European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2021.04.02.67

# GCPMED 2020
# Global Challenges and Prospects of the Modern Economic Development

# THEORETICAL AND LEGAL ASPECTS OF DIGITAL TRANSFORMATION OF FORENSIC - EXPERT ACTIVITY

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## Abstract

The article is devoted to some theoretical and legal aspects of the digital transformation of state forensic-expert activity. Digitalization processes have covered almost all spheres of life, penetrating into various fields of activity, including forensic-expert science. Through the prism of theoretical and legal science, the authors consider the concept and characteristics of expert activity, as well as the principles on the basis of which expert practice is carried out. Every year, the number of expert studies and the amount of information used are increasing, and the range of tasks assigned to experts in various types of legal proceedings is expanding. All this leads to the need to introduce information technologies and software into expert activities that allow automating the work of an expert, increasing the speed and quality of expert examinations. The paper highlights ways to promote the introduction and use of information technologies in expert research. The authors from the theoretical and legal point of view reveal the features of forensic examination, as well as examples of some technical means, digital and information technologies used by knowledgeable persons in the formation of expert opinions in civil proceedings. The article also discusses the problems that arise in the digital transformation of forensic-expert activity, and suggests ways to solve them.



*Keywords:* Activity, digitalization, forensic, principles of law, research

https://doi.org/10.15405/epsbs.2021.04.02.67
Corresponding Author: R. R. Khasnutdinov
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

## 1. Introduction

Digitalization processes have covered almost all spheres of life, penetrating into various fields of activity. Currently, the daily use of various digital and information technologies and gadgets by a modern person during the day makes it possible to "simplify life", get the necessary information in an accelerated deadlines, order or perform a service. The emerging processes of automation and informatization make it necessary to "improve" all spheres of public life in order to extract "profit" and improve the quality of work by minimizing the efforts made. The sphere of forensic examinations is no exception. Forensic examinations are conducted in various types of legal proceedings, one of which is civil. The expert's conclusion is not only the final document of its activity, but also the most important source of evidence. In this regard, high requirements are placed on the quality of the research carried out for forensic expertise. This is particularly relevant in the context of increasing the number of assigned expertise, digitalization of a huge flow of information and the emergence of new, primarily digital, types of objects of expert research.

## 2. Problem Statement

Every year in Russia, the number of expert studies and the amount of information used in them are increasing. The range of tasks assigned to experts in various types of legal proceedings is expanding. All this leads to the need to introduce information technologies and software into expert activities. Such processes allow to automate the work of the expert, increase the speed and quality of examinations. Over the past few years, many scientific papers have been written on the digitization of forensic activities. This topic is covered not only by Russian (Rossinskaya, 2019), but also by foreign scientists (Casey & Souvignet, 2020; Joseph & Norman, 2021; Parvez et al., 2018; Rani & Jain, 2021). Consideration of the theoretical and legal aspects of the use of information technologies in state expert activities to solve problems set in the framework of a particular type of legal proceedings will allow us to see more deeply the impact of global processes of digital transformation on all spheres of life.

## 3. Research Questions

The questions of this research are: What is the concept and content of state forensic activity? On what principles is based forensic expertise? What are the main directions for implementing digital technologies in the work of forensic experts? What digital technologies and software program are used in the production of certain types of forensic examinations? What problems arise in the process of digital transformation of forensic activity and how should they be resolved?

## 4. Purpose of the Study

The authors of this research aim to consider the theoretical and legal aspects of the digital transformation of forensic activity. This goal was achieved by solving the following research tasks. First, the concept and characteristics of expert activity are analyzed through the prism of a legal-theoretical approach. It also shows the principles stipulated by the law, on the basis of which expert practice is

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carried out. Secondly, the features of implementing digitalization processes in the expert's work are shown. The paper provides examples of some technical tools and information technologies used by knowledgeable persons involved in legal proceedings when forming an expert opinion. Third, the authors noted the problems that arise in the framework of digital transformation of forensic activity, and suggested ways to solve the problems that arise.

## 5. Research Methods

This research was conducted on the basis of both general scientific methods of analysis, synthesis, deduction, generalization, and using private scientific methods: comparative-legal, system-structural. Comparative legal analysis was used to identify the features of views on the issues of digitalization and Informatization of expert activity in general, and forensic expertise, in particular, among Russian and foreign researchers. The system-structural method allowed us to generalize the main directions of digital transformation of forensic activity in civil proceedings and determine the vector of their further development. The research was based on scientific research, works, scientific articles and publications of Russian and foreign legal scientists, practitioners who consider various aspects of the digital transformation of forensic expertise. This study was conducted in two stages. In the first stage there were analyzed existing scientific literature on the research subject as well as legislation regulating expert activity in general and within certain types of proceedings; identified issues, the purpose and methods of research. At the second stage, the main conclusions obtained from the analysis of scientific literature and legislation were formulated, and the publication of this study was prepared.

## 6. Findings

Speaking about the digitalization of expert research in the context of mass development and application of information technologies in various aspects of the life of the state, people and society, it should be noted that in accordance with Federal law of dated 31.05.2001 N 73-FZ (hereinafter - Law No. 73-FZ), state forensic expert activity is a form of assistance to judges, bodies of inquiry, investigators and other interested persons in solving issues raised by an expert and requiring special knowledge in the field of science, technology and art (article 2). Law No. 73-FZ defines the specifics of expert examination in civil, administrative and criminal proceedings and specifies that expert activities carried out with respect for all human and civil rights and freedoms are subject to compliance with such dominant principles as the legality, comprehensiveness and independence of the expert when forming a complete and objective conclusion. Among other regulatory provisions, Law No. 73-FZ establishes that expert research is conducted using modern achievements of science and technology (article 4), which is especially relevant in the era of comprehensive application of information technologies. In this case, the dissemination of expert practice using appropriate software expands the possibilities of expert research by automating, reducing the number of expert errors committed, and speeding up routine operations.

We agree with the position of Kamalova (2019) that the integration and subsequent application of modern technologies in expert activities is implemented in the following ways. The first way is based on the accumulation of knowledge, capabilities and technologies obtained as a result of achievements in the field of natural, technical and mathematical sciences, which allows the results to be transformed into a

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technological and information base for various types of expertise. The second way involves the creation of specialized programs tailored to the needs of expert research, which require both certain knowledge on the part of the expert, and the allocation of basic structures and parameters in the field of consideration of offenses in a particular branch of law. In this case, we mean patterns and cause-and-effect relationships that are used in the framework of forensic activities.

Russian procedural laws such as civil procedure code, among other regulations governing the performance of expert examination, establishes that the expertise appointed by the court if the parties and other persons participating in the consideration and resolution of civil cases, there are questions, the answers to which require special knowledge in science, technology, art and crafts (clause 1, article 79 Civil procedure code of Russian Federation dated 14.11.2002 N 138-FZ). The final list of questions, taking into account the wishes of the participants in the proceedings, is formed by the court, which makes a decision on the appointment of an expert examination.

At the moment, the structure of expert research assigned to resolve civil, criminal and other cases in court uses such innovations in the digital space as automated acquisition of experimental data, electronic document management, ensuring the confidentiality of processed information and the authenticity of electronic documents submitted to the expert for examination. Expert in the course of their activities have to deal with electronic documents, speakers on the one hand as evidence in the case, as the objects of expert examination, with third parties as sources of knowledge and information to maintain their level of competence (Bayush, 2018). Integrated and diverse databases and information system, accumulating various kinds of information, in the expert's work are also important and determine its high effectiveness. Currently inconceivable activities of the expert without reference to the legal-reference systems ("Garant", "ConsultantPlus" IRS "Law"), individual genera and species expertise to the different specialized databases and automated information retrieval systems of crime registration (filing of fingerprints, fired bullets and cartridge cases, counterfeit money, AIPS "Metals", "Drugs").

The expert uses photo and video recording, audio recording, capture and processing of digital images. At the same time, working with images is based on the fact that a bit is made for a copy (image) of the device, which can be verified as an exact copy using arithmetic hashes, such as the SHA-1 and MD-5 software algorithms. In this case, it is important that all digital effects of the expert are carried out on a copy of the digital source in order to exclude the possibility of impact on the original. In expert practice, various systems and software for digital image analysis are actively developed and used, aimed at solving identification and diagnostic problems. Examples of such systems are the fingerprint system "papilon", portrait "OWL".

It is common practice to introduce computer modeling (3D modeling), automation systems for calculations, collection and processing of experimental data (Piskunova, 2016) into the work of an expert. Various software systems for automated solution of expert tasks significantly optimize the expert's work. An example of such a complex is the "Autoex" technology, which allows to automate the production of auto technical expertise, to carry out the necessary calculations, to make reports and generate an expert opinion (Burtseva & Seleznev, 2012).

The introduction of automated expert workstations into expert practice, which include a set of technical tools and software that is individual for a specific type of forensic examination, contributes to

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the uniformity of actions during expert research, reduces the expert's time spent on conducting a specific study while simultaneously improving the quality of the results obtained, and also allows for a uniform approach to the practice of expert research. However, it is worth to consider that the procedural legislation imposes a number of certain requirements for the expert's opinion. This, for example, is expressed in the fact that the expert should logically explain the inferences contained in the conclusion, based on the specifics of the tools used in the framework of expert activity. In this case, the technological processes implemented by specific software should be clear and transparent so that the expert can give a reasoned conclusion to the interested parties initiating the examination.

An additional difficulty in the application of information technologies in expert activities is seen in the fact that the dynamic development of the digital space causes an increase in the volume of stored data, the processing of which does not have time to provide the staff of experts operating in state and non-state expert institutions. The growing variety of technologies used outstrips the ability to timely implement them in expert institutions and simultaneously master these technical means. There is also a problem of insufficient funding allocated from the federal budget for the purchase of advanced technologies, and their rapid subsequent obsolescence. The market for digital data analysis tools and technologies in modern conditions is mostly represented by foreign-made products, which limits their use in the Russian Federation in terms of pricing due to currency fluctuations, and obsolescence due to the fact that the introduction of IT- technologies into domestic expert practice occurs with a certain time lag.

It is also necessary to mention the problem of ensuring the security of data stored on information carriers and programs, as modern technologies allow to automate the collection, storage and processing of a large number of information necessary for expert research. That is why the question arises about the use of cyber security tools, including those based on the latest encryption systems and blockchain technologies. In this case, the detection of foreign traces of influence in the structure of the available information is impossible without the use of appropriate technologies. At the same time, methods for protecting the information required by the expert in his work should be based on preliminary accounting of data accumulated on the appropriate equipment, in order to subsequently exclude a possible dispute regarding the preservation and immutability of the data that is being analyzed. Finally, it should be noted that the problem that arises in the context of comprehensive and active implementation of digital technologies in expert activities is the lack of qualification of existing experts in terms of their knowledge of IT- literacy. In this case, mastering knowledge in the field of digital technologies requires appropriate training within educational institutions, but the level of training of specialists receiving education, including in areas related to forensic examinations, does not keep up with the dynamic changes in the changing information environment. Thus, it seems logical to organize continuous improvement of the knowledge of experts in the field of IT- technologies on the basis of higher education in order to provide the necessary competencies in the operation of computer programs and technical devices.

This study of the theoretical and legal aspects of the digital transformation of forensic activity allowed us to formulate a number of conclusions. The legal basis for the introduction of digital technologies in forensic activities is the above-mentioned Law No. 73-FZ, according to which expert research is conducted using modern achievements of science and technology. In the era of comprehensive and widespread use of information technologies, the integration of the latter into the activities of an

expert, in particular with his participation in civil proceedings, is a natural process and occurs in the following areas. On the one hand, forensic science uses digital technologies and information systems developed by other sciences and branches of technology to solve expert problems. On the other hand, specialized software designed to optimize the work of experts is created for conducting individual expert studies. Forensic expertise is transformed through the introduction of electronic document management and automated acquisition of experimental data, the use of databases and data banks, means of recording and processing digital data. It is a common practice to introduce computer modelling, calculation automation systems, and automated expert workstations into the expert's work.

## 7. Conclusion

Thus, it can be summarized that the use of information technologies and software in forensic activities in civil cases has a key value. Digital transformation helps to reduce the time frame for conducting research without losing its quality. In the future, this affects both the effectiveness of the expert's work and the completeness and objectivity of the conclusion formed by him. An important point is the timely elimination of existing problems that have a negative impact on expert activity. First, it is to ensure the security of forensic data stored on information carriers and programs. Second, improving the quality of expert training, taking into account the latest scientific achievements in the field of digital and information technologies. Third, increasing state funding for state forensic activities in order to acquire advanced technologies and software for experts in a timely manner. Due to this, expert research conducted by both state and non-state expert institutions and experts will be more based on the achievements of the information space, which will significantly facilitate the production and improve the quality of forensic research.

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