is the type of publications is the most operative scientist's reaction to changes in science[30]; 3) articles are most massive type of scientific publications (there are not so many monographs), thus, we have a huge amount of resources, which enables to reduce the likelihood of errors. It should be noted that we did not find many Lithuanian legal research articles because we believe that not all articles fall into our database under investigation, not all scientists publicize all of their articles. On the other hand, new things spread slowly. On the other hand, our empirical research did not include Lithuanian monographs because in that case we would have to expand the empirical research field of foreign legal scholars as well.

As the new science presupposes interdisciplinarity, we found in which branches of science there are most reflections of the new science. However, legal research articles were separated so that we could understand the new science manifestations in legal science articles.

2002.;LOYTARD, J. F. *Postmodernus būvis*. Vilnius: Baltos lankos, 1993; STROGATZ, S. *Sync: The emerging science of spontaneous order*. New York: Hyperion, 2003.

[30] For example, E. Kūris first used the concept of paradigm in his article: KŪRIS, E. Konstitucijos aiškinimas, konstitucinės teisės šaltiniai ir besikeičianti konstitucinės teisės paradigma. *Teisės problemos*, 2003, Nr. 3(41), p. 8-32, and only then in his habilitation procedure: KŪRIS, E. *Konstitucinė teisė kaip jurisprudencinė teisė: konstitucinė justicija ir konstitucinės paradigmos transformacija Lietuvoje.* Habilitacijai teikiamų mokslo darbų apžvalga, Vilniaus universitetas, Teisės fakultetas, 2008.

In order to investigate the global view, we chose four of the most representative databases of research articles containing articles from a variety of scientific fields, including legal science: Thomson Reuters (ISI) Web of Science; Annual reviews; Oxford Journals Online; JSTOR. We chose the scientific articles in the period of 1990-2013 because from 1990 many scientific articles became available in the digital area, which of course is associated with beginning of the "digital" era. It should be noted that empirical research articles in general include legal science articles as well (covering a wide range of scientific areas in general), if there were any of them with specific concepts. Aiming at investigating the situation in Lithuania, we chose the scientific articles of 1990-2013 in Lithuanian virtual library database[31]. The total quantitative number of elected scientific articles was 375 061. Qualitatively reviewed and selected were 543 scientific articles, and 215 of them were selected according to the criteria set and then analysed in more detail.

This study is divided into several parts, ***first,*** research of articles in foreign databases in general (all scientific fields, including law), where the concepts representing the new science were used. Using the database search engines we looked for these concepts: "postmodern*", "postmodern science*", "postmodern paradigm*", "new paradigm*", "paradigm*", "new science*", "holistic science*", "complex paradigm*", "complex dynamic system*", "complex social system*", "complex system*", "chaos", "indetermin*", "synergetic*", "interdisciplinar*", "transdisciplinar*", "multidisciplinar*", "butterfly effect*"[32]. We believe that at this stage of changes in thinking paradigms it would be appropriate to investigate the occurrence of these concepts in general science articles so that we could see a complete picture of changes. Following this study, further research was conducted in the areas where most of the concepts representing the new science were used. We searched in Thomson Reuters (ISI) Web of Science database because such data were available in this database (in other databases this would be much more difficult given the vast quantities of articles and the imperfect search engine). Each of our chosen concepts representing the new science (a

[31] Library resources. *Lithuanian Virtual Library* [interactive. Retrieved on 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

[32] It should be noted that in order to improve the search, this concept has been introduced into a search engine to search with "*" (to search for all associated words related with a root) and quotation marks (to search a specific term, rather than individual words).

total of 18) was examined separately, selecting 5 research areas in the database with most of research articles using those concepts. So we got the data of the most popular fields of science. Later, we studied what are the most popular areas of research taking into account all our concepts and summing up articles, if certain areas were among the five areas of each concept. It must be borne in mind that our rating does not reflect all the articles written in the field of science because the investigation according to each concept in a field of science, a certain field of science by a particular concept may remain in sixth place or lower, and did not take this fact into account. We analysed and ranked them according to all of the concepts used.

For qualitative data analysis we employed qualitative methods. From the empirical data collected in the quantitative study, according to each concept from each database we selected five (if not five, then to the extent applicable) scientific articles (in all areas) according to citation[33] (from Thomson Reuters (ISI) Web of Science and Annual Reviews databases) and relevance[34] (from Oxford Journals Online and JSTOR databases) criteria and we examined how each concept is used in accordance with our criteria: whether they try to define the concept, or tell about its context, or say something more about it, some fundamentals. We determined what the scientists say about it, what is the context or definition of use for each concept. In short, the main selection criterion is that the concepts were not only mentioned.

Second, the general study of Lithuanian research articles (all fields of science, including legal science), where the concepts representing the new science are used. We believe that this study will help to establish a situational picture, whether Lithuanian scholars apply our chosen concepts. We chose the concepts as discussed in the previous parts of our empirical study, but choosing their equivalent in the Lithuanian language: *„postmodernizmas“*, (eng. postmodernism), *„postmodernusis mokslas“* (eng. postmodern science), *„postmodernioji paradigma“* (eng. postmodern paradigm), *„naujoji paradigma“* (eng. new paradigm), *„paradigma“* (eng. paradigm), *„naujasis mokslas“* (eng. new science), *„holistinis mokslas“* (eng. holistic science), *„sudėtingoji*

[33] If we refer to research from the databases Thomson Reuters (ISI) Web of Science and Annual Reviews, we have in mind that the articles were selected according to the citation criterion. That is, these databases can provide information to the articles most cited by the researchers.

[34] If we refer to research from the databases Oxford Journals Online and JSTOR, we have in mind that the articles were selected according to the relevance criterion. This means that the articles are lined up according to their relevance. It is presumed that such articles are most relevant to the search query in the database system.

(kompleksinė) paradigma“ (eng. complex paradigm), *„sudėtingoji (kompleksinė) dinaminė sistema“* (eng. complex dynamic system), *„sudėtingoji (kompleksinė) socialinė sistema“* (eng. complex social system), *„sudėtingoji (kompleksinė) sistema“* (eng. complex system), *„chaosas“* (eng. chaos), *„indeterminizmas“* (eng. indeterminism), *„sinergetika“* (eng. synergetics), *„tarpdisciplinišKumas“* (eng. interdisciplinarity), *„transdisciplinišKumas“* (eng. transdisciplinarity), „*multidisciplinišKumas“* (eng. multidisciplinarity), *„drugelio efektas“* (eng. butterfly effect).[35]. These concepts were searched in scientific articles (1990-2013): in the Lithuanian virtual library database [36] according to the search system. We introduced these concepts into the search engine: *„postmodern*“, „postmodern* moksl*“, „postmodern* paradigm*“, „nauj* paradigm*“, „paradigm*“, „nauj* moksl*“, „holist* moksl*“, „sudėting* (kompleksin*) paradigm*“, „sudėting* (kompleksin*) dinaminė sistem*“, „sudėting* (kompleksin*) socialin* sistem*“, „sudėting* (kompleksin*) sistem*“, „chaosas“, „indeterminizmas“, „sinergetika“, „tarpdisciplinišKumas“, „transdisciplinišKumas“, „multidiscpliniškumas“, „drugelio efektas“*[37].

For qualitative data analysis we employed qualitative methods. From the empirical data collected in the quantitative study, according to each concept from each database we selected five (if not five, then to the extent applicable) scientific articles (in all areas) according to the relevance criterion[38] and we examined how each concept is used in accordance with our criteria: whether they try to define the concept, or tell about its context, or say something more about it, some fundamentals. We determined what scientists say about it, what is the use of each concept in the context or its definition.

Third, we carried out research of articles in legal science in foreign databases where the concepts representing the new science were used. We believe that it is appropriate to examine the extent of the use of concepts in legal science representing the new science,

[35] All concepts were introduced in the search system according to the root, for example, “postmodern*”, and the concept of multiple words in quotation marks, namely that the system selected the concept rather than single words, such as ”postmodern* moksl*“.

[36] Library resourses. *Lithuanian Virtual Library* [interactive. Retrieved on 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

[37] It should be noted that in order to improve the search, this concept has been introduced into a search engine to search with “*” (to search for all associated words related with a root) and quotation marks (to search a specific term, rather than individual words).

[38] This means that the articles are lined up according to their relevance. It is presumed that such articles are most relevant to the search query in the database system.

and determining whether changes are taking place in legal science. We analysed the same 18 selected concepts that represent the new science (as well as general research of articles in foreign databases), in the same databases and using the same criteria, both quantitatively and qualitatively, but concentrating only to legal science articles while using the database search system. Databases: Thomson Reuters (ISI) Web of Science; Annual Reviews; Oxford Journals Online; JSTOR. We chose the period of research articles: 1990-2013. Using the database search engines we looked for these concepts: "postmodern*", "postmodern science*", "postmodern paradigm*", "new paradigm*", "paradigm*", "new science*", "holistic science*", "complex paradigm*", "complex dynamic system*", "complex social system*", "complex system*", "chaos", "indetermin*", "synergetic*", "interdisciplinar*", "transdisciplinar*", "multidisciplinar*", "butterfly effect*".[39] We selected and researched scientific articles only attributable to the legal science.

Fourth, the study of research articles in Lithuanian legal science where the concepts representing the new science were used. We believe that it is appropriate to examine the extent of the use of concepts in legal science representing the new science, and determining whether changes are taking place in legal science and in Lithuania. We analysed the same 18 selected concepts that represent the new science, in the same Lithuanian virtual library database[40] using the same criteria, both quantitatively and qualitatively, but concentrating only to legal science articles while using the database search system.

The study of research articles dealing with the concepts characteristic of and representing the integrity of legal science and neuroscience. We believe that it would be appropriate to examine to what extent the legal science and our selected neuroscience are in the way of the integrity and the dialog, and what changes legal science undergoes. In the empirical examination of the documents, we chose the concepts: "neurolaw", "neuroscience and law", "neuroscience and social science". We used the same databases: Thomson Reuters (ISI) Web of Science; Annual Reviews; Oxford Journals Online;

[39] It should be noted that in order to improve the search, this concept has been introduced into a search engine to search with "*" (to search for all associated words related with a root) and quotation marks (to search a specific term, rather than individual words).

[40] Library resourses. *Lithuanian Virtual Library* [interactive. 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

JSTOR and the same period of time (1990–2013) as in other cases of our research. Using the database search engines we looked for these concepts: "neurolaw*", "neuroscience* and law", "neuroscience* and social science*".[41] The quantitative number of research articles was 1701. Qualitatively reviewed and selected were 33 scientific articles, and 17 of them were selected according to the criteria set and then analysed in more detail.

In a qualitative study, we applied the same criteria as in previously discussed cases, selected five articles from each database according to the citation criterion (from Thomson Reuters (ISI) Web of Science and Annual Reviews databases) and relevance criterion (from Oxford Journals Online and JSTOR databases) and we examined how each concept is used in accordance with our criteria: whether they try to define the concept, or tell about its context, or say something more about it, some fundamentals. Then we determine what the scientists say about it, what is the context or definition of the use for each concept. As we can see, we did not study the use of these concepts in Lithuania because just as we began to investigate it we did not find the use of these concepts and therefore we limited our research by articles from foreign databases.

DISSERTATION RESEARCH HYPOTHESES

Hypotheses:

1. One of the main features of the old science[42] was that it separated sciences from each other, and the reality was perceived as an accurately controlled and predictable mechanism and completely independent of the complexity of the context. In legal science this occurred when legal science was retracted from the values of social and cultural context. This legal positivist paradigm is undoubtedly suitable for solving absolutely clearly understandable and simple problems, but its power is reduced when it is necessary to address dynamic, complex problems dependent on the context. Therefore, we believe that in more recent research papers we will find more and more reasoned evidence of the efficiency of the application of the new paradigm in legal science.

[41] It should be noted that in order to improve the search, this concept has been introduced into a search engine to search with "*" (to search for all associated words related with a root) and quotation marks (to search a specific term, rather than individual words).

[42] When we speak about the old science we mean modern science which was formed in about the seventeenth century. For example, even in ancient times science was not divided – everything was philosophy.

2. There is no clear definition of the concept of paradigm, but it is more than a theory. Furthermore, this definition becomes even more complicated when it is examined in many sciences, including law. We hope to identify affinities and inconsistencies in various sciences using the concept of paradigm.

3. Postmodernism is a new stage in the world, where the new science develops aiming at changes in science in general and legal science – most importantly, destroying the beliefs of the old science paradigm and correcting its mistakes. Examining the scientific sources we hope to find conceptual evidence of the application structure of the new science in various sciences and legal science (reliability, weaknesses, and objectivity).

4. We believe that in science articles the paradigm of the new science is expressed intensely in the world, but it manifests much less in science articles in Lithuania. We believe that in the world the concepts representing the new science mainly manifest in technological sciences, but they manifest in the social sciences as well.

5. We believe that the present state of legal science in the world and Lithuania is as follows: the prevailing paradigm of science in Lithuanian legal science is deterministic (of the old science) and legal science insufficiently interacts with other sciences (for the lack of interdisciplinarity), and the world's scientists in legal science increasingly turn to the paradigm of complex dynamic systems (the new science), and integration with other sciences. We believe that the legal science in Lithuania is more "applied", i.e. more practical problem "solver", and in the world, the emphasis is on the development and verification of integrated new ideas, concepts and theories. We believe that good practice must unambiguously depend on good theory.

6. We believe that the intensity of neuroscience and legal science integration is increasing. We expect that this integration would increase the objectivity and reliability of the determination of the truth and justice in legal science and practice.

7. We raise the hypothesis that in legal science articles the paradigm of the new science manifests to a greater degree in the world than in Lithuanian legal science articles.

8. We expect that in the future the new paradigm of science would not only provide the legal science with more accuracy and reliability of scientific knowledge, but also bring the legal science closer to the solution of real problems, i.e. provide legal science not only with theoretical depth and pragmatic approach, but also with the dynamic

interpretation of human values, social and cultural context. We suppose that in the future legal science will become increasingly more integral, combining well-established methodologies of other sciences, the rational mind, and heuristic problem solving methods, reliable empirical facts, and good practices.

THE EXPLORATION LEVEL OF THE RESEARCH PROBLEM IN LITHUANIA AND ABROAD

In Lithuania and abroad there hasn't been any empirical or conceptual/analytical systematic research that systematically analysed the problems raised in the dissertation. However, the problems addressed in the dissertation are investigated fragmentary not only in Lithuania, but also in the world. The scientists in Lithuania that should be mentioned are E. Kūris[43] T. Berkmanas[44]; G. Lastauskienė[45]; E. Mackuvienė[46]; K. Kirtiklis[47]; R. Baločkaitė[48]; S. Kanišauskas[49]; A. Valantiejus[50]; D. Beinoravičius[51]; G. Mesonis[52]; A. Plėšnys[53]; J. Motiejūnas[54]; J. Machovenko[55]; S. Arlauskas[56]; A. Skurvydas[57], A. Jokubaitis[58], A. Birgelytė[59].

[43] KŪRIS, E. *Konstitucinė teisė kaip jurisprudencinė teisė: konstitucinė justicija ir konstitucinės paradigmos transformacija Lietuvoje.* Habilitacijai teikiamų mokslo darbų apžvalga, Vilniaus universitetas, Teisės fakultetas, 2008.
[44] BERKMANAS, T. The development of the philosophies of science and law: parallelisms, reciprocities, perspectives. *Jurisprudencija,* 2009, t. 2 (116); BERKMANAS, T. Analogija tarp mokslo ir teisės: istoriniai ir probleminiai aspektai. *International Journal of Baltic Law,* 2007, Vol. 3., No. 3.
[45] LASTAUSKIENĖ, G. Bendras mokslas apie teisę ir jo perspektyvos. *Teisė,* 2004, t. 51.
[46] MACKUVIENĖ, E. Teisės mokslo ir jurisprudencijos moksliškumo problema. *Socialinių mokslų studijos,* 2010, 1(5).
[47] KIRTIKLIS, K. Ar filosofijai tebėra vietos socialiniuose moksluose? *Sociologija. Mintis ir veiksmas*, 2010, t. 1 (26).
[48] BALOČKAITĖ, R. Postmodernioji galios epistema ir jos raiška Lietuvos viešajame diskurse. *Sociologija. Mintis ir veiksmas*, 2005, t. 1.
[49] KANIŠAUSKAS, S. Tarpdisciplininis projektas: proveržis į mokslų ir praktikos sintezę. *Problemos*, 2011, t. 80; KANIŠAUSKAS, S. „Postmodernistiniai" mokslas ir filosofija: santykis ir problemos. *Filosofija. Sociologija*, 2005, t. 1.
[50] VALANTIEJUS, A. Pozityvizmo svyruoklė. *Sociologija. Mintis ir veiksmas*, 2004, t. 1; VALANTIEJUS, A. Postmodernizmas ir epistemologinio reliatyvizmo spąstai. *Sociologija. Mintis ir veiksmas*, 2003, t. 2.
[51] BEINORAVIČIUS, D. Tarpdisciplininiai teisės pažinimo aspektai. *Logos*, 2001, t. 68.
[52] MESONIS, G. Teisės diskurso dialektika. *Logos*, 2011, t. 66.
[53] PLĖŠNYS, A. Mokslas kaip mokslo filosofijos problema. *Problemos*, 2011, t. 79.
[54] MOTIEJŪNAS, J. Realizmo ir antirealizmo ginčas: mokslinės teorijos ir tiesos santykis. *Logos*, 2009, t. 59.
[55] MACHOVENKO, J. Modernioji ir postmodernioji Lietuvos teisės istorijos mokslo paradigma. *Teisė*, 2012, t. 83.
[56] ARLAUSKAS, S. Jurisprudencijos moksliškumo kriterijai šiuolaikinėje teisės filosofijoje. *Jurisprudencija*, 2009, 4 (118).
[57] SKURVYDAS, A. *Apie mokslą, tiesą ir pažangą*. Kaunas: Vitae Litera, 2010
[58] JOKUBAITIS, A. Postmodernism and politics. *Lithuanian political science yearbook*, 2001.
[59] BIRGELYTĖ, A. Sinergetika kaip nelinijinio mąstymo ir veikimo modelis. *Logos*, 2005, Nr. 44.

Foreign scientists would be R. Feldman[60]; A. Rappaport[61]; L. Wolpert[62]; J. Elster[63]; S. Jasanoff[64]; B. Holz[65]; G. T. Jones[66]; B. Leiter[67]; H. T. Edwards[68]; A. J. Kolber[69]; M. Heise[70]; M. Galanter[71]; J. A. Blumenthal[72]; E. A. O'Hara[73]; O. R. Goodenough, K. Prehn[74]; D. A. Martell[75]; M. S. Pardo, D. Patterson[76]; F. Parisi[77]; H. T. Markey[78]; M. M. Siems[79]; B. Ryan[80]; J. Gleick[81]; I. Prigogine[82] ; H. Collins, T. Pintch[83]; B. Goodwin[84]; J.

[60] FELDMAN, R. Historic perspectives on law & science. *Stanford Technology Law Review* [interaktyvus]. January 2, 2009 [žiūrėta 2011-02-05]. Prieiga per internetą: <http://stlr.stanford.edu/pdf/feldman-historic-perspectives.pdf >; FELDMAN, R. Law's misguided love affair with science. *Minn. J. L. Sci. & Tech.*, 2009, No. 10 (1).

[61] RAPPAPORT, A. Conceptual analysis in science and law. *University of California, Hastings College of Law* [interaktyvus]. 2010 [žiūrėta 2012 11 20]. Prieiga per internetą: <http://works.bepress.com/aaron_rappaport/1>.

[62] WOLPERT, L. What lawyers need to know about science. Iš REECE, H. (Ed.) *Law and science*. Oxford: Oxford University Press, 1998.

[63] ELSTER, J. *Explaining social behavior: more nuts and bolts for the social sciences.* Cambridge: Cambridge University Press, 1 edition, 2000.

[64] JASANOFF, S. Law's knowledge: science for justice in legal settings. *American Journal of Public Health: Supplement on Scientific Evidence and Public Policy* [interaktyvus]. 2005, Vol. 95, No. 1 [žiūreta 2010-02-05]. Prieiga per internetą:
<http://www.defendingscience.org/upload/JasanoffKNOWLEDGE.pdf>.

[65] HOLZ, B. Chaos worth having: irreducible complexity and pragmatic jurisprudence. *Minnesota Journal of Law, Science & Technology*, 2006, No. 8 (1).

[66] JONES, G. T. Dynamical jurisprudence: law as a complex system. *Georgia State University Law Review*, 2008, Vol. 24, No. 4.

[67] LEITER, B. The demarcation problem in jurisprudence: a new case for scepticism. *Oxford Journal of Legal Studies*, 2011, Vol. 32, No. 1.

[68] EDWARDS, H. T. The growing disjunction between legal education and the legal profession. *Michigan Law Review*, 1992, No. 91.

[69] KOLBER, A. J. The experiential future of the law. *EMORY L. J.*, 2011, no. 60.

[70] HEISE, M. The past, present, and future of empirical legal scholarship: judicial decision making and new empiricism. *U. L. Rev*., 2002, No. 3.

[71] GALANTER, M. In the winter of our discontent: law, anti-law and social science. *Annu. Rev. Law Soc. Sci.* 2006, Vol. 2.

[72] BLUMENTHAL, A. Law and social science in the twenty first century. *Southern. California Interdisciplinary Law Journal*, 2002, No.12.

[73] O'HARA, E. A. How neuroscience might advance the law. *Philos. Trans. R. Soc. Lond. B. Biol. Sci*., 2004, No. 359 (1451).

[74] GOODWIN, B. *How the leopard changed its spots. The evolution of complexity*. New York: Princeton University Press, 2001.

[75] MARTELL, D. A. Neuroscience and the law: philosophical differences and practical constraints. *Behav. Sci. Law*, 2009, No. 27 (2).

[76] PARDO, M. S.; PATTERSON, D. Neuroscience and legal theory: jurisprudence, morality and economics. law and neuroscience conference papers [interactive. Retrieved on 2012 11 21]. Internet link: <http://lawandphil.rutgers.edu/law-and-neuroscience-conference-papers>.

[77] PARISI, F. Multidisciplinary perspectives in legal education. *University of St. Thomas Law Journal*, 2009, Vol. 6.

[78] MARKEY, H. T. Jurisprudence or "juriscience"? *Wm. & Mary L. Rev*. [interactive]. 1984, vol. 25, issue 4 [retrieved on 2011-05-22]. Internet link: <http://scholarship.law.wm.edu/wmlr/vol25/iss4/3>.

[79] SIEMS, M. M. A world without law professors [interactive] 2010 [retrieved on 2011-07-20]. Internet link: <http://ssrn.com/abstract=1481868>.

[80] RYAN, B. Does postmodernism mean the end of science in the social sciences and does it matter anyway. *Theory & Psychology*, 1999, No. 9.

[81] GLEICK, J. *Chaos: making a new science*. Viking, 1987.

[82] PRIGOGINE, I. *The end of certainty. time, chaos, and new laws of nature*. Oxford: The Free Press, 1997.

[83] COLLINS, H.; PINCH, T. The *Golem: what everyone should know about science*. Cambridge: Cambridge University Press, 1993.

Ladyman[85];P. Medawar[86]; D. Patterson[87]; M. Alvesson[88]; M. Gell-Mann[89]; T. Kuhn[90]; M. J. Wheatley[91]; S. A. Kauffman[92]; S. Strogatz[93]; J. W. Forrester[94].

All these works show the increasing manifestation of the paradigm of the new science – of complex dynamic systems, indeterministic science, chaos–in various sciences.

THE NOVELTY AND ORIGINALITY OF THE RESEARCH

We have found that the problem of the relationship between legal science and the new science, manifestations of the new science in legal science have been very little studied not only in Lithuania, but in the whole world, although over the last 10-15 years, the new science paradigm has increasingly manifested not only natural and biomedical sciences, but in the social sciences as well. It should be noted that there have not been written any doctoral dissertations on this topic in Lithuania, and we could not find any dissertations of this kind abroad.[95]

We would like to note that our studies have shown that the new science paradigm, implying opening, interdisciplinary approach (for example, neurolaw), contextual relevance, integrity, "the demolition of the walls" is a new phase of changes in which the world of science "struggles", in which the changes science paradigms and methodologies take place. We respect both the perception of the paradigm of the old science and the "old" perception legal science, being conscious of the difficulties of changes and their inevitability. Besides, we have been convinced that the paradigm of the old science can be successfully applied the law in dealing with less complex problems. However, our research has shown that reliable solutions of complex problems in law are impossible without the dynamism of the object, its integrity, diversity of social and cultural context,

---

[84] GOODWIN, B. *How the leopard changed its spots. The evolution of complexity*. New York: Princeton University Press, 2001.
[85] LADYMAN, J. *Understanding philosophy of science.* London, New York. 2002.
[86] MEDAWAR, P. *The limits of science*. Oxford: Oxford University Press. 1988.
[87] PATTERSON, D. *A companion to philosophy of law and legal theory*. Oxford: Blackwell Publishing, 2008.
[88] ALVESSON, M. *Postmodernism and social research*. Buckingham: Open University Press, 2002.
[89] GELL-MANN, M. *The quark and the jaguar: adventures in the simple and the complex.* San Francisco: W. H. Freeman, 1994.
[90] KUHN, T. *The structure of scientific revolutions*. Chicago: Chicago University Press, 1970.
[91] WHEATLEY, M. J. *Leadership and the new science. Discovering order in a chaotic world*. San Francisco: Berrett-Koehler Publishers, 1999.
[92] KAUFFMAN, S. A. *Investigations.* Oxford: Oxford University Press, 2000.
[93] STROGATZ, S. *Sync: The emerging science of spontaneous order*. New York: Hyperion, 2003.
[94] FORRESTER, J. W. *World dynamics.* Cambridge, Massachusetts: Wright Allen, 1971.
[95] We have searched the internet through search engines, for example,<www.google.com; www.openthesis.org>.

reliable empirical facts and rational mind as well as ways of heuristic solutions. Our research has shown that not only the social sciences but also the legal science becomes increasingly integrated with biomedicine and biology/neuroscience. According to the study, we believe that this integration cannot be too fast–it must occur only after clear understanding of the pros and cons of neuroscience methods. We have realized that in the meantime there are more disadvantages than advantages. We would like to emphasize that we have looked at the problems, changes, transformation of the scientific world to another state in a new way in order to better know the existing phenomena taking place in the legal science or possible changes that can challenge the legal science in the near future. We believe that in the future the legal science will not only become more integral and will be able to obtain reliable empirical findings (for example, example of neurolaw), will pay more attention to the object of interest and the dynamism of its dependence on the context, but also successfully apply the rational and heuristic/intuitive problem solving and the search for truth methods.

THE STRUCTURE OF THE DISSERTATION

The structure is determined by the dissertation topic associating the legal science with the development and the changes in science in general, so we divided the thesis into two parts. In very general terms, we primarily wanted to glance out of the old science (including the developmental stages of legal science) and the positions of understanding the new science. So that we could talk about the postclassic discourse (new scientific paradigm) in law, we have to analyse a number of steps in a broader context in general. Therefore, the next part of the dissertation deals with the challenges of the relationship of the current state of legal science and the paradigm of the new science.

The first part can be divided into the following sections: first, in general analysis of what is the paradigm, then problem of the identification of the old and the new science, the of analysis of the main features of the old deterministic science, including key development stages of legal science. The third section examines what is the new–indeterministic, postmodern, complex dynamic systems–science, what are its main features, identifying the concepts that represent it most. The analysis of the paradigm of the new science consists of the examination what is postmodernism, the problem of the

new scientific "names" and principles, the aspect of the absolute truth collapse, the butterfly effect, the new science as the chaos science the search for the integrity of the the new science revealing the concepts of multidisciplinarity, interdisciplinarity and transdisciplinarity. The fourth section seeks to find out whether or not the new science is already with us, so we present empirical (quantitative and qualitative) research results of the concepts representing the new science in all sciences in general (all fields of science) in foreign databases and Lithuanian scientific articles (all fields of science).

The second part can also be divided into sections: first we analyse the problem of the hard separation of legal science with modernism, further we analyse the issue of legal paradigms, whether or not we can speak about legal paradigms, what are they, what is the crossroads of knowledge and its possible ways; the fourth section distinguishes paradigms: analytical, normative, and critical, and we analyse their most general features; it should be noted that at the critical paradigm the field of examination slightly widens in order to answer the question of whether this paradigm can be called postmodern, further we raise the question of what legal theories are postmodern, and we present our critical opinion on their perception. The fifth section deals with the issues of the competition of paradigms in law. The sixth section analyses the topics of changes values and attitudes tin legal science. The seventh section deals with changes in the attitudes towards science in general, the problems of scientific nature of legal science, analyses of the "gulf" between legal science and practice. The eighth section views law as a complex dynamic, chaotic system. The ninth one analyses the question of integrity and interdisciplinarity of legal science. The tenth section chooses the case of neuroscience and legal science integrity and analyses whether the dialogue between these sciences is inevitable, thus it presents research results of research articles that used the concept typical of and characterizing the integrity phenomenon of law and neuroscience. The eleventh section highlights five features of the new postmodern science paradigm, and analyses their advantages and disadvantages. The twelfth section presents research (quantitative and qualitative) results of legal research articles in foreign databases where the concepts representing of the new science were used. The thirteenth section presents research (quantitative and qualitative) results of Lithuanian legal science research articles where the concepts representing of the new science were used. And

finally, the last, fourteenth, section presents the possible forecast of the development of legal science as well as the glimpse to the future.

MOST SIGNIFICANT FINDINGS

Most significant findings:

1. We believe that the most valuable feature of the old science is that it looks for the truth, grounding it on the incontrovertible facts and well-defined logic, and the largest drawback of the old science is separation of the object of knowledge from the social and cultural context, and the belief that the object is as an "accurate functioning and managed machine". Further scientific achievements have shown that the advantages of the old science work well even now and weaknesses are being eliminated, although with difficulties.

2. We have found that there is no single scientific concept of law, there is no single answer about what should be considered as legal science. Traditionally identified theory of law, or jurisprudence, or philosophy of law, or similar as legal science are not enough to expand the boundaries of legal science. The law should not be viewed dogmatically. First it should be understood that law can no longer be a closed system, legal scholars can no longer distance themselves from other sciences. Various concepts, their abundance and confusion, often mislead legal scholars and they cannot find a common language. It must be recognized that it is not so important how we call the science of law; more important is to speak about the same thing.

3. Observing these changes taking place in today's world, both in science and in other areas, sometimes it seems more and more that people can hardly find answers due to the established rules, dogmas, or attitudes. The same is in legal science and practice. For many years legal science followed the example of other sciences, and especially the successful natural sciences, and particularly those affected by determinism, so legal science was influenced by the ideas of positivism, which, though they were stricter or softer in different periods, but still constrained, too distanced from a person seeking for the absolute truth at any cost. The paradigm of old science influenced the concept and the evolution of the positive law; however, it absolutized the application of the facts and

logic and distanced the law from the social and cultural context and the "common sense".

4. We noticed that every era depending on scientific and cognitive achievements and culture has in the broadest sense their rules, principles, patterns or models of understanding and evaluation of the reality that highly influence the development of specific sciences. Despite the fact that in a certain era, it seems that a certain paradigm is the best, but from the viewpoint of critical science, there cannot be the best paradigm–it can only move towards a better one, allowing a clearer understanding of the diversity of the world, but not absolutely clear. In addition, we believe that we must have a sufficiently rigid structure of the concept of a paradigm because otherwise, in the change of scientific and cultural achievements, the principle of "all things are possible" may predominate. Such a relativist view cognition is none the better than the strict absolutizing of cognition.

5. We agree with the S. M. Feldman that postmodernism is best understood as a young intellectual, cultural and social era.[96] The era in which, as noted by Z. Bauman, there is constant and inevitable pluralism of cultures, community traditions, ideologies, "life forms" or "language games". The problem of postmodern world is not how to globalize the most important cultures, but to save the cooperation and mutual understanding between cultures.[97] For example, in science postmodernism usually occurs within the theory of chaos and nonlinear complex dynamic (indeterministic) systems, in the arts–through new artistic manifestations, and in management - through flexible management and operations and diverse structure.[98] Apparently, there lies the core of postmodernism and its strength–to pursue the dialogue between the opposites, to seek for integrity, aspiration for versatility, the broadest possible picture of the world, and most importantly–to build bridges of cooperation between all the different "colours" of the world.

6. In terms of the new science, the scientific community has called the new paradigm of science in a number of different ways–the paradigm of postmodern science,

[96] FELDMAN, S. M. *American legal thought from premodernism to postmodernism. An intellectual voyage.* Oxford University Press, 2000.
[97] BAUMAN, Z. *Intimations of postmodernity*. 1992.
[98] HAN, C. S.; LEE, S. K.; ENGLAND, M. Transition to postmodern science-related scientometric data. *Scientometrics*, 2010, Volume 84, Issue 2, p. 391-401.

evolutionary, of new science, of complex dynamic systems, chaos, nonlinear thinking, humanization of science, the constructivist paradigm. Postmodern science is sometimes understood as a deconstructed modernist science.[99] J. Gleick presented a significant difference between the linear and non-linear (complex, chaotic) system: the linear system easily pushed may fall out of the path, and the non-linear one, if pushed, will start its journey again.[100] We believe that this feature encourages achieving greater progress, new quality changes. Complex systems in themselves contain many elements, they are open, interacting, they change, they renew, they have self-regulatory strength, they make errors, improve and upgrade.

7. The criteria could be provided enabling us to discuss the differences between the old and the new science. (Table 1). In very simple terms, the old and the new science differently "think", the thinking standards are different.

Criterion	The old science – deterministic	The new science – of complex dynamic systems
1. The goal of cognition	Describe, explain, construct and predict reality.	Better understand the reality in the context of a particular era.
2. The object of cognition	Deterministic, composed of a sum of its parts, neat, predictable, controllable.	Indeterministic, dynamic, chaotic, non-linear, self-regulating, complex (the whole is more than the sum of parts).
3. The subject of cognition	Rational, objective, "almighty".	Irrational, often mistaken, "losing against nature".
4. The relationship between the subject and the object of cognition	The knowledge of the object does not depend on the subject (objective knowledge).	The knowledge of the object depends on the subject.
5. The relationship between the object of cognition and the context	The object does not depend on the context. In order to learn objectively, the object must be separated from the context.	The object depends on the context.
6. Approach to the truth	The truth is absolute.	The truth is relative, depending on the subject's cognitive limitations and the object's and chaotic nature and dynamics.

[99] FELDMAN, S. M. *American legal thought from premodernism to postmodernism. An intellectual voyage.* Oxford University Press, 2000.
[100] GLEICK, J. C*haos: making a new science*. Viking, 1987.

7. The sources for determining the truth	Undisputed facts and mind: on the basis the mind the truth is directly derived (constructed) from the facts. Without the empirical facts the truth can neither be discovered nor established.	Facts, critical thinking, common sense ("historical and social experience") are more plausible–the truth is constructed of questionable facts and logic, theories, predictions, interpretations, common sense and the social context of the times.
8. Approach to theories	Theory must correspond to the relevant direct indisputable facts. Only then they are absolutely correct. Theoretical knowledge is impossible without empirical facts. Theories are complete systems of the interpretation of the truth.	Theories do not have to be derived from direct indisputable facts. Theories can be constructed from indirect facts. Theoretical knowledge without direct empirical facts may be correct. All theories are hypothesis.
9. Approach to intuition and common sense	They are not reliable sources of knowledge.	It is critically valued, but important sources of knowledge.
10. Approach to changes	In principle this is a predictable and precisely controlled process. The main force of change is external and managed by "orders".	It is inevitable, continuous, unpredictable and hardly precisely controlled process. The main force of change is the self-regulating, depending on the environmental and internal dynamic interaction (especially cultural).
11. Relationship between cognition and morality	Cognition does not depend on morality and human values.	Cognition depends on morality and human values.
12. Approach to cognition limits	In principle, you can learn everything.	The limits of cognition expand–in principle we will never know everything.

Table 1. Features of the old and the new science[101]

8. A total of 373 336 scientific articles were found in foreign databases (from all scientific fields, including law), in which our chosen concepts representing the new science were used. The most often used concept in science in general in all our chosen foreign databases of research articles (Figure 1) was "paradigm" – we found 182 593 research articles. Others most commonly used concepts were "chaos",

[101] SKURVYDAS, A. *Apie mokslą, tiesą ir pažangą*. Kaunas: Vitae Litera, 2010.;VALANČIENĖ, D. Naujojo – sudėtingųjų dinaminių sistemų – mokslo įtaka teisės mokslui. *Teisė*, 2011, t. 78, p. 197-210.

"postmodernism". The least often used concept was "holistic science" (47 articles). However, it can be said that these figures are also sufficiently high because the new science is the current status of science, and changes appear little by little. 81 (26%) of 317 articles met our criteria for qualitative research (is the concept was attempted to define, or its context described, or said something more so that we were able to learn more about it, something fundamental).

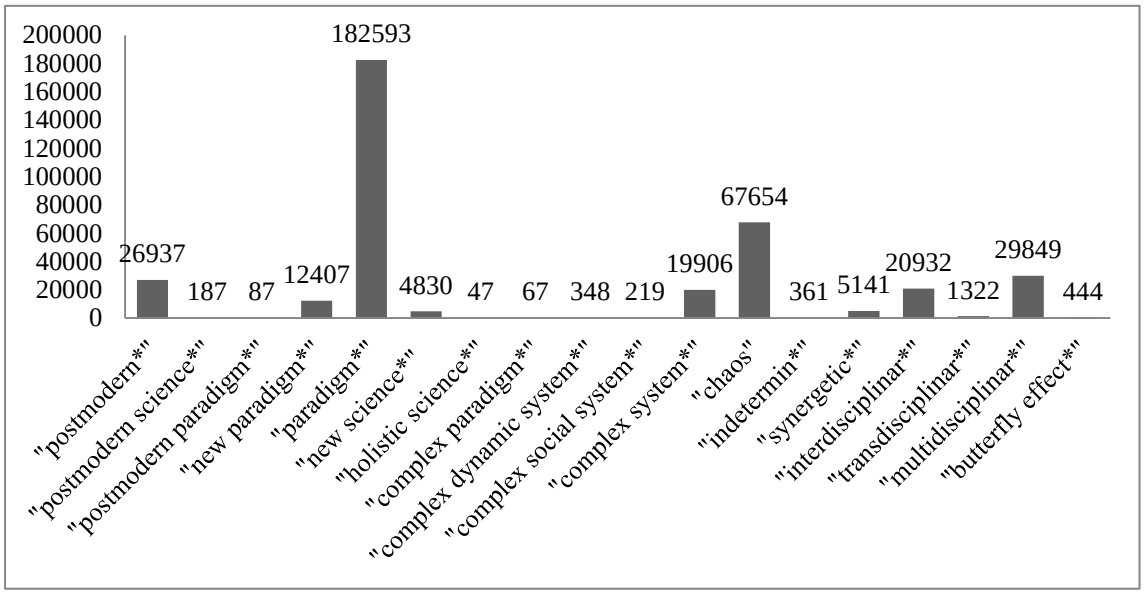


Figure 1. Concepts used in research articles. The total number of articles according to the foreign databases

Based on the information gathered, we distinguished research areas (Figure 2) where concepts of the new science were used most often. The five main areas were engineering, physics, informatics, neurosciences, psychology. However, from the viewpoint of the new science, these exclusive areas also include education science, business economics, literature, philosophy, sociology, arts, history of the philosophy of science, etc. Thus, we may confidently state that the new science is reflected not only in technological, physical sciences or biomedicine, but also in the social sciences and the humanities.

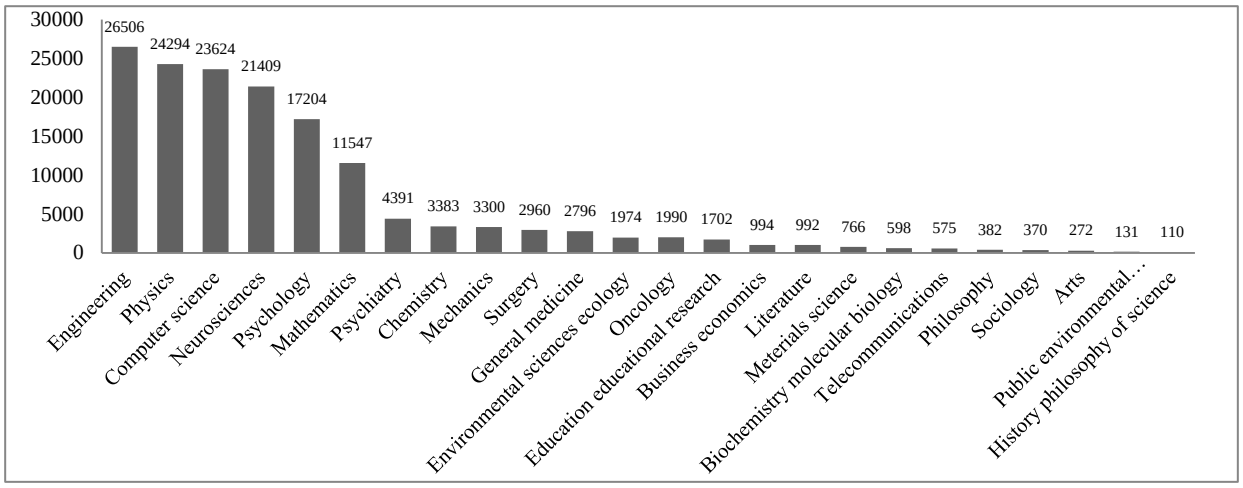


Figure 2. The number of articles (according to the foreign databases) of the specific areas of science where concepts of the new science were used (according to all concepts and according to their falling into the top five of each concept)

9. In total we found 1 725 scientific articles in Lithuania (Lithuanian virtual library database[102]), where the concepts representing the new science were used.

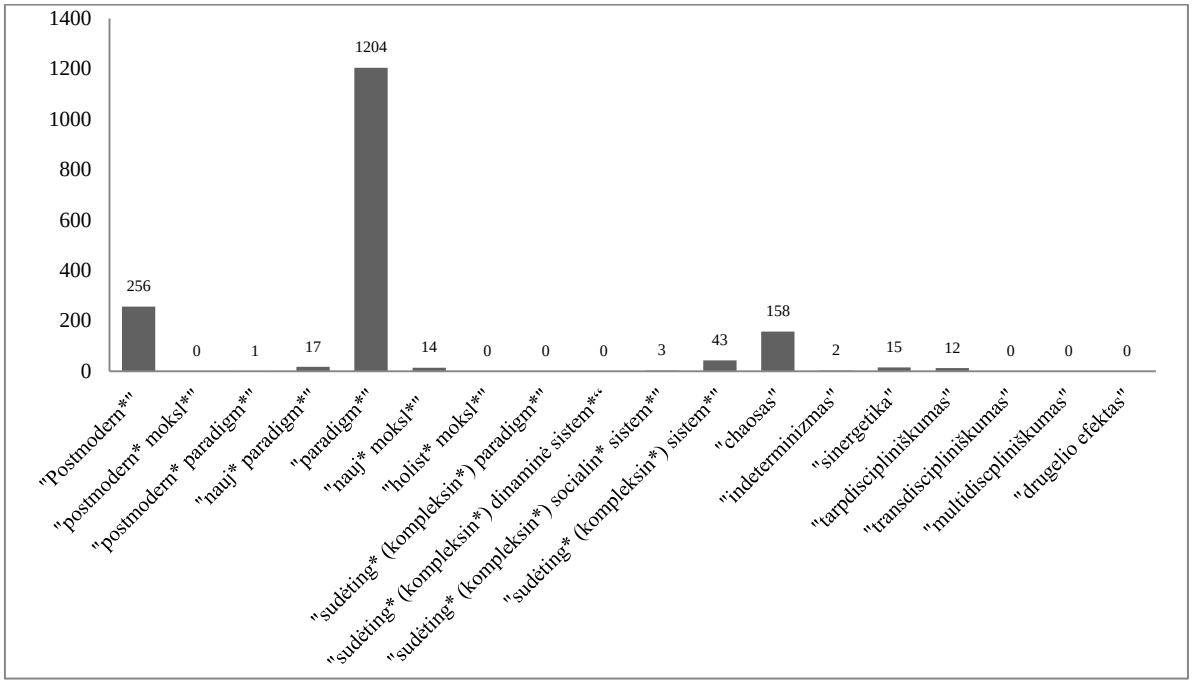


Figure 3. The number of Lithuanian research articles where the concepts representing the new science were used (1990-2013)

Most often the concept of "paradigm" (lith. *paradigma*) was used (1 204 articles), then "postmodernism" (lith. *postmodernizmas*) (256 articles) and "chaos" (lith. *chaosas*) (158 articles) (Figure 3). We found no articles that used the concepts of "postmodern

[102] Library resources. *Lithuanian Virtual Library* [interactive. Retrieved on 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

science" (lith. *postmodernusis mokslas*), "holistic science" (lith. *holistinis mokslas*), "complex paradigm" (lith. *sudėtingoji (kompleksinė) paradigma*), "complex dynamic system" (lith. *sudėtingoji (kompleksinė) dinaminė sistema*), "transdisciplinarity" (lith. *transdisciplinišKumas*) and the "butterfly effect" (lith. *drugelio efektas*). Out of 46 articles, 27 (58%) articles met our criteria for qualitative research (is the concept was attempted to define, or its context described, or said something more so that we were able to learn more about it, something fundamental).

10. Legal science in our academic community is still more associated with modernism and still we can see the great influence of the classic (old) science paradigm. However, postmodernism is increasingly beginning to show its "face". We note that legal scholars in the West are increasingly aware of the changes taking place in science in general, which have to be responded by legal scholars as well, and they legal scholars respond, although of course there is a struggle between classical legal scholars and "revolutionaries". We believe that the trend is increasingly imminent in Lithuanian legal research environment as well.

11. In the context of the new science and legal science, there is no need to contrast the paradigms of law, both of the old science and the new science, in our opinion, there must be ways to "communicate". We agree that they are different, but really they do not have to destroy each other, only in one context perhaps one is stronger, in the other context the other is stronger, and even better, certain "parts" of one or the other paradigm. Only by changing the attitude to science we can view differently the legal science and its relationship to changes in science. The future will show whether different sciences communicate effectively with each other. The current status indicates that there are more of those who want to start a conversation.

12. We are confident that the better quality of science, the more it will be beneficial to the improvement of human life. As we can see, usually there is a huge gulf between science and practice, and to build a "bridge" between them we need time and will of both legal practitioners and scientists. The future of legal science will depend not only on the culture of research, but also on the open dialogue between researchers and practitioners about one common goal–that there was more truth and justice in our highly complex and dynamic world. Moreover, legal science needs to be more open to the world. One possible example is encouraging scientific dialogue between legal scholars in different

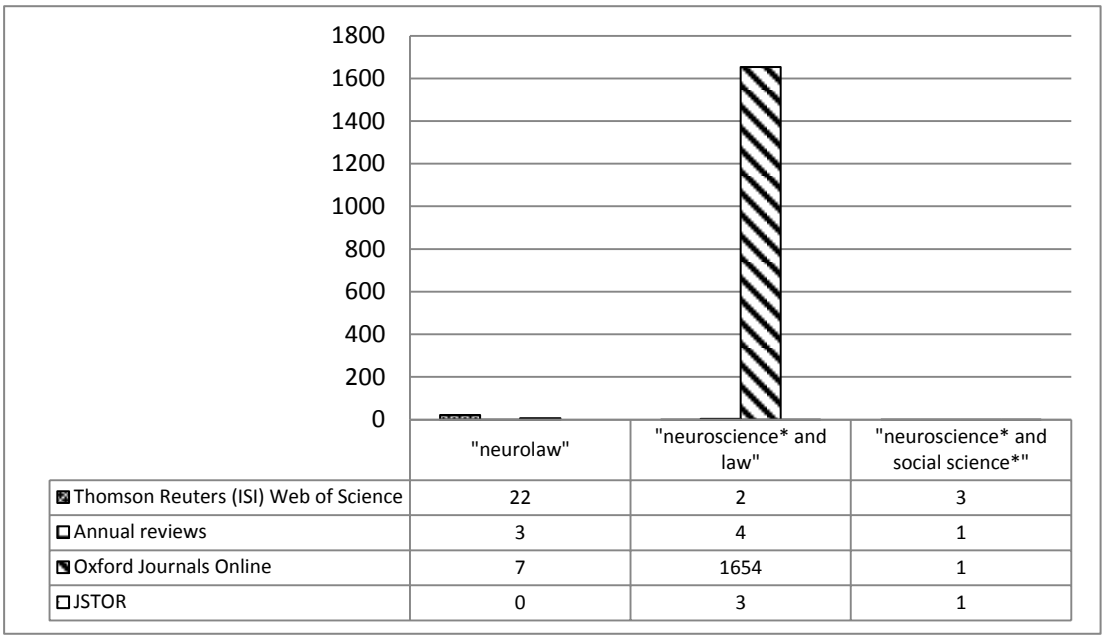
countries and areas of law. How legal scholars will be able to participate in this complex world of science developments, how they will be able to talk, to develop dialogue will determine great paradigmatic changes in the legal science, and most importantly–the search for justice and getting closer to the real truth.

13. The search for a fair legal order is false hope, chaos is inevitable.[103] Therefore, we believe that we have to accept these processes as completely natural, trying to deepen our knowledge in their management, look for ways to identify, construct, and connect the important elements of the law rather than focus on small deterministic parts not seeing the whole "picture" of the reality and complexity.

14. We believe that the current law and neuroscience dialogue is inevitable. Probably it can be argued that one cannot dissociate from clearer understanding, so neuroscientists and legal scholars increasingly find ways to build bridges. Although at first glance it might seem that it is not so important for neuroscientists to conduct research that is relevant only to legal scholars, but we should agree that this integration is important for both sides since neuroscientists are not so familiar with the legal aspects compared to representatives of legal science, thus research including sensitive social groups, such as criminals is interesting and important in neuroscience as well in order to maximize the knowledge of people of different social groups. Scientists in both areas pursue a common goal–increased knowledge about human reasoning, emotions and behaviour. Neuroscientists have much knowledge which legal scholars can take over, and it would be best if they conducted joint research, raising and discussing common issues. Of course, we can guess that this will have a major change in the field of law. This is a new and rapidly evolving science, the greatest achievements and importance of reforms of which will be seen in the future. So far, it is oriented to address most problems of criminal law and issues of legal procedures.

15. In total we found 1 701 research articles in the databases (in all scientific fields), which involved our chosen concepts characterized by and reflecting the phenomenon of integrity of law and neuroscience.

[103] SCOTT, R. E. Chaos theory and the justice paradox. *William and Mary Law Review*, 1993, Vol. 35, Issue 1.



	"neurolaw"	"neuroscience* and law"	"neuroscience* and social science*"
Thomson Reuters (ISI) Web of Science	22	2	3
Annual reviews	3	4	1
Oxford Journals Online	7	1654	1
JSTOR	0	3	1

Figure 4. The number of research articles which involved our chosen concepts characterized by and reflecting the phenomenon of integrity of law and neuroscience (1990-2013). Distribution according to the foreign databases

Most often used concept was "neuroscience and law" (1 663 articles) (Figure 4), and the least often used–"neuroscience and social science" (Figure 4).

From 33 articles, 17 (51%) of them met our criteria for qualitative research (is the concept was attempted to define, or its context described, or said something more so that we were able to learn more about it, something fundamental).

16. Realizing the manifestation of postmodern paradigm (the new paradigm, in the context of complex dynamic systems paradigm, where there is postmodern, postclassical science of complex dynamic systems[104]) in law, we tried to formulate its five features, their potential advantages and disadvantages, and the scenario for eliminating them (Table 2). We were guided by our intuitive/heuristics insights.

	Feature	Advantages	Disadvantages	Scenario for eliminating them
1.	**Dependence of the truth on the subject and the context**	1. Stimulus to look for ways which would allow the subject to make	In the absence of clear agreements and understanding about the impact of	Application od neurolaw: a) mechanisms of self-control; b)

[104] As we can see, the new science can be called differently, but due to the abundance of these concepts and to avoid the very high confusion, our distribution - old and new - in this context, seems clearer. However, postmodern paradigm influences new scientific developments, postmodern world means more, it includes a wide range of areas, not only science but also culture, art, etc. Therefore, in this table, we want to "view" the general post-modern paradigm in legal science.

		fewer mistakes which are stimulated by the socio-cultural and economic context. 2. Clearer understanding of the real reason of behaviour so and its consequences in the context.	the context and the inability to manage it, it is possible to bring each truth to the context. Then "everything is possible"–this leads to legal nihilism and autocracy.	mechanisms of managing emotions; c) it is necessary to agree on the priorities of social, cultural, moral, economic consequences. It is necessary to gradually, "step by step" apply technologies of other sciences to assess the truth, but in all cases not lose "common sense" and not to harry too much so that not make mistakes/ scientific method in law can help that.
2.	**Dynamics of the complex of causes**	1. Allows you to understand the whole, which is often not the sum of the individual parts. 2. Urges to consider the context of time (history).	As there are no adopted rules and ways how to do it, "approach" alone may be not enough to assess justice more correctly. In addition, while it is not clear how the whole depends on sum of its parts, then "all sorts of interpretations of justice scenarios" (including the poor ones) are possible.	Scientific method in law can help that as its aim is to look for more objective ways, causes, how separate parts make a whole, and to understand and evaluate the whole. Besides, to explore, which factors of justice assessment are more changeable, and which are less changeable. In addition, it is necessary to follow long-term values of human behaviour more.
3.	**Flexibility and versatility of the methodologies for determining the truth**	Possibility to determine the truth more objectively.	Possibility to make more mistakes as one is not familiar with the methodologies of determining the truth and justice, as well as their application.	To familiarize with most reliable methodologies of determining the truth in social (and other) sciences. Everywhere apply the scientific method, the core of

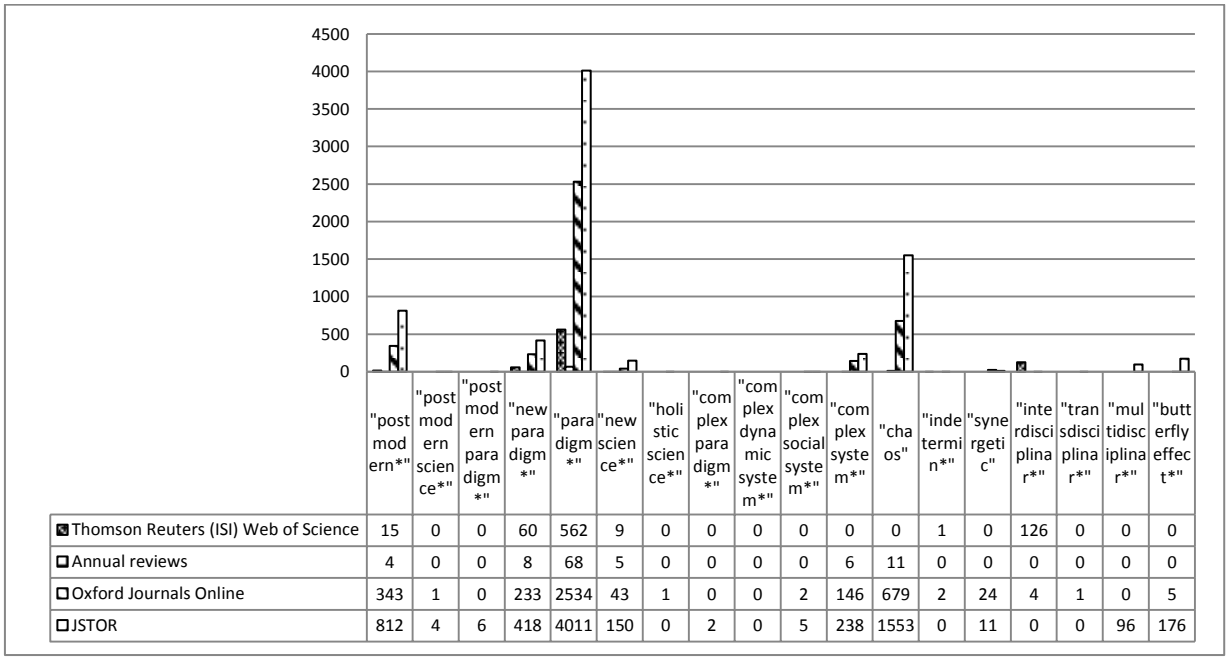
				which is critical analysis of principles, procedures and methodologies for determining the truth.
4.	**Uncertainty of the research object**	This allows you to be alert not to miss the "little things" that can change everything later. In addition, it makes you understand that all the causes cannot be determined at one time in principle - they "roll out" unexpectedly and unpredictably.	The potential of excessive scepticism.	It is necessary to describe in more detail and discuss the scenarios how to protect themselves "from little things." For this reason, research methodology to study nonlinear systems dynamics suits here well as its main principle is to assess the object in time and change. You can apply it when procedures are clear.
5.	**Changes of the criteria of truth and justice**	Possibility to specify, review, re-estimate the criteria of truth and justice.	If there is no scientific approach and responsibility, there is a possibility to reject "good" and to take "bad".	Deep interdisciplinary studies (research) in legal science, philosophy for humanity and revision, adjustment or recording of human moral values.

Table 2. Features, advantages and disadvantages of postmodernism as well as the scenarios for eliminating disadvantages

17. According to our study, from the total of 373 336 research articles in foreign databases in science in general, which is used concepts representing the new science, 24 750 (which is 6%) were research articles in legal science.

The concept of "paradigm" was used most often in all our chosen databases (Figure 5) – we found 7 125 legal research articles. In general, we found 182 593 research articles, thus excluding legal science, there remained 175 468 articles in other sciences. Other concepts: "chaos" 2 243 articles, o in other sciences – 65 411, "postmodernism" 1 174

articles, in other sciences – 25 763 articles. The least used concepts: "complex dynamic system" (not a single article in legal science), "transdisciplinarity" (1 article), "holistic science" (1 article), "complex paradigm" (2 articles). The majority of legal science articles with the concepts of the new science were in JSTOR database (7 482 articles). Others: Oxford Journals Online (4018 articles), Thomson Reuters (ISI) Web of Science (772 articles) and Annual Reviews (102 articles).



	"post modern*"	"post modern science*"	"post modern paradigm*"	"new paradigm*"	"paradigm*"	"new science*"	"holistic science*"	"complex paradigm*"	"complex dynamic system*"	"complex social system*"	"complex system*"	"chaos"	"indetermin*"	"synergetic"	"interdisciplinar*"	"transdisciplinar*"	"multidisciplinar*"	"butterfly effect*"
Thomson Reuters (ISI) Web of Science	15	0	0	60	562	9	0	0	0	0	0	0	1	0	126	0	0	0
Annual reviews	4	0	0	8	68	5	0	0	0	0	6	11	0	0	0	0	0	0
Oxford Journals Online	343	1	0	233	2534	43	1	0	0	2	146	679	2	24	4	1	0	5
JSTOR	812	4	6	418	4011	150	0	2	0	5	238	1553	0	11	0	0	96	176

Figure 5. The number of legal science research articles with the concepts representing the new science (1990-2013). Distribution according to the foreign databases

From 167 articles, 99 (59%) of them met our criteria for qualitative research (is the concept was attempted to define, or its context described, or said something more so that we were able to learn more about it, something fundamental).

18. In the database of Lithuanian Virtual Library[105] we found 13 legal research articles with concepts representing the new science (Figure 6).

[105] Library resources. *Lithuanian Virtual Library* [interactive. Retrieved on 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

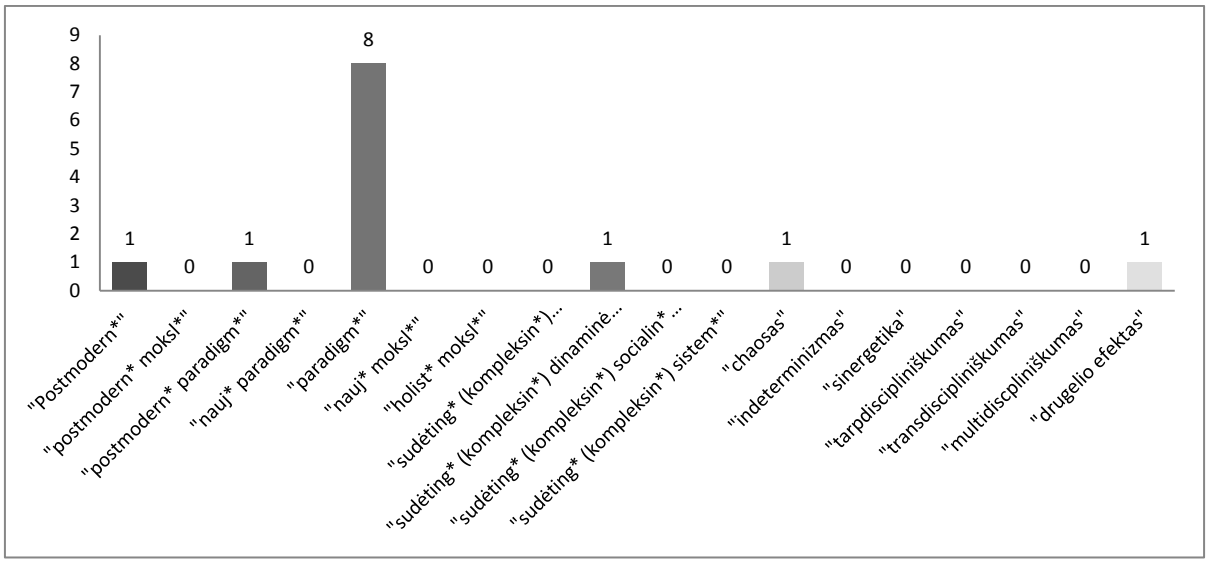


Figure 6. The number of Lithuanian legal science research articles with the concepts representing the new science (1990-2013[106])

We found the following concepts: (Figure 6): "paradigm" (lith. *paradigma*) (8 articles), "postmodernism" (lith. *postmodernizmas*) (1 article), "postmodern paradigm" (lith. *postmodernioji paradigma*) (1 article), "complex dynamic system" (lith. *sudėtinga (kompleksinė) dinaminė sistema*) (1 article), "chaos" (lith. *chaosas*) (1 article), and "butterfly effect" (lith. *drugelio efektas*) (1 article).

From 10 articles, 8 (80%) met our requirements for qualitative research and were analysed in more detail.

19. Our current state is also the time for the revaluation of our aims and values. Postmodern period is characterized by the formation of various ideas that influence legal science and the whole philosophy of law. There is also a variety of doubts. Approach to reality is changing. Science is changing as well. Today it is perceived as science of complex dynamic systems (or postmodern, of chaos), which increasingly influences legal science. And what is the specific influence of postmodernism to legal science? Several possible examples are as follows: legal science is encouraged to open; legal scholars should seek for common dialogue among themselves and with practitioners; legal scholars should seek for common dialogue not only among themselves, but also with scientists in other fields; integration of sciences and interdisciplinary approach are promoted; law is more and more perceived as a complex dynamic system (which is difficult to manage and predict); today legal science should no longer be perceived as a

[106] Library resources. *Lithuanian Virtual Library* [interactive. Retrieved on 2013-09-20]. Internet link: <http://www.lvb.lt/primo_library/libweb/action/search.do?mode=Basic&vid=LABT_VU1&tab=local&>.

defined system, where you can always find a clear answer; freedom of creativity, daring ideas and criticism are strongly encouraged; legal science should no longer be dissociated from values, moral, social and cultural context, legal science should be integral and no longer be separated from life. In other words, postmodernism encourages legal science to review the values, it is time for new values, their revaluation, time for new research methods, this is the time when the aim should be to combine sciences, common sense and social context so that we could understand the reality not absolutely clearly, but more clearly. However, the changes must be such that there always remained the possibility to return.

CONCLUSIONS

After analysing and classifying the sources of research methodology, philosophy of science, history of science as well as legal science, carrying out empirical (quantitative and qualitative) research, we have implemented our research objectives:

1. We have discovered that the old (classic)–deterministic, largely dehumanised–science is based on the search for absolute clarity and objectivity. One of the biggest flaws of the old science is that it has identified the strict boundaries between sciences and separated the subject from the object and its context. Speaking about legal science, the old science influenced the conception and development of the positive law, and it absolutized the application of facts and logic, distanced law from the social context and human culture, values and common sense as well as the heuristic way of problem solving. To this day legal science has been greatly influenced by both the scholastic method formed at the beginning of its development and the positivism (legal positivism) ideas of the nineteenth century according to which law had to be cleaned from values and separated from the influence of other sciences.

2. We have found that the issue of perception of the paradigm becomes especially important when talking about the problem of identification of the old (classical) and the new (postclassical, postmodern, of complex dynamic systems) science. Priority shall be given to the definition of T. Kuhn, according to which paradigm is a whole of values, principles and a set of rules accepted by the scientific communities or agreed by the research approaches, which determine not only the choice of the research aims, but also

the interpretation of the data obtained. Paradigm is more than a theory, but less than a worldview. Unfortunately, due to the incompleteness of cognition clear boundaries between legal paradigms and theories or even the concept of worldview often disappear. The criteria of the determination of these boundaries need constant revision. Those criteria are often not clearly defined.

3. We have established that now various postmodern ideas, theories appear in the world, which help us to see the world differently, revise the values, ways of cognition, to change the approach to the truth, in other words, encourage us to look at the reality in a postmodern way. Postmodern look is looking without absolutizing (as in the modern period) possibilities of cognition and being increasingly aware that all cognition depends not only on the subject's cognitive limitations, but also on the complexity of the object, its dynamics and context. The new science develops in the state of postmodern world; it encourages combining sciences, common sense and social context so that we could understand the reality not absolutely clearly, but more clearly. We have found that most representative concepts of the new science are: "chaos", "butterfly effect", "complex dynamic system", "indeterminism", "interdisciplinarity".

4. We have found that the paradigm of new science has a major impact on science in general; it increasingly manifests in research papers. However, higher intensity is visible in foreign research articles. Qualitative research results have revealed that in 74% of foreign and 42% of Lithuanian scientific articles the concepts of new science are simply mentioned without defining them, without specifying the context, that is nothing more or fundamental that could be learnt about them. It must be acknowledged that in the world of science there are no clear and definitive agreements for the new science concepts and, more precisely, their definitions. Empirical (quantitative) study of foreign research articles confirms that concepts representing the new science can be most often found in engineering, physics, computer sciences, also in the other fields of science, such as social sciences (such as sociology) and humanities (for example, literature).

5. We have established that the state of contemporary legal science can be characterized by:

- More and more legal scholars of the world note that the new science influences legal science. We have noticed that more and more legal scholars argue that it is important to combine science and life, and most importantly–use not one, but

many research methodologies (their integration). Moreover, more and more scientists believe that only by changing attitudes to science in general it is possible to understand law differently and to realize that law is a complex dynamic system where it is impossible to find a single and correct answer for everybody, and most important, to predict the behaviour. It is argued that the only way legal scholars and practitioners will be able to identify trends and to make more sustainable and balanced decisions. And most importantly, there are more and more scientists who believe that social systems cannot be researched using deterministic methods.

- It is the state where there are doubts about the scientific nature of legal science. The reasons for such doubts are as follows: legal science is still associated with modernism; the closed nature of legal science; the fragmentation of law into scientific and practical fields, the growing gap between research and practice; legal science increasingly becomes more practical dissociating from fundamental theoretical problem solving, theory building, etc.; unchanged approach to science in general and its potential.
- This is the state where legal scholars must respond to changes in contemporary science, to criticize, to question and to change, i.e. they must increasingly improve the scientific method. More important is not to make mistakes that have already been made by other sciences in their long historical journey. We believe that in the transformations of the world there will always remain a good place to legal science as well as legal practice (craft). In addition, we found a tendency that legal scholars are still searching for the research methodology between empiricism and rationalism, between empirical social constructivism.
- In Lithuanian legal science, this state is more "applied", though in the world it is directed towards creativity and integrity aiming at a rational balance between theory and practice.
- We have identified that this is a state when it is important to realize that both the positivist paradigm (the old paradigm) in law, and the paradigm of new science have their share of good, and it is important to consider that, to find dialogue, improve, and it would be even better if representatives of these two paradigms

were aware of pros and cons of each paradigm, and not hastened to reject what is new and what is not clear.

6. Our chosen case of research of the integrity of legal science and neuroscience–neurolaw is inevitable dialogue between these two sciences aiming at clearer knowledge of complex legal issues, when the fates of people are resolved, and in particular, to answer what the truth is in a particular case. In Lithuania it is still very difficult to find interfaces between these sciences. Qualitative research results have revealed that 49% of foreign scientific articles using concepts characteristic of the integrity phenomenon between law and neuroscience and reflecting it simply mention them without defining them, without reference to the context, nothing more is said so that we could learn more about them, some fundamentals. This shows that scientists are still cautious. Perceiving the scope of this integration, the importance of the dialogue between sciences and increasing interest we can say that legal science will inevitably face great challenges and changes.

7. Qualitative research results have revealed that 41% of foreign and 20% of Lithuanian scientific articles in legal science using concepts of the new science simply mention them without defining them, without reference to the context, nothing more is said so that we could learn more about them, some fundamentals. Thus, in other areas of science, the paradigm of the new science manifests more than in legal science, both in Lithuania and worldwide. Other sciences are increasingly aware of the advantages of the paradigm of the new science as well as the importance of the integration with other sciences. In Lithuanian legal science it is expressed even less than in legal science in other countries. The prevailing paradigm in Lithuanian legal science is still deterministic (the old science) and legal science little interacts with other sciences (the lack of interdisciplinarity).

8. We have identified that the paradigm of the new science could not only provide the legal science with the accuracy, objectivity and reliability of scientific knowledge, but also bring the legal science closer to the solutions of the real problems, i.e. closer to the analysis of human values and social as well as cultural context. Its current status is complex and not clearly defined status of both global and social phenomena and the legal of science itself. This state is not only inconvenient, but it may also be dangerous. Inconvenient as constant doubts, uncertainty and ambiguity are very tiring. Dangerous

because if it is not clear, then not only various “prophets” can appear, but also the feelings of absolute helplessness and relativism may occur among the lawyers. When analysing the historical context of changes in paradigms we noticed that it is never possible to know in advance whether the new paradigm will be better, thus critical and gradual understanding of the social and cultural context, scientific research developments in the academic community would lead legal science towards changes, after which there is always a possibility and go back and check. This return means that still we will never return to the same status, the “old parts” will still be viewed according to the current epoch and the whole current context after finding the dialogue with the “old” and “new” parts of cognition.

PREDICTIONS AND RECOMMENDATIONS

We believe that the perspective for the future development of legal science both in Lithuania and the global context (although the change in the world is more intensive) could be directed as follows:

1. In Lithuania legal scholars should begin to take more interest in the new paradigm of science and its relation to legal science.
2. Lithuanian legal scholars are more likely to be affected by the paradigm of new science, and this will encourage them to improve the methodology, design and develop theories, which can make a huge impact on practice.
3. Legal science should become increasingly open to cognition, innovation and changes. We suppose that legal scholars increasingly will be able to maintain, develop and improve the dialogue both “inside” among legal scholars and practitioners as well as with representatives of other sciences, and in particular in search of truth and justice. We believe that both legal scholars and practitioners who regard themselves as supporters of the old science or the new science, the old or new approach to reality should stop fighting and try to seek greater dialogue on a complex and dynamic road towards the same most genuine goal–justice. We believe that a very important dialogue between law and neuroscience causing a lot of changes may thus be developed.

4. Legal science as any other contemporary science should become integral. However, all the integration is very complex and requires a high level of research and experience, patience, and dedication to a long journey of cognition. Therefore, we believe that there is no need to immediately and quickly respond or reject possibilities of integrity, such as between neuroscience and law.
5. Legal scholars should try more to be important partners to scientists in other fields because it is believed that the limits of science are more likely to disappear.
6. In legal science, the subject's role, values, social and cultural context can increasingly be better perceived.
7. Although there is no single paradigm of legal science, it must be recognized that law is increasingly perceived as a complex and dynamic system. We believe that Lithuania law will increasingly be perceived as a complex dynamic system as well.
8. Legal scholars following different legal paradigms should learn to coexist, cooperate without destroying the underlying different approaches.
9. Legal scholars should understand the importance of changes in legal studies in the preparation of lawyers who will "grow" amidst interdisciplinary, comprehensive approaches, values, morals, critical attitudes, creativity and free thought.
10. In the future, it may happen that we will have to reconsider the strengths and weaknesses of traditional and classical legal science, perhaps even returning to certain elements of the previous paradigm. However, parts of the "old" legal science parts can already be different: in different context, a period of time, dynamic and changing, and we believe, in a dialogue with "parts" of the new paradigm.
11. It is necessary not to delay, but not to hurry too much because real cognition is not necessarily fast, visible and "convenient". We believe that both legal scholars and practitioners will inevitably have to learn to combine the rational mind with less disputed facts (experience) and common sense, as well as the social and cultural context.

AUTHOR'S PUBLICATIONS RELATED TO SUBJECT OF DISSERTATION

1. VALANČIENĖ, D. Contemporary Status of Law Science: Postmodernism, Uncertainty about its Scientific Character and Change in the Approach to Science Itself. *Procedia – Social and Behavioral Sciences*, 2013, Vol. 92, p. 981-985.
2. VALANČIENĖ, D. Is dialogue between neuroscience and law inevitable? *Ugdymas, kūno kultūra, sportas (Education. Physical Training. Sport)*, No. 73, 2013, p. 73-79.
3. VALANČIENĖ, D. Šiuolaikinės teisės mokslo būklės suvokimo paieška ir žvilgsnis į galimas ateities perspektyvas (Eng. *Current status of law science awareness search and look at possible future perspectives*). *Teisės apžvalga*, 2013, No. 1 (10), p. 5-29.
4. SKURVYDAS, A.; KUNDROTAS, V.; VALANTINIENĖ, I.; VALANČIENĖ, D. Complex dynamic systems – a new management paradigm: fashion or necessity? *Baltic Journal of Management*, 2013, Vol. 8, No. 1, p. 66-78.
5. VALANČIENĖ, D. Teisės paradigmų pažinimo kelias. (Eng. *The way towards cognition of law paradigms*). *Teisė*, 2012, t. 82, p. 159-180.
6. VALANČIENĖ, D. Naujojo – sudėtingųjų dinaminių sistemų – mokslo įtaka teisės mokslui (Eng. *The influence of new science – the science of complex dynamic systems – on the science of law*). *Teisė*, 2011, t. 78, p. 197-210.
7. SKURVYDAS A., VALANČIENĖ D. Naujojo mokslo – sudėtingųjų dinaminių sistemų – tyrimo paradigma: nuo biologijos iki teisės (Engl. *New science – complex dynamic systems – research paradigm: from biology to law*). *Ugdymas, kūno kultūra, sportas*, 2009, t. 4 (75), p. 70-79.

ANNOUNCEMENTS IN SCIENTIFIC CONFERENCES ON THE THEME OF DISSERTATION

1. VALANČIENĖ, D. *Contemporary status of law science: postmodernism, uncertainty about its scientific character and change in the approach to science itself.* (International scientific conference "Current paradigms in social sciences. Lumen international scientific conference". 2013, Iasi, Romania, 10-13April).

Thesis: VALANČIENĖ, D. *Contemporary status of law science: postmodernism, uncertainty about its scientific character and change in the approach to science itself*.

Current paradigms in social sciences Lumen international scientific conference. 2013, Iasi, 10-13 April. Book of abstracts, p. 257

2. VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in legal science*. (International scientific conference of PhD students and young researchers "The interaction of national legal systems: convergence or divergence?" 2013, Vilnius (Vilnius University, Faculty of Law), Lithuania, 25-26 April).

Thesis: VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in legal science*. International conference of PhD students and young researchers. The interaction of national legal systems: convergence or divergence? 2013, Vilnius, 25-26 April. Conference papers, p. 383-390.

3. VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in Legal theory and legal history.* (International scientific conference "Проблемы возникновения и развития белорусской государственности к 1150-летию первого летописного упоминая о государственных образованиях у восточных славян" (eng. *The statehood emergence and developement challenges problems of Belarus, as the first Eastern Slavic states derivatives mentioned in the year 1150 chronicle*). 2012, Minsk, Belarus, 20 November.

Thesis: VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in Legal theory and legal history.* Проблемы возникновения и развития белорусской государственности к 1150-летию первого летописного упоминая о государственных образованиях у восточных славян. Материалы международной научно теоретической конференции студентов, магистрантов и аспирантов. Минск, 20 Ноября 2012 г., p. 53-55.

INFORMATION ABOUT THE AUTHOR

Education:

1993–2005 – Kaunas „Varpas“ gymnasium.

2005–2010 – Vilnius University, Faculty of Law (Master of Law).

The title of Master Thesis: Interrelationship of law and science: in the light of the old and new science. Supervisor: Assoc. Prof. Dr. Zenonas Namavičius.

Achievements in the years of studies: Honorary Diploma for very good learning activities.

Autumn 2010 – present: doctoral studies in Legal Theory at Vilnius University,
Faculty of Law. Supervisor: Prof. Dr. Jevgenij Machovenko.

Internships and work experience:

2007-07-11–2007-08-10: Professional Partnership of Advocates “Jurevičius, Balčiūnas ir Bartkus” (Internship).

2009-03-18–2009-04-09: the Seimas of the Republic of Lithuania, Commission for Ethics and Procedures (Internship).

September 2011 – December 2011; September 2012 – December 2012: seminars to first year students in the courses of “Introduction to studies in legal system and legal theory”, “Legal Theory” (Vilnius University, Faculty of Law).

Since September 2012 – Lithuanian Sports University, faculty of Sports Education, Department of Sports Management, Economics and Sociology, assistant (study courses: “Business Law”, “Business Management and Business Law”, “Neurojurisprudence and Neuroethics”, “Neuroeducation”).

Since September 2014 – Vilnius University, Faculty of Law, Department of Public Law, assistant (study course: “History of Law”, seminars to first year students).

Research interests:

Legal theory, philosophy of law, philosophy of science, neurolaw, complex dynamic systems and the problems of legal science, interdisciplinarity, neuroeducation.

TEISĖS MOKSLAS SENOJO IR NAUJOJO MOKSLO PARADIGMOS AKIVAIZDOJE (REZIUMĖ)

Tyrimo mokslinė problema, aktualumas. Šių dienų pasaulyje[107] vyksta mokslo[108] paradigmų kaita: „kovoja“ senasis[109] (deterministinis ir mechanistinis mąstymas, pagrįstas visiško aiškumo, apibrėžtumo ir objektyvumo siekiu) su naujuoju[110] (postmoderniuoju, sudėtingųjų dinaminių sistemų, postklasikiniu, chaoso) mokslu (taip supranta, pavyzdžiui, I. Prigogine[111]; S. A. Kauffman[112]; S. Strogatz[113]; J. Gleick[114]; J. Elster[115]; J. W. Forrester[116]), kuris nesuabsoliutina pažinimo galimybių ir vis labiau supranta, kad kiekvienas pažinimas priklauso ne tik nuo subjekto pažinimo ribotumo, bet ir nuo konteksto įvairovės, objekto sudėtingumo, dinamikos, t. y. negalimumo iš principo jį absoliučiai tiksliai pažinti, ištirti, suprasti. Naujojo mokslo paradigma remiasi sudėtingųjų dinaminių sistemų mokslo pasiekimais (pavyzdžiui, J. Gleick[117]; M. Gell-Mann[118]; J. Elster[119]). Sudėtingoji dinaminė sistema yra: a) sudaryta iš daugiau nei dviejų elementų, kurie susiję kintamais abipusiais ryšiais, b) sunkiai suprantama, valdoma ir prognozuojama.

Suvokiame, kad reikia pirmiausia perprasti svarbiausius šių dienų mokslo bruožus, jo pokyčius (nes pats mokslas ir jo metodologijos taip pat nuolatos kinta), vėliau, įsitikinti, kokį požiūrį, paradigmą palaiko šiuolaikiniai mokslininkai, ką teigia taip vadinamas naujasis mokslas (sudėtingųjų dinaminių sistemų, postklasikinis, postmodernusis mokslas), ar jis turi daug šalininkų, kiek naujasis mokslas atsispindi mokslininkų

---

[107] Reikėtų patikslinti, kad tiek į mokslą apskritai, tiek į teisės mokslą, yra žvelgiama Vakarų pasaulio kontekste.

[108] Jeigu klaustume, kaip apibrėžti mokslą, galėtume teigti: mokslas – tiesos atradimo, patvirtinimo ir prognozavimo sistema, kuri priklauso nuo subjekto gebėjimų ir objekto sudėtingumo. Mokslo tikslas – suprasti realybę. Mokslas kuria žinias, žinios – progresą. Tai atvira ir dinaminė sistema, kuri turi siekti kurti ir tobulėti, vystyti dialogą įvairiausiose srityse (*Declaration on science and the use of scientific knowledge* [interaktyvus. Žiūrėta 2014-07-01]. Prieiga per internetą: < http://www.unesco.org/science/wcs/eng/declaration_e.htm>).

[109] Disertacijoje klasikinis – deterministinis, mechanistinis – mokslas, kuris vystėsi nuo XVII a., vadinamas senuoju mokslu.

[110] Disertacijoje šiuolaikinis – sudėtingųjų (kompleksinių), dinaminių sistemų – mokslas, kuris pradėjo vystytis nuo XX a. pabaigos, nors užuomazgų galima rasti ir anksčiau, vadinamas naujuoju mokslu.

[111] PRIGOGINE, I. *The end of certainty. Time, chaos, and new laws of nature*. Oxford: The Free Press, 1997.

[112] KAUFFMAN, S. A. *Investigations.* Oxford: Oxford University Press, 2000.

[113] STROGATZ, S. S*ync: the emerging science of spontaneous order.* New York: Hyperion, 2003.

[114] GLEICK, J. C*haos: making a new science*. Viking, 1987.

[115] ELSTER, J. *Explaining social behavior: more nuts and bolts for the social sciences*. Cambridge: Cambridge University Press, 1 edition, 2000.

[116] FORRESTER, J. W. *World dynamics.* Cambridge, Massachusetts: Wright Allen, 1971.

[117] GLEICK, *supra note* 114.

[118] GELL-MANN, M. *The quark and the jaguar: adventures in the simple and the complex.* San Francisco: W. H. Freeman, 1994.

[119] ELSTER, *supra note* 115.

darbuose, ypač svarbu įsitikinti, jeigu moksle vyksta rimti pokyčiai, ar teisės mokslas į tai reaguoja ir kaip reaguoja, ar dėl savo specifiškumo iš viso turi į tai reaguoti? Turime pabrėžti, kad teisės mokslas disertacijoje tai – fundamentalusis teisės mokslas (generalinė jurisprudencija, teisės filosofija, teisės teorija, teisėtyra, kitaip tariant, fundamentalusis teisės mokslas, kuris yra kaip pagrindas).

Tyrimo objektas – senojo mokslo paradigmos pagrindiniai privalumai ir trūkumai; naujojo mokslo paradigmos privalumai ir trūkumai ir jį reprezentuojantys bruožai, išryškėjantys per sąvokų tyrimą apskritai moksle ir teisės moksle; teisės mokslo paradigminiai pokyčiai mokslo pokyčių kontekste; teisės ir neuromokslo integravimosi galimybės.

Tyrimo tikslas – pateikiant įžvalgas, susijusias su apskritai mokslo sampratos kaita, nustatyti, kiek ir kaip naujojo mokslo paradigma pasireiškia apskritai moksle ir teisės moksle, ir atskleidžiant naujojo mokslo paradigmos reikšmę teisės mokslui ir teisės mokslo šiuolaikinę būklę, prognozuoti ir pateikti, remiantis svarbiausiais faktais, euristines/intuityvias galimas teisės mokslo raidos ateities įžvalgas/perspektyvas.

Tyrimo uždaviniai:

1. Atskleidžiant senojo ir naujojo mokslo identifikavimo problemą, išanalizuoti, kokie yra senojo – deterministinio mokslo pagrindiniai bruožai, aptariant ir pagrindinius teisės mokslo vystymosi etapus.

2. Nagrinėjant daugelį mokslų, tarp jų ir teisės mokslą, bendriausiais argumentais ir bruožais aptarti, kas yra paradigma.

3. Išanalizuoti, kas yra postmodernizmas ir naujasis – indeterministinis, postmodernus, kompleksinių dinaminių sistemų – mokslas, kokie jo pagrindiniai bruožai, nustatant labiausiai jį reprezentuojančias sąvokas bei jų reiškimosi bruožus.

4. Ištirti, kiek pasirinktose reprezentatyviose duomenų bazėse Lietuvoje ir pasaulyje galima surasti apskritai mokslo straipsnių, kuriuose vartojamos naująjį mokslą reprezentuojančios sąvokos ir bruožai. Kokybiniu ir konceptualiu aspektu ištirti, kaip labiausiai cituojamuose arba relevantiškiausiuose apskritai mokslo straipsniuose yra šios sąvokos vartojamos (apibrėžiama, kritikuojama ar pan.). Taip pat ištirti, kokiose mokslo srityse naujojo mokslo sąvokos ir bruožai labiausiai pasireiškia.

5. Atskleidžiant teisės mokslo ir naujojo mokslo sąsajų pagrindinius aspektus, analizuojant pagrindines šiuolaikines teisės mokslo problemas, vykstančius pokyčius, nustatyti šiuolaikinę teisės mokslo būklę, naujojo mokslo idėjų teisės mokslui svarbą.

6. Išanalizuoti teisės ir neuromokslo dialogą, kuo neuromokslas galėtų padėti teisei, atsakant į klausimą, ar tai neišvengiamas dialogas ar tik laikina mada, ieškant būdų, kaip patikimiau nustatyti tiesą ir teisingumą. Taip pat ištirti, kiek pasirinktose reprezentatyviausiose duomenų bazėse galime rasti mokslo straipsnių, kuriuose vartojamos teisės ir neuromokslo integralumo reiškiniui būdingos ir jį atspindinčios sąvokos. Kokybiniu ir konceptualiu aspektu ištirti, kaip labiausiai cituojamuose straipsniuose arba relevantiškiausiuose straipsniuose, apskritai mokslo straipsniuose yra šios sąvokos vartojamos (apibrėžiama, kritikuojama ar pan.).

7. Ištirti, kiek pasirinktose reprezentatyviose duomenų bazėse Lietuvoje ir pasaulyje galima surasti apskritai teisės mokslo straipsnių, kuriuose vartojamos naująjį mokslą reprezentuojančios sąvokos. Kokybiniu ir konceptualiu aspektu ištirti, kaip labiausiai cituojamuose straipsniuose arba relevantiškiausiuose teisės mokslo straipsniuose yra šios sąvokos vartojamos (apibrėžiama, kritikuojama ar pan.).

8. Apibendrinus ir konceptualizavus tyrimo rezultatus, pateikti labiau tikėtinas teisės mokslo raidos ateities įžvalgas/perspektyvas ir praktines prognozes/rekomendacijas dėl teisės mokslo raidos iššūkių naujojo mokslo kontekste.

Tyrimo metodika. Disertacijos tyrimas susideda iš: teorinės (fundamentaliosios) ir empirinės dalies. Disertacijoje taikomi šie metodai: teoriniai (konceptuali, kritinė, sisteminė mokslinės literatūros (kurioje atsispindi disertacijos tematikos reiškiniai) analizė, lyginimas, apibendrinimas) ir empiriniai (dokumentų kiekybinė ir kokybinė analizė) tyrimo metodai.

Disertacinio tyrimo hipotezės:

1. Senojo mokslo[120] vienas iš pagrindinių bruožų yra tai, kad jis atskyrė mokslus vienus nuo kitų, realybę suvokiant kaip tiksliai valdomą ir prognozuojamą mechanizmą ir visiškai nepriklausomą nuo konteksto sudėtingumo. Teisės moksle tai pasireiškė, teisę atitraukiant nuo vertybių, socialinio ir kultūrinio konteksto. Ši pozityvistinė teisės paradigma neabejotinai tinka sprendžiant aiškiai suprantamas ir nesudėtingas problemas,

[120] Kalbėdami apie senąjį mokslą turime omenyje modernųjį mokslą, kuris susiformavo apie XVII a. Pavyzdžiui, dar Antikos laikais mokslas nebuvo suskirstytas, viskas buvo filosofija.

bet jos galia sumažėja, kai reikia spęsti dinamiškas, sudėtingas ir nuo konteksto priklausiančias problemas. Todėl manome, kad naujesniuose mokslo straipsniuose rasime vis daugiau argumentuotų įrodymų dėl naujojo mokslo paradigmos taikymo efektyvumo teisės moksle.

2. Nėra aiškaus paradigmos sąvokos apibrėžimo, tačiau tai yra plačiau nei teorija. Šios sąvokos apibrėžimas tampa komplikuotas, kai jį nagrinėja daugelis mokslų, tarp jų ir teisės. Tikimės surasti bendrumų ir neatitikimų įvairiuose moksluose vartojant paradigmos sąvoką.

3. Postmodernizmas – tai naujasis pasaulio etapas, kuriame vystosi naujasis mokslas, siekdamas pokyčių apskritai moksle ir teisės moksle, svarbiausia, griaunant senojo mokslo paradigmos įsitikimus ir taisant jo klaidas. Tikimės, nagrinėjant mokslo šaltinius rasti konceptualių įrodymų dėl naujojo mokslo įvairiuose moksluose ir teisės moksle taikymo struktūros (patikimumo, trūkumų, objektyvumo).

4. Manome, kad pasaulyje naujojo mokslo paradigma apskritai mokslo straipsniuose reiškiasi intensyviai, tačiau Lietuvos mokslo straipsniuose ji reiškiasi kur kas mažiau. Manome, kad pasaulyje naująjį mokslą reprezentuojančios sąvokos labiausiai reiškiasi technologiniuose moksluose, tačiau jos reiškiasi ir socialiniuose moksluose.

5. Manome, kad Lietuvoje ir pasaulyje teisės mokslo šiuolaikinė būklė pasireiškia šiais bruožais: Lietuvos teisės mokslo vyraujanti paradigma, yra deterministinė (senojo mokslo) ir teisės mokslas nepakankamai sąveikauja su kitais mokslais (trūksta tarpdisciplinišKumo), o pasaulio teisės mokslininkai vis labiau atkreipia dėmesį į sudėtingųjų dinaminių sistemų paradigmą (naujojo mokslo) bei integraciją su kitais mokslais. Manome, kad teisės mokslas Lietuvoje yra labiau „taikomasis“, t. y. labiau praktinių problemų „sprendėjas“, o pasaulyje vis didesnis dėmesys skiriamas naujų integruotų idėjų, koncepcijų ir teorijų kūrimui ir patikrinimui. Manome, kad gera praktika vienareikšmiškai privalo priklausyti nuo geros teorijos.

6. Manome, kad neuromokslo ir teisės mokslo integracijos intensyvumas vis didėja. Tikimės, kad tai padidintų tiesos ir teisingumo nustatymo objektyvumą ir patikimumą teisės moksle ir praktikoje.

7. Keliame hipotezę, kad pasaulyje teisės mokslo straipsniuose naujojo mokslo paradigma reiškiasi kur kas intensyviau nei Lietuvos teisės mokslo straipsniuose.

8. Tikimės, kad naujojo mokslo paradigma ateityje turėtų labiau ne tik suteikti teisės mokslui mokslinio pažinimo tikslumo ir patikimumo, bet ir teisės mokslą priartinti prie realių problemų sprendimo, t. y. teisės mokslui suteikti ne tik teorinio gilumo ir pragmatiškumo, bet ir žmogiškųjų vertybių, socialinio ir kultūrinio konteksto dinamiško interpretavimo. Spėjame, kad teisės mokslas ateityje vis labiau taps integralesnis, vienijantis ir kitų mokslų gerai veikiančias metodologijas, ir racionalų protą, ir euristinius problemų sprendimo būdus, patikimus empirinius faktus, ir geras praktikas.

IŠVADOS

Išanalizavę ir susisteminę mokslo metodologijos, mokslo filosofijos ir istorijos bei teisės mokslo šaltinius, atlikę empirinius (kiekybinius ir kokybinius) tyrimus, įgyvendinome išsikeltus uždavinius:

1. Ištyrėme, kad senasis (klasikinis) – deterministinis, žymia dalimi dehumanizuotas – mokslas yra pagrįstas absoliutaus aiškumo ir objektyvumo siekiu. Vienas iš didžiausių senojo mokslo trūkumų yra tai, kad jis išskyrė griežtas ribas tarp mokslų ir atskyrė subjektą nuo objekto bei jo konteksto. Kalbant apie teisės mokslą, senasis mokslas padarė įtaką pozityviosios teisės sampratai ir raidai, tačiau suabsoliutino faktų ir logikos taikymą ir nutolino teisę nuo socialinio konteksto bei žmonių kultūros, vertybių bei sveiko proto bei euristinio problemų sprendimo būdo. Teisės mokslui didžiulę įtaką iki šių dienų daro tiek vystymosi pradžioje susiformavęs scholastinis metodas, tiek XIX a. pozityvizmo (teisinio pozityvizmo) idėjos, pagal kurias teisę buvo siekiama išvalyti nuo vertybių ir atskirti nuo kitų mokslų įtakos.

2. Nustatėme, kad paradigmos suvokimo klausimas tampa ypač svarbus, kai kalbame apie senojo (klasikinio) ir naujojo (postklasikinio, postmoderniojo, sudėtingųjų dinaminių sistemų) mokslo identifikavimo problemą. Pirmenybė suteiktina T. Kuhn apibrėžimui, pagal kurį paradigma – tai mokslinių bendrijų priimta arba susitarta tyrimo požiūrių, vertybių, principų ir taisyklių visuma, nuo kurios priklauso ne tik tyrimo tikslų pasirinkimas, bet ir gautų duomenų interpretavimas. Paradigma yra daugiau nei teorija, bet mažiau nei pasaulėžiūra. Deja, dėl pažinimo neužbaigtumo dažnai išnyksta aiškios ribos tarp teisės paradigmų ir teorijų ar net pasaulėžiūros sampratos. Šių ribų nustatymo

kriterijus būtina nuolatos tikslinti. Šių ribų nustatymo kriterijai dažnai dar nėra tiksliai apibrėžti.

3. Nustatėme, kad dabar pasaulyje formuojasi įvairios postmoderniosios idėjos, teorijos, kurios skatina mus kitaip žvelgti į pasaulį, peržiūrėti vertybes, pažinimo būdus, keisti požiūrį į tiesą, kitaip pasakius – skatina mus postmoderniai žvelgti į realybę. Postmoderniai žvelgti – tai žvelgti nebesuabsoliutinant (kaip moderniuoju laikotarpiu) pažinimo galimybių ir vis labiau suprantant, kad kiekvienas pažinimas priklauso ne tik nuo subjekto pažinimo ribotumo, bet ir nuo objekto sudėtingumo, dinamikos ir konteksto. Naujasis mokslas vystosi postmodernioje pasaulio būsenoje, jis ragina suvienyti mokslus, sveiką protą ir socialinį kontekstą tam, kad ne absoliučiai aiškiai, bet aiškiau galėtumėm suprasti realybę. Ištyrėme, kad labiausiai reprezentuojančios naująjį mokslą yra šios sąvokos: „chaosas“, „drugelio efektas“, „sudėtingoji dinaminė sistema“, „indeterminizmas“, „tarpdisciplinišKumas“.

4. Nustatėme, kad naujojo mokslo paradigma daro didžiulę įtaką apskritai mokslui, ji reiškiasi mokslo straipsniuose vis intensyviau. Tačiau didesnis intensyvumas matomas užsienio moksliniuose straipsniuose. Kokybinio tyrimo rezultatai atskleidžia, kad užsienio – 74 proc., o Lietuvos – 42 proc. mokslo straipsnių, naujojo mokslo sąvokos yra tiesiog paminimos, jų neapibrėžiant, nenurodant konteksto, nepasakoma nieko daugiau, kad būtų galima apie jas sužinoti plačiau, fundamentaliau. Reikia pripažinti, mokslo pasaulyje nėra aiškių ir galutinių susitarimų dėl naujojo mokslo sąvokų ir tuo labiau jų tikslių apibrėžimų. Užsienio mokslo straipsnių empirinis (kiekybinis) tyrimas patvirtina, kad naująjį mokslą reprezentuojančių sąvokų daugiausiai galima atrasti: inžinerijos, fizikos, informatikos srityse, tačiau tarp kitų mokslo sričių, kuriuose daugiausiai šių sąvokų randama, yra ir socialiniai (pavyzdžiui, sociologija) bei humanitariniai mokslai (pavyzdžiui, literatūra).

5. Nustatėme, kad šiuolaikinė teisės mokslo būsena pasireiškia šiais ypatumais:

- Vis daugiau pasaulio teisės mokslininkų pastebi, kad naujasis mokslas daro įtaką ir teisės mokslui. Pastebėjome, kad vis labiau teisės mokslininkai teigia, kad svarbu sujungti mokslą ir gyvenimą, o svarbiausia – moksle naudotis ne viena, bet daugeliu metodologijų (jų integracija). Be to, vis daugiau yra manančių, kad tik pakeitę požiūrį į mokslą apskritai suvoksime kitaip ir teisę, kad teisė yra sudėtingoji dinaminė sistema, kur rasti bendrų ir visiems teisingų atsakymų, o

svarbiausia nuspėti elgseną – neįmanoma. Teigiama, kad tik taip teisės mokslininkai ir praktikai gebės atpažinti tendencijas ir priimti labiau subalansuotus ir apsvarstytus sprendimus. O svarbiausia, vis labiau sutinkama mokslininkų, manančių, kad socialinės sistemos negali būti tiriamos deterministiniais būdais.

- Tai būsena, kai abejojama teisės mokslo moksliškumu. Tokių abejonių priežastys: teisės mokslas vis dar siejamas su modernizmu; teisės mokslo uždarumas; teisės susiskaldymas į mokslinę ir praktinę, kad vis labiau didėja atotrūkis tarp mokslininkų ir praktikų; teisės mokslas vis labiau praktiškėja, atsiribojant nuo fundamentalių teorinių problemų sprendimo, teorijų kūrimo ir t. t.; paties požiūrio į mokslą apskritai ir jo galimybes nekeitimas.
- Tai būsena, kai teisės mokslininkai turi reaguoti į šiuolaikinio mokslo pokyčius, kritikuoti, kelti klausimus ir keistis, t. y. turi vis tobulinti mokslinį metodą. O dar svarbiau nedaryti klaidų, kurias jau padarė kiti mokslai ilgoje savo istorinėje kelionėje. Manome, kad pasaulio transformacijose, visados išliks vietos geram teisės mokslui, kaip ir gerai teisės praktikai (amatui). Be to, pastebėjome tendenciją, kad teisės mokslininkai vis dar ieško tyrimo metodologijos tarp empirizmo ir racionalizmo, tarp socialinio empirinio konstruktyvizmo.
- Lietuvos teisės moksle ši būsena labiau „taikomoji“, nors pasaulyje ji vis labiau krypsta link kūrybiškumo ir integralumo, siekiant racionalaus balanso tarp teorijos ir praktikos.
- Ištyrėme, kad tai būsena, kada svarbu suvokti, kad tiek pozityvistinė paradigma (senoji paradigma) teisėje, tiek naujojo mokslo paradigma turi gerąsias savo dalis, kurias svarbu derinti, rasti dialogą, tobulinti, o dar geriau – jei šių dviejų paradigmų atstovai suvoktų kiekvienos paradigmos privalumus ir trūkumus, neskubėdami atmesti tiesiog to, kas yra nauja ir neaišku.

6. Mūsų pasirinktas teisės mokslo ir neuromokslo integralumo tyrimo atvejis – neuroteisė yra neišvengiamas dialogas tarp šių dviejų mokslų, siekiant aiškesnio pažinimo sudėtinguose teisiniuose klausimuose, kai yra sprendžiami žmonių likimai, o svarbiausia, siekiama atsakyti, kas yra tiesa, konkrečioje byloje. Lietuvoje šių mokslų sąsajų rasti vis dar labai sunku. Kokybinio tyrimo rezultatai atskleidžia, kad užsienio 49

proc. mokslo straipsnių, kuriuose teisės ir neuromokslo integralumo reiškiniui būdingos ir jį atspindinčios sąvokos yra tiesiog paminimos, jų neapibrėžiant, nenurodant konteksto, nepasakoma nieko daugiau, kad būtų galima apie jas sužinoti plačiau, fundamentaliau. Tai parodo, kad mokslininkai vis dar yra atsargūs. Suvokiant šios integracijos, dialogo tarp dviejų mokslų svarbą ir didėjančio susidomėjimo mąstą – galime teigti, kad teisės mokslas neišvengiamai susidurs su dideliais iššūkiais ir pokyčiais.

7. Kokybinio tyrimo rezultatai atskleidžia, kad užsienio 41 proc., o Lietuvos – 20 proc. teisės mokslo straipsnių, naujojo mokslo sąvokos yra tiesiog paminimos, jų neapibrėžiant, nenurodant konteksto, nepasakoma nieko daugiau, kad būtų galima apie jas sužinoti plačiau, fundamentaliau. Taigi kitose mokslo srityse naujojo mokslo paradigma yra labiau pasireiškianti nei teisės moksle, tiek Lietuvoje tiek viso pasaulio mastu. Kiti mokslai vis labiau suvokia naujojo mokslo paradigmos privalumus, integralumo su kitais mokslais svarbą. Lietuvos teisės moksle ji reiškiasi dar mažiau nei kitų šalių teisės moksle. Lietuvos teisės moksle vyraujanti paradigma yra vis dar deterministinė (senojo mokslo) ir teisės mokslas mažai sąveikauja su kitais mokslais (trūksta tarpdisciplinišKumo).

8. Ištyrėme, kad naujojo mokslo paradigma galėtų ne tik suteikti teisei mokslinio pažinimo tikslumo, objektyvumo ir patikimumo, bet ir teisės mokslą priartinti prie realių problemų sprendimo, t. y. teisės mokslą priartinti prie žmogiškųjų vertybių bei socialinio ir kultūrinio konteksto analizės. Dabartinė būsena yra sudėtinga ir aiškiai neapibrėžta tiek pasaulio, tiek socialinių fenomenų, tiek paties teisės mokslo būsena. Tokia būsena yra ne tik nepatogi, bet gali būti ir pavojinga. Nepatogi, nes nuolatinės abejonės, netikrumas ir neaiškumas labai vargina. Pavojinga, nes jei nėra aišku, tada dažnai į paviršių gali iškilti ne tik įvairūs „pranašai“, bet ir tarp pačių teisininkų gali atsirasti bejėgiškumo ir absoliutaus reliatyvizmo jausmas. Ypač yra pavojingas absoliutaus reliatyvizmo jausmas, nes tada „viskas galima“. Analizuojant paradigmų kaitos istorinį kontekstą pastebėjome, kad niekada neįmanoma iš anksto žinoti, ar naujoji paradigma bus geresnė, todėl kritiškai, mažais žingsneliais, suvokiant socialinį ir kultūrinį kontekstą, mokslo pokyčius visoje mokslo bendruomenėje teisės mokslas galėtų eiti pokyčių link, po kurių visada yra galimybė ir sugrįžti, ir pasitikslinti. Toks sugrįžimas reiškia, kad vis tiek niekada negrįšime prie to paties, „senosios dalys“ vis tiek bus

suvokiamos pagal esamą laikotarpį ir visą dabartinį kontekstą, radus dialogą su „senosiomis“ ir „naujosiomis“ pažinimo dalimis.

PROGNOZĖS IR REKOMENDACIJOS

Manome, kad teisės mokslo raidos ateities perspektyva tiek Lietuvoje, tiek pasaulio kontekste (nors pokyčiai pasaulyje vyksta intensyviau) galėtų būti nukreipta tokia linkme:

1. Lietuvoje teisės mokslininkai vis labiau turėtų pradėti domėtis naujojo mokslo paradigma ir jos sąsajomis su teisės mokslu.
2. Lietuvos teisės mokslininkai vis labiau gali būti paveikiami naujojo mokslo paradigmos, o tai skatins juos tobulinti metodologiją, kurti ir plėtoti teorijas, o tai savaime galėtų padaryti didžiulę įtaką ir praktikai.
3. Teisės mokslas turėtų tapti vis labiau atviras pažinimui, naujovėms, pokyčiams. Spėjame, kad teisės mokslininkai vis labiau gebės palaikyti, plėtoti ir tobulinti dialogą tiek „viduje“ tarp teisės mokslininkų ir praktikų, tiek su kitų mokslų atstovais, o ypač, siekiant tiesos ir teisingumo. Manome, kad tiek teisės mokslininkai, tiek praktikai, kurie save laiko senojo mokslo ar naujojo mokslo, senojo ar naujojo požiūrio į realybę dalimi turėtų nustoti kovoti, o stengtis siekti kuo didesnio dialogo sudėtingame ir dinamiškame kelyje link pačio tikriausio teisės tikslo – teisingumo. Manome, kad gali išsiplėtoti labai svarbus ir daug pokyčių sukeliantis neuromokslo ir teisės dialogas.
4. Teisės mokslas, kaip ir kiekvienas šiuolaikinis mokslas, vis labiau turėtų tapti integralus. Tačiau visos integracijos yra labai sudėtingos ir reikalaujančios didelės tyrimų ir patirties, kantrybės ir nusiteikimo ilgai pažinimo kelionei. Todėl manome, kad nereikia iš karto ir greitai „reaguoti“ ar atmesti integralumo galimybes, pavyzdžiui, tarp neuromokslo ir teisės.
5. Teisės mokslininkai vis labiau turėtų stengtis tapti svarbiais partneriais kitų sričių mokslininkams, nes spėjame, kad mokslo ribos vis labiau gali išnykti.
6. Teisės moksle vis labiau gali būti suvokiamas subjekto vaidmuo, vertybės, socialinis ir kultūrinis kontekstas.

7. Nors ir neegzistuoja vienintelė teisės paradigma, reikia pripažinti, kad teisė vis labiau gali būti suvokiama kaip sudėtingoji dinaminė sistema. Manome, kad ir Lietuvoje teisė vis labiau bus suvokiama kaip sudėtingoji dinaminė sistema.

8. Skirtingomis teisės paradigmomis besivadovaujantys teisės mokslininkai turėtų išmokti koegzistuoti, bendradarbiauti, nenaikinant skirtingų požiūrių.

9. Teisės mokslininkai turėtų suvokti pokyčių svarbą teisės studijose, ruošiant teisininkus, kurie bus „išaugę“ tarpdiscipliniško, plataus požiūrio, vertybių, moralės, kritiško požiūrio, kūrybos ir laisvos minties apsuptyje.

10. Ateityje gali atsirasti tokia būsena, kada reikės persvarstyti ir tradicinio, klasikinio teisės mokslo privalumus, ir trūkumus, galbūt netgi sugrįžtant prie ankstesnės paradigmos tam tikrų elementų. Tačiau „senosios“ teisės mokslo dalys jau gali būti kitokios: kitame kontekste, laikotarpyje, dinamiškos ir kintančios, ir kaip manome, radusios dialogą su naujosios paradigmos „dalimis“.

11. Reikia nedelsti, bet ir neperskubėti, nes tikrasis pažinimas nėra būtinai greitas, matomas ir „patogus“. Neišvengiamai tiek teisės mokslininkams, tiek praktikams, manome, kad reikės mokytis derinti racionalų protą su mažiau ginčijamais faktais (patirtimi) bei sveiku protu, kaip ir socialiniu bei kultūriniu kontekstu.

AUTORĖS PASKELBTI STRAIPSNIAI DISERTACIJOS TEMA

1. VALANČIENĖ, D. Contemporary status of law science: postmodernism, uncertainty about its scientific sharacter and shange in the approach to science itself. *Procedia - social and behavioral sciences*, 2013, Vol. 92, p. 981-985.

2. VALANČIENĖ, D. Neurolaw: is the dialogue between neuroscience and law inevitable? *Ugdymas, kūno kultūra, sportas (Education, physical training, sport)*, No. 73, 2013, p. 73-79.

3. VALANČIENĖ, D. Šiuolaikinės teisės mokslo būklės suvokimo paieška ir žvilgsnis į galimas ateities perspektyvas. *Teisės apžvalga*, 2013, No. 1 (10), p. 5-29.

4. SKURVYDAS, A.; KUNDROTAS, V.; VALANTINIENE, I.; VALANCIENE, D. Complex dynamic systems – a new management paradigm: fashion or necessity? *Baltic journal of management*, 2013, Vol. 8, No. 1, p. 66-78.

5. VALANČIENĖ, D. Teisės paradigmų pažinimo kelias. *Teisė*, 2012, t. 82, p. 159-180.

6. VALANČIENĖ, D. Naujojo – sudėtingųjų dinaminių sistemų – mokslo įtaka teisės mokslui. *Teisė*, 2011, t. 78, p. 197-210.

7. SKURVYDAS, A., VALANČIENĖ, D. Naujojo mokslo – sudėtingųjų dinaminių sistemų – tyrimo paradigma: nuo biologijos iki teisės. *Ugdymas, kūno kultūra, sportas*, 2009, t. 4 (75), p. 70-79.

MOKSLINĖS KONFERENCIJOS, KURIOSE BUVO PASKELBTI DISERTACINIO TYRIMO REZULTATAI

1. VALANČIENĖ, D. *Contemporary status of law science: postmodernism, uncertainty about its scientific character and change in the approach to science itself.* Pranešimas 2013 m. balandžio 10-13 d. vykusioje tarptautinėje konferencijoje "Current paradigms in social sciences Lumen international scientific conference" (Iasi, Rumunija).

Tezės: VALANČIENĖ, D. *Contemporary status of law science: postmodernism, uncertainty about its scientific character and change in the approach to science itself*. Current paradigms in social sciences Lumen international scientific conference. 2013, Iasi, 10-13 April. Book of abstracts, p. 257

2. VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in legal science*. Pranešimas 2013 m. balandžio 25-26 d. vykusioje tarptautinėje doktorantų ir jaunųjų mokslininkų konferencijoje "The interaction of national legal systems: convergence or divergence?" (Vilnius, VU TF).

Tezės: VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in legal science*. International conference of PhD students and young researchers. The interaction of national legal systems: convergence or divergence? 2013, Vilnius, 25-26 April. Conference papers, p. 383-390.

3. VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in Legal theory and legal history.* Pranešimas 2012 m. lapkričio 20 d. vykusioje tarptautinėje konferencijoje "Проблемы возникновения и развития белорусской государственности к 1150-летию первого летописного упоминая о государственных образованиях у восточных славян" (Minskas, Baltarusija).

Tezės: VALANČIENĖ, D. *The paradigm of new science – complex dynamic systems – and its importance for research in Legal theory and legal history.* Проблемы возникновения и развития белорусской государственности к 1150-летию первого летописного упоминая о государственных образованиях у восточных славян. Материалы международной научно теоретической конференции студентов, магистрантов и аспирантов. Минск, 20 Ноября 2012 г., p. 53-55.

DISERTACIJOS AUTORĖS GYVENIMO, MOKSLINĖS, KŪRYBINĖS VEIKLOS APRAŠYMAS

Išsilavinimas:

1993–2005 m. – Kauno „Varpo“ gimnazija.

2005–2010 m. – Vilniaus Universitetas, Teisės fakultetas (Teisės magistro laipsnis).

Magistro darbo tema: Teisės ir mokslo sąsajos: senojo ir naujojo mokslo žvilgsniu. Vadovas: doc. dr. Zenonas Namavičius.

Pasiekimai studijų metu: garbės raštas už labai gerą mokymąsi.

Nuo 2010 m. rudens – Vilniaus universitetas, Teisės fakultetas (teisės teorijos doktorantūros studijos). Vadovas: prof. dr. Jevgenij Machovenko.

Praktika ir darbo patirtis:

2007-07-11–2007-08-10 – Advokatų profesinė bendrija „Jurevičius, Balčiūnas ir Bartkus“(praktika).

2009-03-18–2009-04-09 – Lietuvos Respublikas Seimas, Etikos ir procedūrų komisija (praktika).

2011 m. rugsėjis–2011 m. gruodis; 2012 m. rugsėjis–2012 m. gruodis (studijų dalyko „Įvadas teisinės sistemos ir teisės teorijos studijas“, „Teisės teorija“ seminarų vedimas pirmo kurso studentams Vilniaus universiteto Teisės fakultete).

Nuo 2012 m. rugsėjo mėn. – Lietuvos sporto universitetas, Sporto edukologijos fakultetas, Sporto vadybos, ekonomikos ir sociologijos katedra, asistentė (dėstomi studijų dalykai: „Verslo teisė“, „Verslo vadyba ir verslo teisė“, „Neurojurisprudencija ir neuroetika“, „Neuroedukologija“).

Nuo 2014 m. rugsėjo mėn. – Vilniaus universitetas, Teisės fakultetas, Viešosios teisės katedra, asistentė (studijų dalyko „Teisės istorija“ seminarų vedimas pirmo kurso studentams).

Mokslinių interesų sritys:

Teisės teorija, teisės filosofija, mokslo filosofija, neuroteisė, sudėtingosiosios dinaminės sistemos ir teisės mokslo problemos, tarpdisciplinišKumas, neuroedukologija.