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**Summary of the doctoral dissertation  
„Electronic seal in legal transactions in Poland”**

A seal has been used for centuries to authenticate documents in paper form, as well as to secure the integrity of objects and rooms. There have been periods in history when a seal played a key role in securing the conduct of legal transactions, more important even than the signature of a natural person.

Today, the devaluation of the traditional seal is observed. There are two main reasons for such a state of things. Firstly, it is the loss of values by the traditional seal, which made this tool attractive to participants of legal transactions looking for various measures to increase the level of security of these transactions. Secondly, the development of the Internet contributes to the fact that legal transactions are increasingly being transferred to the digital space. The basis of electronic legal transactions is the exchange of data in electronic form. Tools are needed to sufficiently secure this data. One of them may be a new type of seal understood as a set of certain functions aimed at securing legal transactions, that is an electronic seal.

The electronic seal has been introduced into the Polish legal order by Regulation no 910/2014 of The European Parliament and of The Council EU of 23.7.2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (eIDAS Regulation). Electronic seal means data in electronic form, which is attached to or logically associated with other data in electronic form to ensure the latter's origin and integrity. Contrary to the electronic signature, which is always put by a natural person, the holder of an electronic seal is a legal person. The motive behind the introduction of an electronic seal was the recognition by the EU legislator of the problem of ensuring the authenticity of electronic documents that do not have an e-signature. The development of electronic legal transactions is associated with changes, as a result of which, in some cases, the concept of electronic signature does not meet the needs of participants of transactions. Automation of processes carried out as part of electronic legal transactions becomes common. Increasingly, certain activities are carried out without human intervention. These trends include the concept of an electronic seal, which - unlike an electronic signature

used as a result of a conscious human decision - can be used as part of automated processes managed by ICT systems. The use of an electronic seal is therefore intended to increase the level of cybersecurity, while maintaining ease of practical use.

The eIDAS Regulation entered into force in the EU on 1.7.2016, starting the process of multiannual legislative changes in the member states. At the level of national law, local regulations in the scope covered by the regulation should be clarified and changes necessary for the correct implementation of the requirements of the EU act should be made. This is important as the eIDAS Regulation sets a general framework for the regulation of an electronic seal, but its widespread use depends on coherent and consistent actions taken at the national level. This process is currently underway. The Polish legislator has not decided to pass a separate act that would contain detailed provisions related to the electronic seal in one place. The scope of application of this tool is to result from the regulations relating to specific processes. In such a situation, it is reasonable to ask questions about the areas in which the use of an electronic seal will bring benefits, and hence in which processes it is necessary to enable the use of the described tool.

The objective of the paper is to present the issue of an electronic seal and its role in electronic legal transactions in Poland. The analysis aims to determine how to use the electronic seal in electronic legal transactions in order to use its potential for the benefit of the participants of these transactions. The paper also identifies barriers that may occur at the stage of implementing this tool in Poland.

The paper consists of five main chapters, each of which has been divided into subchapters containing separate problem issues. The paper contains introductory remarks and a summary of the results of the analysis, which was included in the closing remarks and conclusions.

The first chapter presents a historical outline of the use of a traditional seal in legal transactions and the process of departing from it as a result of the gradual loss of values ascribed to it, as a tool for increasing the level of security of legal transactions. At the same time, the genesis of the formation of the electronic seal was presented, which in the digital space can fulfill the role that the traditional seal originally played in the course of transactions using documents in paper form. Then, based on a comparative legal analysis, the methods of regulating the issue of an electronic seal in the systems of various countries, including those from outside Europe, were presented.

The second chapter presents the process of shaping the legal regulation of the electronic seal at the EU level, including the origins of undertaking legislative work in this

area, as well as the course of this work. The objectives, assumptions and principles of the eIDAS Regulation regarding the electronic seal were discussed. The process of adjusting Polish legal regulations to the eIDAS Regulation was also described in the further part of the chapter. The results of the study of the legislative activities of the Polish legislator in the field of taking up the subject of an electronic seal were presented.

The systematics of the next two chapters is analogous to each other. Each of these chapters consists of four subchapters that correspond to the subject matter, with the third chapter devoted to ordinary and advanced electronic seal, while the fourth chapter deals with the subject of a qualified electronic seal. The presentation of individual types of the described tool takes place in an interdisciplinary perspective, thus taking into account both legal and technical conditions. A part of both the third and fourth chapters is an analysis of the legal effects that can be achieved by using a given type of electronic seal. These effects are defined both in EU and national law.

In the fifth chapter of the paper, an assessment was made of whether the legal framework of the electronic seal in its current form properly uses the potential of the described tool. The assessment focuses on two usable functions that can be performed by the electronic seal, that is securing the integrity and authenticity of electronic data origin and providing a carrier for legal persons' declarations of will. The assessment is accompanied by postulates to introduce certain modifications and additions to the existing regulations. In a separate subchapter the author analysed whether and how the use of a potential of an electronic seal can translate into the effectiveness of activities of public administration.