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РОЗВИТОК ПРАВОВОЇ КІБЕРНЕТИКИ У ПОЛЬЩІ В ХХ-МУ СТОРІЧЧІ

Анотація. У другій половині ХХ століття активізувались правові дослідження в Польщі. Зокрема, було здійснено спробу використати для вивчення правових проблем інструменти, що надані кібернетикою. Головною метою статті є стисла презентація основних положень та зв'язку між кібернетикою та правом у польській науковій думці. Зокрема, автор робить спробу показати процес еволюції від початків кібернетики права до сучасної юридичної інформатики в Польщі.

Дослідження у галузі кібернетики права, що здійснювались в Польщі у ХХ столітті, слід вважати достовірними та творчими. Це підтверджується не тільки розвитком теорії правових інформаційних систем у галузі правової інформатики, але, насамперед, чітким зазначенням обмежень у використанні кібернетичного моделювання в галузі правових наук. Серед вчених в цій галузі вирізняються Францишек Студницький, Єжи Врублевський, Анджей Малиновський та Єжи Курциш. Результати їх досліджень підтвердили справедливість тези про те, що роль людини не може бути зведена лише до пасивної складової соціального механізму, тоді як суспільство не є аналогом машини і не піддається безапеляційному контролю на розсуд центральної влади. Тому застосування кібернетичного моделювання в юридичних науках має межю, обумовлену специфікою психофізичної побудови людини.

Більш ефективними з точки зору юридичної практики виявились наукові дослідження в галузі правової інформатики. Вони в кінцевому підсумку призвели до створення правових інформаційних систем. Безсумнівно, це було також зумовлено технологічним прогресом та ІТ-революцією, яка відбулася наприкінці ХХ століття. В даний час важко уявити собі роботу юриста без доступу до пошукових систем або використання комерційних програмних баз даних, що містять правові акти, аналітику та правові вчення. (наприклад, в Польщі це *Legalis*, *LexPolonica*). У цій перспективі, значним також є вплив кібернетичних досліджень на нормотворчу діяльність у Польщі у ХХ столітті. Суттєвих змін зазнала також методологія юридичної практики.

Ключові слова: кібернетика права, правова інформатика, польське право, юриспруденція.

Summary: During second part of the XX Century a few interesting researches about law were developed in Poland. One of them was an attempt to use tools that a cybernetics gave to explore a legal problems. The mine subject of article is a short presentation of general assumptions and relation between cybernetics and law in Polish science. Especially, the author tries to show a process of evolution from beginning of cybernetics of law until the contemporary legal informatics in Poland.

Keywords: cybernetics of law, legal informatics, Polish law, jurisprudence.

Аннотация. Во второй половине ХХ века активизировались правовые исследования в Польше. В частности, была предпринята попытка использовать инструменты, предоставленные кибернетикой для изучения юридических проблем. Главной целью статьи является краткая презентация основных положений и связи между кибернетикой и правом в польской научной мысли. В частности, автор демонстрирует процесс эволюции от начал кибернетики права до современной юридической информатики в Польше.

Ключевые слова: кибернетика права, правовая информатика, польское право, юриспруденция.

1. The conditioning of the development of judicial cybernetics in Poland.

The term ‘cybernetics’ has a long tradition in Poland. The first one who used this term in 1843 in a sense of governing human collectives was Bronisław Trentowski [1, p. 9-10]. However,

the cybernetics as a science had not started to develop until the mid 20th century. The book *Cybernetics or control and communication in the animal and the machine* [2] written by Norbert Wiener, considered the author of modern cybernetics, was published in Polish translation in the early 1960 [3]. Cybernetics (Greek: *kybernetikos* – the art of steering, the art of governing) as a science studying the processes of steering systems focused on the processes of communication and information [4 – 6] using for that purpose its own conceptual apparatus. The basic ones include such notions as: open and closed systems, steering, steered and control systems, homeostasis, steering, system environment, regulation and feedback [7, 8, 9]. From 1950s to 1980s the science was developing dynamically in Poland. It is proved by a long list of publications whose authors searched for the use of cybernetics to improve the steering of technical, electronic, bionic, linguistic, military, medical, economic, social and psychological systems.

Initially, the USSR authorities, and with them also the Communist parties ruling in other socialist countries, perceived cybernetics negatively. Partially the criticism resulted from new problems that arose in the field of cybernetic exploration. There were considerations to what extent social life and psychological activities of people could be described in the way of cybernetic models, whether the products of technology could be human analogue thinking, and whether it was possible to steer the social system by using appropriate algorithms. Thanks to its broad scope of application, cybernetics began to gradually aspire to be *mathesis universalis* in industrial societies. As a science based on positivistic assumptions it aimed to build universal scientific laws. Practiced on a high level of abstraction, it enabled describing various dynamic systems including human societies. A broad spectrum of applications led to conflict between cybernetics and Marx's dialectical materialism which aspired to the role of metascience. Finally, the anticybernetic campaign was terminated by the Soviet military officials aware of the practical usefulness of the research findings of the science [10, p. 901-902].

The current legal and political model aided the application of the achievements of cybernetics to organise and control the society through the legal system. Marxism-Leninism accepted the principle of democratic centralism as the basis of the system of the Polish People's Republic. The model of a single centre of supreme power was introduced to be the political representation of the nation. The postulate of combining the legislative and executive functions was supposed to lead to the situation in which the realisation of power actions would possibly be most closely related to the will of the working class. In legal and structural terms the highest place in the structures of national authorities was taken by the Sejm which was the representative of the nation. Its will was supposed to be put into action by the Council of the State, while the intermediary enabling steering the socio-political system was the Council of Ministers and the state apparatus [13, p. 19].

Marxism assumed the existence of close relationship between the law and the material basis of social existence. The existing economic relationships shaped the legal order. Another determinant of the legal system was politics existing in every element of the superstructure. Each form of public awareness, the state, law, morality, science, art, culture included the political element. Consequently, the government policy had to be reflected also in the law as a tool of the implementation of objectives designated by the authorities. The legal system was *a peculiar form of implementing the working class policy* [15, p. 51]. It was assumed that *socialist law, as a very important element of the superstructure, serves the new socialist economic relations i.e. relations free from exploitation. As a tool of progressive class, the socialist law reflects more or less faithfully the known objective laws of social development* [15, p. 91-92].

2. The Genesis and the Development of Cybernetics of the Law in Poland.

Political and social state of affairs in Poland caused the *Cybernetics of the Law* to become a propitious research area; its scientific potential had been indicated earlier by Wiener [3, p. 51]. The cybernetic approach to legal sciences in Poland dates back to the 1950s. Franciszek Studnicki was a forerunner in this field. Gradually, two main lines of research could be distinguished. The former focused on the application of cybernetic methods in the study of the state legal system and its performance; some other chosen aspects in this field were also taken into account. This research area was conceptualized as *the cybernetic model of analysis*. The latter line of research, defined as *the automation of legislative decisions*, concentrated on exploring the possibilities of algorithmisation of legislative decisions, additionally aided by the use of numerical machines [16, p. 126; 17, p. 195].

The initial assumptions towards the use of cybernetic analysis in the study and the description of the legal structure were based on the general model for the dynamic system of correlated components. The components of the system are provided with inputs and outputs which constitute the means of communication between those elements. The edge areas, additionally distinguished in the system, serve as communication channels linking the system and its surrounding environment. The key premises of cybernetic modelling are based on the feedback linkage, i.e.: the means of paths identification, enabling the individual components to exert influence on the other elements within the system. The character of those feedback linkages determine the performance of the whole system; its state changes, depending on the flow of information. Additionally, the model of a ‘black box’ proved to be applicable as a research mode; it enables analyzing the functioning of the system or its individual components as seen from the outer perspective. That approach resulted in the possibility of focusing on the whole system and the interaction of individual system units, excluding the analysis of its internal parts [16, p. 163-164; 8, p. 38-39].

To recognize the law as the instrument which serves the public authority to administer the social and economic system, the model of management system was of a particular importance. *Controlling*, in terms of cybernetics, may be defined as affecting the state of the system variables. Such an approach requires the control constituent to be distinguished. That constituent specifies the shape of the object and the element being controlled, the state of which is determined by the received control signals. The control process is performed through the inputs and outputs being the part of the individual system elements. Due to deviations in operation, i.e. variations in the functioning of the controlled elements, in the context of expected performance required by the controlling element, a correcting element was distinguished in dynamic systems. The correcting element, through its connections with the controlling and controlled components, enables modification of the system performance by eliminating identified deviations. The correcting element serves as a hemostat in the system [18, p. 100; 19, p. 8; 6, p. 52; 16, p. 164].

In Poland, in the course of the research concerning the application of Cybernetics in jurisprudence, it was quickly noticed that the analogy between the general assumption of cybernetic modelling and the role of the state legal system could be drawn. The legal system constitutes one of the most important instruments of social control [20, p. 129]. However, to meet the expectations of the centre powers, the legislative activity should conform to the conditions of rationality and purposefulness. The support for the legislative process itself was to be the policy of the law. Leon Petrażycki, a prominent lawyer, advocated the law policy to be practiced as early as in the beginning of the 20th century. As being consistent with the assumptions of the theory of Marxism-Leninism, underlying the political control of social systems, his concept had numerous followers in Poland [21, p. 120].

Cybernetics gave the state and the law theoreticians effective instruments to describe the social reality in the realms of establishing and applying the law. In the 1970s, Cybernetics of the Law, as a sub-discipline, finally found its place at the confluence of the Legal Sciences, Social Cybernetics and Cultural Cybernetics [22, p. 11; 23, p. 90]. According to the assumptions of cybernetic models, the legal system was analogous to the control system. A ‘legal norms giver’ played a role of a controlling component i.e. the giver was a subject entitled to create the legal order. In the Polish People’s Republic it was the Polish Parliament and during the intermissions between its sessions – the Council of the State. On the other hand, the whole society or individual addressees of the legal norms played the role of the controlled components of the system. The other option embraced also the cases of individual applications of the law. The institutions dealing with the application and enforcement of the law acted as corrective components of the system in question. They operated in the range of their entitlement to reduce inconsistency between the addressees’ behaviour and the patterns of behaviours specified by the legal standards. Notably, those tasks were fulfilled by the courts of law, the law enforcement and the investigative authorities, the security administration and the state administration [16, p. 164-165].

In accordance with the cybernetic model, drawn up for the description of the law application, the ‘legal norms giver’ (controlling component) creates a specific control signal (legal regulation). Afterwards, by introducing certain provisions, on the grounds of which the norms of behaviour are reconstructed, the addressees receive the message (norms of behaviour) and adjust their conduct, according to the signals of the ‘norm giver’. All that is accompanied by the process of generating new signals which are sent back to the controlling component (norm giver) and the corrective component (e.g. courts of law). The flow of those messages creates a feedback loop containing the information on the status of the applicable law being implemented. In the social control system using the legal one, the special role is performed by its corrective elements, such as: courts, prosecutors, Citizens' Militia, etc. Their task was to respond to cases of violation of the legal order by the addressees of norms and to restore the desired state [24, p. 899; 16, p. 165-166].

Cybernetic analysis of the control system is characterized by a holistic approach. Its individual elements are treated as “black boxes”, that is, their internal structure and rules of functioning are disregarded. Such an approach suffices in physical or organic systems. However, if the cybernetic modelling is to have any sense at the socio-economic and cultural level, it has become necessary to penetrate the internal structure of the “black boxes”. It was necessary because human communities constitute the undetermined systems. The behaviour of individual elements of the system is not only the result of receiving signals sent by the control element. The functioning of society and the economy as well as individual recipients of social norms is also influenced by other stimuli (the effect of the so-called “humanistic coefficient”). The above-mentioned conditions forced Polish researchers to modify the traditional cybernetic approach to the issue of jurisprudence [16, p. 166-167].

The universality of cybernetic instruments in the case of the description of the process of controlling human communities became, in consequence, a weakness of the concept. That was particularly visible in the context of constructing a cybernetic model of the legal system. The essence of each model is to present a simplified or idealized image of reality that exposes the essential features of the original. Researchers realized that achieving the expected effectiveness of social engineering directives requires that the proposed system model faithfully reflected reality in given aspects. The adequacy of the model in relation to the original increases as its complexity grows [25, p. 428-429]. However, on the other hand, the increase in the level of complexity of the model causes a decrease in its usefulness, considering the amount and the

variety of data that needed to be taken into account during its construction. Hence, that particular procedure was necessary to capture the unique specificity of the law [26, p. 39].

Polish legal theorists, investigating the possibility of using cybernetics in jurisprudence, faced a serious problem. To control physical systems (e.g. technical devices) which constitute determinate systems, it was enough to use models that take into account the use of messages created in a formal language. The reference to the formal characteristics of the message was sufficient to program technical devices. On the other hand, it could not serve its intended purpose in managing people [6, p. 91; 18, p. 186-187; 27, p. 133]. At the cultural level, the formal properties of the message play only the role of the carrier of the real factor of influence encoded in the semantic meaning of the message. As a recipient of the message, a human reacts not only to his formal aspect, but also thanks to his or her ability to understand, they assign deeper meanings to the message they receive [8, p. 77; 16, p. 167].

The specific properties of the controlled element in the social system (human) forced researchers to cease using solely the language of formal meanings and to move to the transition to the level of language of semantic and pragmatic meaning. At that point, there emerged practical barriers difficult to overcome in the application of cybernetics. Conducting semantic analyses forced the use of conceptual categories, which, in terms of formal language, cannot be attributed to any specific or unique sense. Legal theorists had to recognize the internal states of the elements of the legal system (human motivations, values, etc. encoded in the psyche) as impossible to fully characterize in cybernetic terms. That resulted in the need to leave them outside the analysis area or attempt to enrich the language of cybernetics by introducing the necessary semantic categories. In the former case, that would involve the need to create models that are too general and therefore not very useful to describe the legal reality. However, in the latter one, by moving away from the assumptions of classical cybernetics, it would be possible to create a new research area in which the assumptions of the basic discipline would no longer be applicable [16, p. 168].

The semantic barrier was not the only problem. It was more difficult to describe the pragmatic aspect of the impact of the law using the formal language of cybernetics. Apart from the semantic meaning of the message, in order to properly understand the law, it is necessary to understand the process of the desired effect of the legal norm on the addressee. The motivational dimension of the message sent by the system control element is of crucial importance here. That state of affairs resulted in the prioritization of qualitative analysis before quantitative analysis. Corresponding difficulties occurred during attempts at cybernetic analysis of the behaviour of the control element and the correction element. In that case, the situation was further hindered by the fact that in the legal system their roles were taken not by single people but by institutions i.e. permanent and formalized organizations [8, p. 12; 6, p. 17-19].

The research conducted led to the conclusion that the complexity of legal issues eluded pure cybernetic categories. Researchers took a stance that in the case of law research, the use of a cybernetic perspective precludes the examination of issues beyond the boundaries set by cybernetic conceptual apparatus. Accordingly, further difficulties and limitations appeared along with the progress of detailed research. Finally, it was accepted that the analysis of the legal system using cybernetic modelling could bring limited practical effects in the state of knowledge available at that time [16, p. 170-171].

3. The genesis of legal informatics in Poland.

More satisfying results were yielded by the research on the automation of legal information search through the use of digital machines (computers). The hypothesis was that there is a formal representation of the operation imitating the search and selection of

information used while applying the law. For that purpose, attempts were made to devise appropriate algorithms [16, p. 171].

The direction of scientific research discussed led to the emergence of the new research trend, legal informatics. The term was used for the first time in Polish science by Jerzy Wróblewski [28, p. 639]. The practical aim of developing that direction of cybernetic research was to facilitate the access to the information concerning legal issues. In formal language, that meant the development of procedures enabling the selection, in the searching space composed of texts of legal acts, judicial and administrative decisions as well as the views of doctrine, a subset of elements contained in a given set, meeting the adopted search criteria [29, p. 25-26]. The selection of information in the set required a prior search of the data entered into the memory of a digital machine (computer) arranged according to the adopted earlier code (database).

The improvement of the tools used in legal informatics enabled more advanced search of legal information. Descriptive method was used in addition to full-text information search systems. In place of a simpler required data search method based on the identification of words contained in legal acts, decisions, judgments, etc. the semantic criterion was applied. It allowed the identification of the searched information using the meaning of the content carried by the text [30, p. 64-65].

Along with the development of the field of legal informatics research in Poland, the discipline's aims have also been clarified. The goal was to construct systems for automatic legal decision-making based on the study of legal norms and their intercorrelations, using digital machines to search for legal information [31, p. 18-19]. Building models, in the area of legal informatics as well as using mathematical and logical methods to analyze legal issues took the form of 1) reconstruction models reflecting all aspects of the real system, and 2) idealization models depicting the system in a simplified manner, showing only these aspects of the system which are considered important for the analysis [31, p. 20]. Jerzy Wróblewski's functional model of imitating the process of the judicial application of the law became one of the more popular cybernetic models [32, p. 25]. In turn, the first Polish computer systems for the search of legal information were created at the turn of the 50s and 60s of the 20th century. Following the Czech researcher, V. Knapp, there began the construction of the foundations of the computer program used while constructing, organizing, applying and interpreting the law [31, p. 24-25].

Eventually, the issue of legal informatics in Poland has been divided into three areas: 1) issues related to computer legal information search systems; 2) problems of constructing factual systems; 3) issues of constructing systems (algorithms) of applying the law. The first two areas have become the space of dynamic development along with the IT progress. The third one has not been developed due to the above mentioned difficulties arising from language barriers between the formal and the semantic meanings of processed legal information, as well as psychological resistance in the Polish society [33, p. 20-21].

Conclusion.

The research in the area of cybernetics of the law conducted in Poland in the 20th century should be considered as reliable and creative. That is proved not only by the evolution of the theory of legal information systems in the area of legal informatics but, above all, by the clear indication of limitations in the use of cybernetic modelling in the area of judicial sciences. Franciszek Studnicki, Jerzy Wróblewski, Andrzej Malinowski and Jerzy Kurcysz are among the scientists with special merits in this field. The findings of their research confirmed the validity of the thesis that a human being cannot be only reduced to the role of a passive component of the social mechanism while the society is not an analogue of the machine and

does not yield to random control in accordance with the will of the centre of power. Therefore, the application of cybernetic modelling in legal sciences found a limit in the form of an impassable barrier determined by the specificity of the psychophysical construction of a human being.

What turned out more efficient from the point of view of legal practice was the scientific exploration conducted in the field of legal informatics. The research in its area eventually led to the creation of legal information systems [8, p. 140, 170]. Undoubtedly, it was also driven by the technological progress and the IT revolution that took place at the late 20th century. Nowadays, it is difficult to imagine the work of a lawyer without access to search engines, for instance, the Internet System of Legal Acts or the use of commercial software databases containing legal acts, case law and legal doctrine views. (e.g. Legalis, LexPolonica). In this respect, the impact of the cybernetic research on law conducted in Poland in the twentieth century has yielded significant achievement which considerably altered the methodology of lawyers' practice.

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