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THE IMPORTANCE OF EMPIRICAL METHODS IN LEGAL RESEARCH: THE CASE OF CRIMINOLOGY, ECONOMIC ANALYSIS OF LAW, AND LAW AS AN ALGORITHM

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Aleksandar Mojašević, Predrag Cvetković, Darko Dimovski

Faculty of Law, University of Niš, Republic of Serbia

Abstract. *This chapter examines the empirical methods applicable in Criminology, Economic Analysis of Law, and the law embodied in the form of algorithms. The first part of the paper explores the empirical research methods used in Criminology. Focusing on the fundamental features of criminological methodology, the chapter elaborates on fundamental and applied research. The second part focuses on interdisciplinary methodology applicable in the field of Economic Analysis of Law (EAL), and examines the accompanying controversies and challenges generated by the development of behavioral research that has fundamentally changed the findings of the EAL. The third part elaborates on the importance of empirical data in the context of law as an algorithm and the "new trichotomy" reflecting the nature of data: text-driven law, data-driven law, and code-driven law. The trichotomy emerges as a result of an attempt to transform legal norms into machine-readable algorithms, as well as to ensure the application of these modalities in the legal context. The authors discuss the importance of empirical methods in law and the "extension" of standard legal methodology.*

Key words: *empirical methods, legal research, criminology, law and economics, law as algorithm, big data*

1. INTRODUCTION

Legal education and legal practice are constantly changing, but the change that deserves special attention and that has taken place in recent decades is the intensive use of *empirical methods*, encompassing *all techniques for systematically gathering, describing, and critically analyzing data* (Lawless, Robbennolt, Ulen, 2010: 7). Although the call for an

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Corresponding author: Aleksandar Mojašević, LL.D., Full Professor, Faculty of Law, University of Niš, Trg kralja Aleksandra 11, 18 105 Niš, Serbia, E-mail: mojasevic@prafak.ni.ac.rs

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empirical and rational study of law may be dated to much earlier times and is linked to the so-called legal realists' movement in America, whose intellectual foundation was laid down by judge Oliver Wendell Holmes (Holmes, 1987), the profound change in legal education and practice took place at the end of the 20th century.[1] This change has been reflected in the publication of new journals, such as the *Journal of Empirical Legal Studies*, the organization of special conferences on empirical methods in law,[2] the publication of subject-specific books on this topic,[3] and numerous scientific and professional papers where legal issues have been investigated by using empirical methods. This trend, conceived in America and accepted in numerous European countries,[4] is only in its infancy when it comes to Serbia.[5]

Besides the definition of empirical methods, the question arises about the differences between empirical research and legal analysis. The best response was provided by Lawless, Robbennolt & Ulen (2010) who single out four basic characteristics of empirical research as opposed to legal analysis: 1) empirical research is based on *observation*, while legal analysis is based on facts; 2) empirical research is used to test *hypotheses* or to establish whether some theory is based on facts or not; 3) empirical research is concerned with *aggregate effects*, while legal analysis is focused on the characteristics of the particular case; 4) empirical research is a *gradual and developmental process*, while legal analysis aims to reach the final resolution on some legal issue (Lawless, *et al*, 2010: 10-15).

In this context, considering the importance of empirical methods in general, the authors discuss the significance of these methods in three fields that are closely related to law. The first one is *criminology*, which is considered an subsidiary legal discipline that has been accepted by traditional legal education without reservation. The second one is the *economic analysis of law*, which has generated numerous controversies and debates among legal scholars in recent decades because it borrows the methodology of economic science and applies it in law. The third field refers to the *digitization and algorithmization of law*, a phenomenon that involves numerous challenges and problems that legal science will have to resolve in the time to come. The main goal of this chapter is to establish whether there are similarities and differences between empirical methods in the three mentioned disciplines and, if so, how they reflect on the law and legal education, respectively. The starting hypothesis is that the development of empirical methods in law is inevitable if we want to gain insight into highly intricate legal phenomena, which necessarily entails a "shift" of the methodological paradigm in law.

2. The Importance of Empirical Methods in Criminology

Every criminological research has a number of stages, which are specified and described in the research project. Criminological research implies not only determining the research subject matter and goals but also resolving all methodological issues. Thus, each research project must include specific parts: author(s), research topic and subject matter, goal(s), space

[1] For more details about the independent development of empirical legal studies (ELS) vis-à-vis legal studies as well as a social science in general, see: Pavone, Mayoral, 2020.

[2] Since 2006, when the first conference on legal empiricism was held at the Austin Law School, University of Texas, the American Society for Empirical Legal Studies (SELS) has organized regular annual Conferences on Empirical Legal Studies (CELS). See: https://community.lawschool.cornell.edu/sels/cels-conferences/

[3] For more on the first atempt to provide synoptic view of empirical methods in law, see: Lawless, *et al*, 2010.

[4] In 2010, the Oxford University Press published a handbook exclusively devoted to empirical jurisprudence, see: Pavone, Mayoral, 2020: 7-8.

[5] On the development of empirical legal research in Serbia, see: Milić, 2019.

and time frame, research hypotheses, methods, sample, variables and indicators, data processing and analysis, scientific explanation, and project significance for crime prevention (Konstantinović Vilić, Nikolić Ristanović, Kostić, 2009: 59). Thus, research methods are important instruments for obtaining data in criminology.

Although it applies the methods of other sciences, criminology has developed its own methods, which contributed to distinguishing criminology as an independent science. These discipline-specific methods are the clinical method and the individual case study method.

The clinical method is based on the idea that a delinquent suffering from a "criminal disease" may be treated in a psychiatric clinic just as a person who is treated in a medical clinic. Thus, the clinical method comprises: medical, psychological and social examination, analysis, criminological (expert) diagnosis, prognosis of future conduct, and determining relevant treatment (Sutherland, Cressey, Luckenbill, 1992: 342). The clinical method has significantly contributed to a wider application of individualized treatment; as each criminal offense and each perpetrator is different, there is a need to apply different forms of treatment to various convicts (Arnaudovski, 2007: 117). The application of the clinical method in Serbia may be illustrated by referring to the Act on the Execution of Criminal Sanctions.[6] Thus, upon admission to a penitentiary institution, the convicted offender is sent to the reception department, where he/she can be kept for a maximum of 30 days (Art. 74, par. 1). This Article also envisages that prescribes that the personality of the convicted person shall be assessed upon admission, including the risk level, capacity for change and individual needs, in order to determine the individualized treatment program and classify him/her into a closed, semi-open or open ward in compliance with bylaws (issued by the Ministry of Justice) regulating the treatment, sentence program and classification of convicted offenders (Art. 74, par. 2). The convicts are classified on the basis of the estimated risk level, the type of criminal offense, the imposed sentence, the state of health, the offender's attitudes to the committed offense, the degree of culpability, prior convictions and other criteria stipulated in bylaws regulating the treatment, program of action, classification and subsequent classification of the convicted offenders (Art. 74, par. 3).

The individual case study method implies the study of individual cases of delinquent behavior and individual perpetrators of criminal offences (Marković, 2010: 32). It includes an extensive examination of the offender's social and family life by collecting data through interviews (with the offender, family, friends, relatives, etc.) and inspecting records and documents. The aim is to address a number of questions: 1) Has the offender experienced any emotional trauma? 2) How strong/weak are his/her moral convictions? 3) How does he/she explain the delinquent conduct? and 4) Does he/she justify such conduct or not? The lack of objectivity and a tendency to justify the delinquent's criminal conduct are considered to be some disadvantages of this method (Sharma, 1998: 13).

In addition to these methods, criminology uses research methods characteristic of other sciences. Depending on whether the subject matter of criminological research is crime as a mass phenomenon or an individual phenomenon, criminologist may apply different quantitative and qualitative methods, which will be analyzed further.

In terms of **quantitative research methods**, criminology borrows the methods originating from mathematics and statistics, generally known as the ***statistical method*** (Konstantinović Vilić & all, 2009: 65-67). Depending on the research subject matter, the statistical method offers an opportunity to perform different types of analysis: static analysis, dynamic analysis, and

[6] Article 74, pars. 1, 2, 3. Act on the Execution of Criminal Sanctions, Official Gazette RS, 55/2014, 35/2019.

correlation analysis (mainly by using SPSS software programs for analyzing scientific data related to the social sciences). *Static analysis* provides data on the frequency of a phenomenon in the research sample; in criminological research, it provides data on the structure of criminality in relation to the type of criminal behavior, the characteristics of the perpetrators, etc. In *dynamic analysis*, the subject matter of research are statistical time variations (high-frequency data on *dynamic* processes). This method may be applied to discover or observe certain trends in the commission of crime, and ultimately to predict the criminality trends in the future. *Correlation analysis* enables the examination of two or more variables (phenomena) and assessing the correlation (interdependence) between them. In criminology, correlation analysis determines the relationship between criminality and other social phenomena, such as alcoholism, drug addiction, economic development, etc.

In addition to statistics, criminologists use inquiry to collect data on crime as a mass phenomenon. ***Inquiry*** is a method of data collection that is based on asking questions about criminal behavior, the delinquent and the victim (Konstantinović Vilić, *et al*, 2009: 65-67). Depending on whether the questions are asked orally or in writing, inquiry may be conducted in the form of an interview and a survey (Konstantinović Vilić, Nikolić Ristanović, 1998: 52). An *interview* may be conducted in the form of free conversation (semi-structured or unstructured interview) or in the form of pre-prepared questions (structured interview). To illustrate the use of interviews in criminological research, we may refer to the research on convict gangs in the Republic of Serbia (Kostić, Dimovski, 2013: 219-236). On the other hand, *a survey* is conducted in the form of pre-prepared questionnaires which the respondents fill out themselves. Surveys may include questions with a limited number of responses, (five-point) Likert-scale questions, multiple choice prompts, open-ended questions, where respondents are free to reply as they wish. (Stanojoska, Aslimoski, 2019: 50). To illustrate the use of surveys, we can refer to the research on the law students' attitudes to euthanasia conducted by professors from three Law Schools in the Republic of Serbia (Dimovski, Turanjanin, Kolaković-Bojović, Čvorović, 2020: 400-402).

The next quantitative method used in criminology is ***assessment***. It can be defined as assigning points to individuals according to pre-set rules, criteria or standards so that the results represent some characteristic features of the assessed individuals (Michell, 1999: 15). In criminological research, assessment is used when collecting data about a person. For example, numerous criminological studies have been conducted linking the level of intelligence and criminality, which confirmed that delinquents have a lower level of intelligence and contributed to explaining the causality of crime. In 1914, Goddard, the proponent of the intelligence testing theory and eugenics, published the results of his empirical research in the book "*The Feeble-mindedness – its causes and consequences*", where he asserted that a low level of intelligence makes criminals incapable of learning socially acceptable behavior and concluded that every feeble-minded criminal was a potential criminal. Considering that feeble-mindedness was inheritable, he proposed the sterilization of such individuals as a form of preventive policy (Dimovski, 2019: 54). Criminologist Zeleny came to similar results in 1933, claiming that low intelligence test results were twice more likely in criminals than in non-criminals (Marsh, Melville, Morgan, Norris, Walkington, 2006: 57). In the period from 1930 to 1936, Hartman and Brown tested 13,454 convicts in the reception department of the Illinois prison and came to the result that the inmates' average intelligence quotient (IQ of 90) corresponded to the mental age of a child of 13 years and 6 months (Korn, McCorkle, 1959: 264). However, other researchers arrived at different results. Thus, the commission of some forms of computer crime

(Dimovski, 2010: 208) or white-collar crime (Kostić, Dimovski, 2010: 24) indisputably calls for an average or high IQ.

The comparative method is a method used for exploring criminality as a mass social phenomenon and collecting data on criminality in different time periods, in various geographical areas or legal systems (Konstantinović Vilić, Nikolić Ristanović, Kostić, 2012: 62). Its importance is reflected in the possibility of comparing a group of delinquents with a group of non-delinquents, which should facilitate the discovery of the causality of criminal behavior (Konstantinović Vilić, *et al*, 2009: 68-69). The progressive development of this method has been recorded since the early 20th century but it was pioneered in the 18th century by criminologists Beccaria, Bentham and others, who compared the criminal justice system of their countries of origin with the systems in other countries. During the 20th century, the intrinsic value of the comparative method was emphasized by the renowned sociologist and criminologist Emil Durkheim, who emphasized a threefold use of this method: comparative analysis of variations in a society in a period of time; comparison of societies that are mutually similar but also partly different (focusing on different societies or the same society in different time intervals) or comparison of different societies having some common characteristics; and comparative analysis of radical changes within the same society over a period of time (Newman, 1977: 50). Although Durkheim primarily focused on the use of the comparative method in sociology, it is fully applicable in criminological research. However, it should be noted that in such cases there may be certain problems that limit the utility value of this method, particularly considering that there is no uniform way of collecting data on criminal offences and no uniform incrimination of crimes in different countries. In some countries, there is a ban on publishing such data. For example, in the USSR, the Stalin regime prohibited the public disclosure of information about criminality in 1933, and this ban remained in force until 1989 (Konstantinović Vilić, Nikolić Ristanović, 1998: 103). Thus, the comparative method is most effectively used for describing the similarities and differences in specific variables observed in the experimental group (delinquents) and the control group (non-delinquents) (Konstantinović Vilić, *et al*, 2012: 62-63).

In addition to quantitative methods, criminological research includes different **qualitative methods**, such as: observation, experiment, and focus groups (Kostić, Dimovski, Mirić, 2015). ***Observation*** can be defined as direct and indirect observation of facts related to the observed phenomenon. Criminologist can observe criminal behavior, the delinquent and the victim. The importance of observation is best evidenced by the opinion of criminologists Buckle and Farrington on the value of observational studies for criminology: "Our knowledge of the nature and incidence of offending would be greatly increased if more research projects were carried out in which crimes were observed as they occurred" (Lindegaard, Copes, 2017: 499). There are several forms of observation. One classification refers to direct and indirect observation. In *direct observation*, it is important that the criminologist's presence does not disturb the regular course of activity in progress. A special form of direct observation is *participatory observation*, which entails a possibility of the researcher's participation in criminal activities; but, in such a case, the researcher should ensure that he/she does not participate in the commission of a criminal offence. Although it is a rather complex procedure, there are cases where criminologists applied this type of observation in practice. In the empirical research for his book "*The Gang: A Study of 1,313 Gangs in Chicago*", the American researcher Frederick Thracher was a member of a Chicago gang (Milutinović, 1979: 57). *Indirect observation* implies observing the facts by examining the documents on criminal conduct, the delinquent and the victim. In illustration, we may refer to the research on the topic of juvenile delinquency, where

the researchers studied articles on juvenile delinquency published in the daily newspaper *Politika* from 1904 to 1941.[7]

Another classification is based on how data is collected, i.e. who performs the observation. In that regard, there are three forms of observation: direct participant observation, researcher observation and camera-recorded observation (Lindegaard, Copes, 2017: 501-503). These forms of observation raise the issue of the researchers' (disruptive) presence during the observation, (undue) influence in the data collection process, and systematic analysis of the collected data. In the *direct participant observation*, researchers observe the offenders in their immediate environment but without disturbing or interfering into the daily activities of the observed person. This form of observation was successfully applied by criminologist Alice Goffman in her study of African Americans (Goffman, 2014). In this form of observation, the researcher's influence tends to be most prominent and the collected data may be least systematic and impartial because researchers are prone to establishing communication with the observed persons in order to learn more about them. In contrast, such influence on the observed person is almost non-existent in camera-recorded observations, when the researcher may collect the most systematic and objective data. The most common form of observation in criminology is *researcher observation*. In this form of observation, the researcher conducting the observation keeps a proper physical distance from the observed person and does not disrupt or influence the observed persons conduct in any way. For example, Buckle and Farrington observed the criminal conduct of thieves (Buckle, Farrington, 1994: 133-141) while Bernasco and Jacques observed the conduct of drug dealers (Bernasco, Jacques, 2015: 376-408). The use of *camera-recorded observations*, pioneered by criminologists, is a relatively new development in criminological research. CCTV cameras have been used to study how criminal events unfold, including street fights (Levine, Taylor, Best, 2011: 406-412), violent demonstration (Nassauer, 2015: 3-23), etc. The main advantage of the camera-recorded observation is the possibility to review the recording as well as the opportunity for multiple researchers to analyze the same behavior and interactions.

The next qualitative method used in criminology is **experiment**, which may be defined as an observation of an artificially induced event or phenomenon (Stanojoska, Aslimoski, 2019: 53). Although widely used in the natural sciences, experiment has a limited application and effect in criminology because any artificially induced phenomenon which constitutes a criminal activity would be punishable under the law. In illustration, we way refer to the study of delinquent children who were placed in positive living conditions in order to monitor behavioral changes in relation to their previous delinquent behavior (Milutinović, 1979: 59).

Another qualitative method applicable in criminological research is the ***focus group*** method. A focus group may be defined as a group interview with a number of people (6–12) who share similar characteristics or needs (Konstantinović Vilić, *et al*, 2009: 7). The focus group meeting is moderated by a facilitator, for the purpose of addressing the pre-determined topic. Back in the 1930s, focus groups were used in market research. In the 1980s, they were quite common in several social sciences. In criminology, focus groups are used to study the ideas, experiences and perceptions of professionals involved in crime prevention. As focus groups can be dominated by one or more participants, researchers have recently started using online focus groups to offer anonymity, which serves as an incentive to some people when talking about sensitive topics, such as crime (Vander Laenen, 2021: 402-404).

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[7] See:Kostić, Dimovski, Mirić, 2015

3. The Importance of Empirical Methods in Economic Analysis of Law

Economic Analysis of Law (abbr. EAL) is a relatively new but quite well-established and recognizable discipline that brings together two large scientific fields (Cooter, Ulen, 2016: 3). It is an economic discipline because it predominantly uses economic methodology to study various legal phenomena and institutions, such as property, contractual and matrimonial relations. Its primary purpose is to *uncover the underlying logic of all legal institutions* (Mackaay, 2013: 5), by assessing the effects and rationale of legal rules, and their desirability (Mackaay, 2013: 6-17). However, given the fact that legal norms are means of directing human behavior by setting specific normative standards, they have important implications for further development of EAL in the direction of incorporating behavioral insights and the gradual emergence of **Behavioral Law and Economics** (abbr. BL&E) (Zamir, Teichman, 2018).

EAL has developed from a discipline that studies only those branches of law that understandably accept economic reasoning (e.g. financial law or competition law) to a discipline that "dives" into branches of law (such as constitutional law, criminal law, civil law, and even procedural law)which are "untouchable" for economics. Today, the concept of "economic imperialism" implies that the economic methodology is applicable in all areas where individuals make a choice, regardless of the collectivity they belong to (Becker, 1976).

EAL is also known as *Law and Economics* (abbr. L&E). The term *Economic Analysis of Law* (EAL) clearly indicates the scientific areas of study and methods used in this discipline. However, the term *Law and Economics* is more appropriate if we want to emphasize that this discipline encompasses various social phenomena (economic, legal, political, etc.). Therefore, the term *Law and Economics* is more appropriate in analyzing various social phenomena (a broader subject matter), while the term *Economic Analysis of Law* is more applicable in analyzing legal phenomena (a narrower subject matter). Thus, we introduce a concise definition of L&E: *The term law and economics is defined as the application of economic theory and econometric methods to examine the formation, structure, processes, and impact of law and legal institutions* (Rowley, 1989: 125).

At the basic level, EAL poses the following question: *What are the effects of a legal norm on (human) behavior?* For instance, does the introduction of a mandatory peaceful dispute resolution before initiating litigation reduce the incentives for parties to sue and go to trial? EAL determines whether it is possible and what the effects of this impact are. In doing so, it uses descriptive (positive) analysis, without making any value judgments. However, EAL goes a step further by engaging in normative (prescriptive) analysis, thus creating a normative EAL. This type of analysis addresses the following questions: whether something is needed and desirable (in terms of law), and whether the effects of legal norms are socially desirable (in terms of EAL). For example, is mandatory peaceful dispute resolution through negotiation and settlement preferable to litigation and court ruling? This brings us to the question of criteria for making a value judgment, considering that the choice of criteria further determines the relation between EAL and legal science.

Lawyers are versed in justice, and they would most likely choose the principle of justice and/or fairness (Rawls, 1971: 60-65),[8] or the general principle of legal certainty over the

[8] The principles of formal justice imply equal treatment in equal matters, and unequal treatment in unequal matters. They are complemented by the principles of substantive justice, specifying which cases should be treated equally and which should be treated differently. The EAL literature most frequently refers to two principles of substantive justice, indicated by Rawls (1971): first, freedom is equally guaranteed to everyone as long as their

content and application of regulations.[9] Economists commonly use a different value rationale. They largely focus on efficiency, primarily allocative or Pareto efficiency (Pareto, 1906)[10] which concerns the satisfaction of individual preferences (Cooter, Ulen, 2016: 14). The problem with this criteria is that any legal change that produces even one loser would be judged as undesirable (Mackaay, 2013: 14). So, for practical policy-making reasons, EAL uses another criterion – the Kaldor-Hicks compensation test (Kaldor, 1939; Hicks, 1939). Its basic logic is that, if gains of a legal or any other change are large enough to offset the losses, the change would be considered desirable, even if no compensation actually occurs (Mackaay, 2013: 15). However, the principles of fairness and efficiency can collide. For example, the introduction of euthanasia into the legal system may ensure a more efficient allocation of resources (e.g. saving on treatment costs); however, is euthanasia ethically acceptable? A similar question may be raised about organ donation. Richard Posner, one of the founding-father of EAL, notes that there are different meanings of justice, such as distributive justice which commonly comes down to economic equality or even efficiency (e.g. the principle of unjust enrichment) (Posner, 1986: 25), while other EAL scholars state that the social welfare is the only criterion for evaluating legal norms (Kaplow, Shavell, 2006). However, Posner accepts the fact that there are still situations when it is not possible to apply only the principle of efficiency (Posner, 1986: 25-26). At the very least, legal and economic approaches are complementary since economics provides mathematical theories (such as price theory or game theory) and empirical methods (statistics and econometrics) for analyzing the effects of the law on human behavior (Cooter, Ulen, 2016: 3). As law has not developed its own empirical methods yet (Lawless, *et al,* 2010:2), borrowing them from economics can be quite useful in analyzing the effects of legal norms on human behavior.[11]

The Posnerian EAL direction follows the tradition of neoclassical economics as the science of rational (economic) choice (Posner, 1986). The basic assumptions underlying this tradition are: 1) resources are limited and have alternative uses; 2) human needs are unlimited; 3) people behave (choose) rationally (Begović, Labus, Jovanović, 2013: 36). The third assumption (rational behavior) is methodological by nature, which means that there is a convention among economists that people behave in such a rational way. However, rational behavior has caused and continues to cause controversy in scientific circles. For this reason, an increasing number of researchers endeavor to use **empirical methods** to prove whether people behave rationally. It has ultimately resulted in the development of Behavioral Economics.

Behavioral Economics (abbr. BE) is a branch of economics that provides a framework for understanding how people actually make decisions (Teitelbaum, Zeiler, 2018). These may be decisions in the economic sphere (e.g. decisions of producers), legal sphere (e.g.

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behavior does not endanger the freedom of others (the concept of negative freedom); second, social and economic inequalities can exist in a society if they are likely to benefit all members, especially those who receive less than others. Fairness implies the adjustment of formal justice to the circumstanes of each specific case. Thus, judges should also show a sense of fairness by weighing the circumstances of each specific case.

[9] See the definition in: https://www.lexisnexis.co.uk/legal/glossary/legal-certainty

[10] The Pareto efficiency criterion means that a change leads to a Pareto improvement if at least one individual will be better off without making others worse off. When no further improvements are possible, there is a Pareto optimum (Pareto, 1906).

[11] We may refer to the empirical research from 2003 (Landes, 2003) which reveals that law-and-economics scholars conducted fewer empirical studies than economic scholars. One of the reasons is that law-and-economics scholars are more likely to choose theoretical projects than the empirical ones because the former hold out the prospect of greater rewards and lower costs (Landes, 2003: 168 and elsewhere).

decisions of litigants) or political sphere (e.g. decisions of bureaucrats). It may be more precise to say that BE studies and describes the decisions of individuals in different social contexts (Mojašević, 2020: 131-145). The study of decisions in the legal sphere generated the development of a special scientific and empirical discipline: **Behavioral Law and Economics** (Korobkin, Ulen, 2000: 1051-1144) which investigates *the legal implications of real, not hypothetical, human behavior* (Jolls, Sunstein, Thaler, 1998: 1476). BE and BL&E rest on realistic assumptions about human behavior, thus building a "real human" model. Those behavioral assumptions are: bounded rationality, bounded willpower, and bounded self-interest (Jolls & all, 1998: 1476). But, BL&E differs from BE in terms of predicting how law and legal institutions influence human behavior. To accomplish their tasks, BE and BL&E rely on behavioral insights. Behavioral insights entail empirical knowledge about what motivates people, how they make decisions, and how they make moral judgments (Zamir, Teichman, 2018: 7). Thus, BE draws upon psychology and uses its insights to investigate decision-making processes. This is supported by the fact that one of the founders of BE is a psychologist Daniel Kahneman, along with a lawyer Kass Sunstein and an economist Richard Thaler. The intellectual basis for the development of this new discipline was the ***Nudge Theory*** (Thaler, Sunstein, 2008) which introduced two new concepts: *nudge* and *choice architecture*. *"Nudge"* is a mechanism of steering people toward the right choices and/or better decisions from the point of view of decision-makers (Thaler, Sunstein, 2008: 5). The implicit assumption behind this rationale is that people do not make perfect decisions; in fact, they are prone to predictable cognitive biases in reasoning and decision-making (see: Samson, 2022: 142-170). *"Choice architecture"* means organizing the context in which decisions are made (Thaler, Sunstein, 2008: 3). Thaler and Sunstein state that politicians who design ballots for elections or doctors who prescribe alternative medical treatments for their patients act as choice architects. In a legal context, choice architects can be judges, mediators and lawyers (Mojašević, 2021: 80-83).

Traditional scholars usually try to add a "branch", regulating a narrow group of legal relations, to the "tree of legal science". Thus, with the development of social relations, "the tree of law" increasingly grows new branches of law, such as economic law, data protection law, etc. Can behavioral law be a branch of legal science? Given the fact that it includes the term "law", behavioral law should be a branch of legal science whose subject matter are the effects of legal norms on people's behavior. Human behavior is the subject matter of study in other disciplines, especially psychology and economics. Notably, law is a behavioral system because it tries to shape human behavior: to regulate, encourage and direct it (Ulen, 2014: 93). Yet, the development of new scientific knowledge in behavioral science has largely contributed to the change of paradigm in shaping human behavior, which increasingly moves away from the traditional one based on the threat of sanctions.

Behavioral Law originates from BL&E, which emerged from L&E, which is rooted in Economics. It follows that the development of Behavioral Law initially started in the field of Economics. However, in recent decades, numerous behavioral pieces of research, combining different social science methodologies, have gone beyond the economic approach and economic methodology (Engel, 2014: 125-142).[12] In general, it may be designated as the **social science methodology.** Therefore, Behavioral Law aspires to become a separate discipline with the aim of systematizing behavioral knowledge in law.

[12] For a review of different empirical methods in BL&E (field evidence, survey data, vignette, and lab experiment), and their pros and cons, see: Engel, 2014.

Certainly, the success of the behavioral program in law depends on the adoption of high-quality methodological standards (as in other empirical disciplines, such as criminology or law and psychology), and the development of discipline-specific empirical methods (Engel, 2014: 125-142). The strength of Behavioral Law lies in its insights which find their application in devising various legal policies, thus creating **behavioral law policy** (crime prevention policy, family and population policy, etc.). The future of Behavioral Law certainly rests on the strength of empirical research, whose credibility will radically change the traditional view of law and legal sciences.

4. Law as an Algorithm: the Role of Empirical Methods

The role of empirical data in legal research has significantly changed along the lines of the digitalization process, which underpins all levels of contemporary reality, including the legal sphere. The elements of new trichotomy of legal research are: text-driven law, data-driven law and code-driven law.[13] The foregoing trichotomy emerged as the result of an attempt to transform legal norms into a machine-readable algorithm for the purpose of coding/programming legal norms and applying them in the digital discourse. Differences among the elements of this trichotomy generate distinctive methods of legal presentation and legal reasoning: text-driven law is based on open-textured concepts (Barker, 2017: 4);[14] data-driven law applies statistical methods and closure, whereas code-driven law logic and logical closure are instrumental (Hildebrandt, 2020: 67-84).[15] The objective of the latter two types of legal research is the 'algorithmization of law'. Algorithmization is a process that allows the text of the legal document to be translated into a format that is understandable to software developers. Namely, legal norms embodied in natural language and contained in legal documents may be converted into algorithms in some stages of the legislative process (implementation, monitoring, control, interpretation). To this end, the use of the following methodologies is proposed: design of pseudo-code, application of formal logic's symbols and flowchart. Successful conversion of legal prose into code requires cooperation between lawyers and programmers. Algorithmization shall convert legal text from prose to code, while preserving its validity and efficiency (Cvetković, 2021: 15-34).

Legal rules in the form of text **(text-driven law)** cannot be formalized to its full extent; the reason lies in the interpretation of a legal norm as an indivisible part of its application. A legal norm is not isolated information in the sense of line of order contained in a program code; it is part of the structure of interconnected rules forming a complex legal system. Text-driven law interpretation is performed by humans; different interpretations are possible because the meaning of legal prose is open-textured. For this very reason, legal

[13] Text-driven law is traditional format of legal norms written in the prose. Data-driven law uses description and prediction to provide for legal advice and legal decision-making. Code-driven law either translates or directly writes legislation into a computer code. See: https://www.cohubicol.com/about/code-driven-law/

[14] Vecht (2020) notes that "Concepts are 'open-textured' if it is unclear whether they apply to some objects or not, not because of a vagueness in the concept but because the objects are new and unexpected in some way, and the concept is simply not capable of handling this odd case". This concept is *mutatis mutandis* applicable in legal discourse since the legal norm shall have a certain level of vagueness (see more in: Shauer, 2013). Code-driven law and data-driven law are part of Artificial Legal Intelligence, the label for all technologies capable of handling law-related tasks which were previously handled by humans.

[15] The issue of code-driven and data-driven law is upgraded with the problem of data-driven and code-driven normativity.

prose has a limited capacity to be presented in the algorithm (and further in the program code). The basic limitation is the reduced ability to convert complex legal standards and concepts into a program code. The major issue is how to codify behavior that is in line with standards such as "reasonableness", "best effort" or others used in legal texts. Translating them into a code or reducing them to an algorithm formula is difficult, if possible at all. The current level of development of Artificial Intelligence technology cannot provide for translating all contract clauses into the language of a program code. Many disputes based on written documents have their roots in the failure of creators to clearly define their meaning, but sometimes this omission is intentional (to ensure the flexibility of the norm in a given social, political, economic or other legally relevant context).

Code-driven law is defined as a set of rules articulated in computer code. The precision and adequacy of rules in the code-driven set of legal rules depends on empirical issues, i.e. whether the relevant rules and facts are considered and formalized correctly. The core idea behind code-driven law is based on the principle of defining calculation instruction set by a programmer for solving legal problems; information about the facts is fed into the computer, which uses it in order to recognize the relevant legal rules and calculates whether they have been fulfilled (Ashley, 2017: 38). The main methodological approach is deductive; what is needed is the existence of abstract rule structures which can then be applied (via deduction) in the coding environment. This requires a step-by-step translation (parsing) of the content of the norm concerned in order to be "driven" by the code lines. To illustrate, in a programming language, the word "delivery" is seen only as a "string",[16] not the label for the seller's obligation to deliver the goods to the buyer; "delivery" in a programming language is an object that requires formalized instructions and the definition of sequences of actions aimed at delivering goods from the seller to the buyer. The computer does not read the legal prose in the context of the written text but analyzes legal prose by parsing it, detecting patterns, and defining statistical data on the analyzed text. The modeled knowledge of various parts of the legal application process can also be mapped by using network graphs (Williams, 2022)[17] as well as flowcharts.

The prerequisite for being able to depict the process of applying a legal norm in a deductive system is to understand it as a logical process. This process should be carried out in a logical conclusion procedure, i.e. the legal syllogism. The legal syllogism deals with an abstract type of conclusion, which can be right or wrong, i.e. it represents the process of applying the law in a formal-logical manner (Wolff, 2022: 51). However, the condition for preserving functional equivalence between the application of law applied in traditional ("analogue") manner and the application of law in the format of a programming code is to express the legal norm in the form which is intelligible for the software developer, and thus eligible to be used as the specification for creating a program code. Accordingly, formalization/algorithmization designates the process of replacing natural language (written text) with symbol signs intelligible for program designers. A major hurdle in this process is identifying and applying a model of logical-formal legal language. The language of law is complicated because it includes many terms that are not suitable for the syllogistic

[16] In any computer programming language, a string is a sequence of characters used to represent text.

[17] The structure of a contract can be modeled as a network in which the terms of the contract are the nodes of the network and the interactions between the terms are the links (see: Williams, 2022).

approach.[18] The language of logic should be as close as possible to the informal language of law. In order to evaluate a statement in natural language, it must first be formalized, i.e. translated into the language of formal logic. Logic, in this sense, relies on a set of symbols. The legal rules can be converted into the form of propositional and predicate logic (Allen, 2013: 1-48). The basic concepts of propositional logic are a statement, truth value of the statement, and logical conjunctions (Madarász, 2012: 8). Predicate logic is an extension of propositional logic which can designate objects and properties of individuals in the form of statements, put them in a mutual relation, and define whether statements are valid for everyone, none or some of applicable cases (Hage, 2006: 69).

In addition of Code-driven Law, the "empiricism" of legal research is reflected in the importance of data collected via digitalization process of legal processes and implementation of norms. "*Big data*" is understood as the possibility, based on the digitization of large parts of the economy and society and the associated rapid growth in available data, to obtain value-adding and decision-relevant knowledge by collecting, storing and evaluating any data at low marginal costs and, if possible, to automate such data and use it in real time (Herbert, 2014: 728). Big data can be used to create a data-driven basis for decision-making, with the help of which better results can be achieved than with traditional data analysis. Data is the smallest unit of machine-readable coded information. The amount and quality of such data is decisive for the quality of the result of Big data analysis.

Data-driven law entails the possibility of the Artificial Legal Intelligence system (Hildebrandt, 2018: 12)[19] to function as a framework for automatic decision-making or predictions by using the statistical methods. In contrast to code-driven law, data-driven law is based on inductive methodology of finding statistical solution. Legal closure based on Big data analysis is the result of probability calculations achieved on the basis of pattern recognition, which recognize features in data and evaluate them according to the frequency and proximity of their joint occurrence with unknown data. In addition to the data-driven law, there is another structure using Big Data for the purpose of getting relevant data in order to enable adequate implementation of legal rules in algorithmic form: *data-guided law*. This structure is based on using the data set from the domain in which the law will be applied ("training data set" for the IT system concerned) (Sileno, 2022: 14). There are specific risks attached to both enlisted data-based structures used in the function of enabling adequate implementation of legal norms concerned, such as: legal dependency, insufficient amount of data, inappropriate data quality, and discriminatory effect of data-driven legal closure.

Weighting up facts, legal arguments, interpreting vague legal concepts and restricted possibility for parsing the legal norm into the code-eligible elements is a hurdle for algorithmization/formalization of legal prose into a computable form. Therefore, the algorithmic application of law by using either a deductive (code-driven) or an inductive (data-driven) approach cannot (for the time being) incorporate the foregoing aspects into the relevant analysis and subsequent application of the norm in the digital environment. Human decision-making is still required for further development of the law.

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[18] Rule-based algorithms cannot make subtle differences as it is impossible to tailor algorithms to evaluate each and every disparity variant of possible situation; there are simply too many variants that a rule-based algorithm would have to include in its programming in order to be able to make decisions like a human being.

[19] The Artificial Legal Intelligence (ALI) system is based on an algorithmic understanding of law, celebrating logic as the sole ingredient for proper legal argumentation. For the definition of ALI, see: Hildebrandt, 2018: 12.

5. CONCLUSION

This Chapter presents the methodology of three distinctive disciplines: criminology, economic analysis of law, and algorithmization of law. Our research indicates that criminology is a well-established subsidiary legal discipline which has developed a specific criminological (empirical research) method but also applies appropriate methods shared by other scientific disciplines. Criminology is a scientific and academic discipline that is recognized among legal scholars and practitioners, and its presence and further development within legal science is indisputable.

The same cannot be said about the Economic Analysis of Law (EAL), considering that it is originally an economic discipline, which "shakes the foundations" of standard legal methodology and aspires to develop into an independent scientific discipline. As expected, the development of this discipline has generated resistance from legal scholars, which has weakened over time, especially with the development of behavioral law studies that can fit better into traditional legal studies. Resistance to the application of economic methodology comes from two sources: 1) insufficient economic education of lawyers (Cooter, Ulen, 2016: 1-3), [20] and 2) an ideological factor regarding the alleged superiority of the EAL over standard legal science (Posner, 1986: 24).[21] Regardless of the resistance, we see the Economic Analysis of Law and its extension in the form of behavioral studies as part of broader legal studies. This stance may be supported by two reasons: first, there is an imminent need for a deeper study of legal issues from this multidisciplinary perspective; second, the natural development of a scientific discipline always leads to breaking through the existing barriers. In this regard, we underscore Kuhn's well-known position that the success of a new theory in conflict with the old one or "a paradigm change" (as noted by Kuhn) depends not only on empirical findings but also on the ability of proponents of the new theory to attract as many supporters as possible; in Kuhn's opinion, this is achieved by occupying key positions at universities and editorial boards of leading journals in the given field (Kuhn, 2012). Diverse forms of empirical legal research seem to be gradually changing the legal paradigm, despite the flaws and controversies that accompany this field. The main critique[22] refers to the ways in which empirical legal research narrowly transplants methods from other social sciences into law; in particular, it refers to excessive reliance on quantitative methods while neglecting the qualitative ones, as well as discarding social science theory and its concepts (e.g. power, inequality, identity, cooperation, conflict, etc).

The "algorithmization of the law" indicates the aspiration to ensure reliance on empirical methods in law, primarily statistical methods and techniques, in order to meet the needs of modern man anchored in technology. The emerging area of "algorithm law" must rely on behavioral law because artificial intelligence is not sufficiently developed to make decisions like humans. However, the understanding and implementation of empirical methods in law shall in principle take into account the following: firstly, the need of using relevant data in parsed/pulverized format in order to enable it usage in the process of program code development (in the "code-driven law" format); secondly, the origin, veracity, representativeness and amount, among others, as the features of data used in the process of norm algorithmization (in the "data driven law" format).

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[20] This situation has dramatically changed in the second part of the 20th century, see: Cooter, Ulen, 2016: 1-3.
[21] For instance, it is considered that the EAL represents *conservative political bias*, see: Posner, 1986: 24.
[22] For more details, see: Pavone, Mayoral, 2020: 12-14.

All in all, these three disciplines have a lot in common as they use sound empirical research methods, primarily the statistical method. Further development of empirical methods mainly rest on closer cooperation among researchers from these disciplines. It will contribute to expanding and deepening the existing legal knowledge, but such collaboration also calls for changing the methodological paradigm in legal research. These changes are dictated by the emergence of empirical legal research (e.g. in criminology), the development of the Economic Analysis of Law (especially its behavioral law perspective), and the digitization and algorithmization of law, all of which clearly confirm the necessity and inevitability of using empirical research methods in law.

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ZNAČAJ EMPIRIJSKIH METODA U PRAVNIM ISTRAŽIVANJIMA: SLUČAJ KRIMINOLOGIJE, EKONOMSKE ANALIZE PRAVA, I PRAVA KAO ALGORITAM

Ovaj rad prikazuje empirijske metode primenljive u kriminologiji, ekonomskoj analizi prava i pravu oličenom u formi algoritama. Prvi deo rada prikazuje empirijske metode koje se koriste u kriminologiji. Fokusirajući se na osnovne karakteristike kriminološke metodologije, ovaj deo rada razrađuje fundamentalna i primenjena istraživanja. Drugi deo rada fokusira se na interdisciplinarnu metodologiju primenljivu u oblasti ekonomske analize prava (EAP) i ispituje prateće kontroverze i izazove izazvane razvojem biheviorističkih istraživanja koja su suštinski promenila nalaze EAP. Treći deo rada elaborira značaj empirijskih podataka u kontekstu prava kao algoritma i „nove trihotomije" koja odražava prirodu podataka: prava vođenog tekstom, prava vođenog podacima i prava vođenog kodom. Trihotomija nastaje kao rezultat pokušaja da se pravne norme transformišu u mašinski čitljive algoritme, kao i da se obezbedi primena ovih modaliteta u pravnom kontekstu. Autori raspravljaju o značaju empirijskih metoda u pravu i „proširenju" standardne pravne metodologije.

Ključne reči: *empirijski metodi, pravna istraživanja, kriminologija, pravo i ekonomija, pravo kao algoritam, veliki podaci.*