Towards a Real Reconciliation of Centralised and Decentralised Approach in Legal Regulation: Application of an AI-Toolkit to a Problem of Jurisprudence

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Abstract[1]

We present results from the implementation of an approach and a toolkit overcoming the limitations of the existing approaches by which law creates mechanisms for regulating socio-economic interests. In the centralized approach the rules come down from the rulers to the ruled ones. That limits the range of interested individuals to establish and implement regulatory mechanisms. In the decentralized approach, if necessary, rulers delegate certain individuals to create rules ad hoc, expanding the range of subjects of decision. This presupposes possibility of power abuse and take conflicting decisions in analogous cases.These disadvantages have been identified back in the ancient Rome. For their overcoming the systems of ius civile and ius honorarium were combined (II B.C.-I A.C.). Such attempts continue, for example within the EU law. A model that overcomes these disadvantages hasn`t been applied so far, because optimal and socially-efficient combination of centralized and decentralized approaches presupposes specific mechanisms. Their establishment and implementation should cover all interested individuals by coordinating and integrating the partial decisions, guaranteeing an optimal adaptability of the society towards the environment. Such mechanisms are achievable by the application of a cognitive approach, methodology and the G-space architecture for identifying inaccurately or mistakenly formulated motivational mechanisms in legislation. We describe how this set of cognitive instruments could be used to correct mistakes in existing legislation and design new, subject to ex-ante defined purposes. We show that the approach, methodology and G-space architecture extend the boundaries of the inter-disciplinary area of Artificial Intelligence in Law.

Keywords: centralization, decentralization, Roman law, legal acts, EU law, disadvantages, cognitive instruments, Artificial Intelligence

Introduction

In his article, prof. D`Amato attempts to synthesize the knowledge of natural law and legal positivism about the nature of law and legal institutions. To overcome the differences in the conceptual apparatus of both theories he uses models from the field of cybernetics. Thus, according to the author, the main statements of the schools of natural law and positivism in

[1] On occasion of Anthony D'Amato's (1975) Towards a Reconciliation of Positivism and Naturalism: A Cybernetic Approach to a Problem of Jurisprudence" 14 W. Ontario L. Rev. 171

terms of moral obligations and fidelity to law, are presented in the same terms. This allows accurate assessment of their explanatory potential. His conclusion is that the legal positivism is only one special, limiting case of natural law approach.

Some of the conclusions in his article led us to the question whether these theories are explanatory models reflecting two contrasting approaches to the legal regulation - centralized and decentralized. Through centralized approach the rules come down from the rulers to the ruled ones. That limits the range of interested individuals to establish and implement regulatory mechanisms. In order to compensate this disadvantage, through decentralized approach, when necessary, rulers delegate certain individuals to create rules ad hoc, expanding the range of subjects of decision. Unfortunately, this presupposes possibility of power abuse and taking conflicting decisions in analogous cases. When the latter becomes a fact, the rulers again give priority to the centralized approach, forming the time-cycle of the management of any known organization nowadays.

Such combination was done in ancient Rome yet, through the interaction of ius civile and praetorian law and still has been done today. For example in the recent events for a European Constitution.

The combination of regulation approaches always creates paradoxes, because ensuring flexibility of the legal system through decentralization serves to strengthen organizations, which historically have always possessed a hierarchical structure. The latter by definition cannot exist without some degree of centralization. If natural law and positivism indeed interpret the characteristics of both regulation approaches as characteristics of the regulated object, then the paradoxes that occur when trying to synthesize their knowledge are the result of the opposed approaches of regulation adopted by both theories.

Used by itself, the toolkit of cybernetics is not sufficient to solve these problems. The latter is achievable by the application of the developed by Goshev and Goshev[1] cognitive approach, methodology and G-space architecture. This philosophy and basic logic will be used in this article. We show that they extend the boundaries of the inter-disciplinary area of Artificial Intelligence in Law.

Concept of legal regulation and approaches of legal regulation

In cybernetics, the possible changes in a system are denoted by the term "variety" - the number of its possible states[2]. Only variety could absorb variety[3], which means that the control system as a whole must be able to generate as much controlling variety as the uncontrolled variety in the management system and its environment. Therefore "legal regulation" is the interaction where the law absorbs the variety generated by society and its environment in such a way that allows society to survive and develop. Then "approaches of legal regulation" are the ways in which the law deals with this variety.

A possible approach is the law to "reduce" the variety in society to a set of states corresponding to its own variety. Thus the legislature adopts a model of the regulated social relationships and prescribes *a priori* the ways in which they should develop. This model is reflected in the system of legal norms and all the other variety of the public relationships ceases to exist for the law as a regulator because from the view point of the legislator, the future of the real world has infinite variety and therefore can never be controlled in the legislative present by means of a finite numbers of statutory words[4]. As shown in the figure 2, from the viewpoint of the time of decision-making, such regulative approach is an a priori one.

[1] Goshev S., Goshev G. (2007), Modeling the Logic Schemes of Legal Systems: Design of Logically Exhaustive, Non-contradictive Legal Mechanisms Producing Justice, Stream: Social Policy, Culture and Welfare , Design Conference 2007 (The International Conference on Design Principles and Practices) - at Imperial College, London University, United Kingdom, 4th to 7th January

[2] see Ashby W.R. (1956), An introduction to cybernetics, New York, John Wiley & sons inc.,p. 121-140

[3] Ashby's Law of requisite variety, see Ashby W., fn.3, p.206-213; Stoianov L., The law of requisite variety in the sphere of the legal regulation-some problems and solutions, Сборник с доклади от Годишна научна конференция на ЮФ на УНСС 2014, София, Издателски комплекс – УНСС,p. 194-199

[4] D'Amato A., fn. 1,p. 191-192

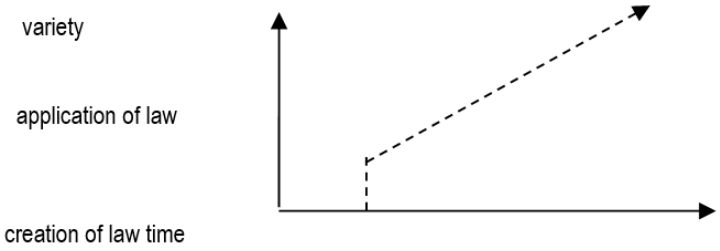

Fig.1

Another approach is by increasing the variety in the legal regulatory mechanism to expand the set of possible states in society and its environment with which the law can handle. Its variation is the case where the legislature based on some general principles for solving conflicts, delegates to a certain body the power to make decisions ad hoc. This variation of the approach of increasing the variety in the regulatory system is a posteriori one, from the decision-making time viewpoint. If we have a body that makes decisions relating to past actions, such a body will have the requisite variety to decide the cases, so long as they are decided one at a time (fig.3)[1].

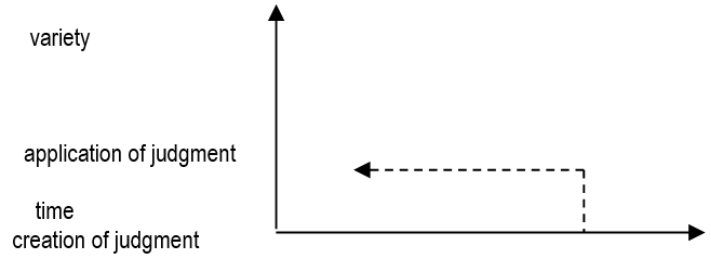

Fig. 2

Under "centralized" and "decentralized" approaches of regulation we understand the manifestations of the approaches of restricting the variety of the regulated system, respectively of increasing the variety in the regulatory system when applied to a hierarchical organization. Their application is combined, while at different cases, or time intervals, a priority is given to one than the other, without completely overcoming their disadvantages. Analysis of specific applications of the approaches helps to identify the reasons for the impossibility to effectively combine them.

The application of the approaches of legal regulation

In the Roman law the disadvantages of the centralized approach of legal regulation appear in the existing since the creation of XII Tables[2] up to 1st century AC, judicial procedure called Legis actiones[3], applied only among the Roman citizens.

[1] D'Amato A., fn. 1,p. 192

[2]In 451-449 BC; About the Twelve tables see Mousourakis G., (2007), A legal history of Rome, Abingdon, Routledge,p. 24 - 26

[3]see Berger Ad., (1953) Encyclopedic dictionary of Roman law, The American philosophical society Philadelphia,p. 541 "*legis actio* oral formulae which were used in the stage of the trial before the magistrate"

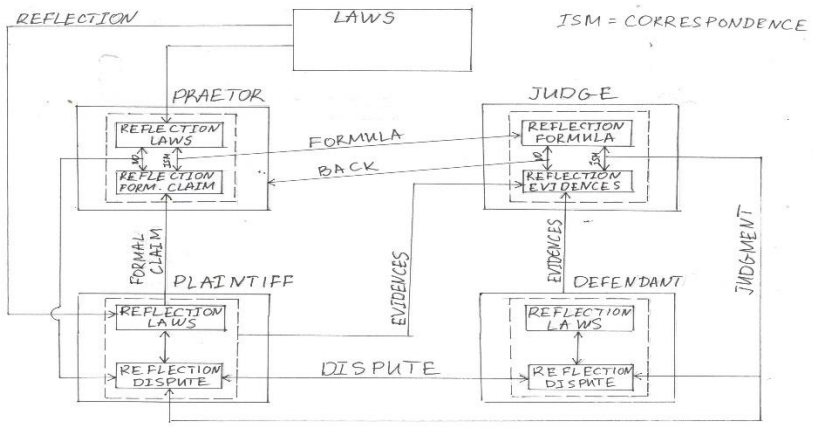

Fig. 3

The procedure had two phases, represented in fig.3. In the first phase (in iure), the parties formulated their dispute in front of the magistrate[1] in the terms of any of the five actions, generally called legis actiones[2]. If he found a correspondence between the expressions used by the parties and the words of the law - he issued formula. The formality and the limited range of formulas in the procedure, did not allow a thorough assessment of the specific case. Despite the variety of disputes, the magistrate examined only those that fell within the scope of legis actiones, while others were legally irrelevant.

After the issuing of the formula, in the second phase (apud iudicem) it was submitted to the judge, who was not official authority. The formula described the dispute in terms of the applicable law as well as the options for the judge's decision. It was a sort of order for the latter, who should have established the presence or lack of a correspondence between the evidence presented by the parties, their statements and the written in the formula. The judge could not deviate from the limits, set to him by the formula. The decision, which he took put an end to the process because there was no appeal. In correspondence between the formula and the facts, the judge condemned or released the defendant depending on whether the claims of the plaintiff were proven or not. If the judge could not solve the dispute because it was unclear what was the content of the formula and how it was related to the facts, he pronounced "non liquet" and then returned the formula back to the magistrate, who could appoint a new judge.

The review of the procedure legis actiones indicates that even when according to its subject the dispute fell within the scope of the legally regulated matter, the plaintiff should strictly adhere to the words of the legal formulas when he requested the magistrate. Any mistakes in the expression[3] led to inability to obtain protection and to impossibility the same dispute to be exposed again in front of the magistrate[4]. The linguistic peculiarities of the procedure made it ineffective for protection of the interests of persons who were not fluent in the legal language.

The formality of the ancient procedure was an obstacle to the successful solving of many social problems. The ignorance of the law by everyone, the incomprehension of the complex expressions of the legal formulas and their inapplicability to foreigners, led to inapplicability of the law to many of the emerging cases in society, because a constitution describing the

[1] In the early times - a consul and from 367 BC a praetor. See Talamanca M., (1989), Lineamenti di storia del diritto romano, 2nd ed., Milano, Dott. A. Giuffre Editore, S.p.A,p. 132-137

[2]Berger Ad., fn. 8,p. 541-542, legis actiones: sacramento, per iudicis arbitri postulationem, per condictionem, per manus iniectionern and per pignoris captionem; Gaius 4, 11 (Institutiones)

[3]see the ref. to words of Gaius in Zimmermann R., (1992), The Law of Obligations, Roman Foundations of the Civilian Tradition, Cape Town, Wetton, Johannesburg, Juta &Co, Ltd Po,p. 82-83

[4]For the principle of *bis de eadem re ne sit actio* connected with the moment of *litis contestatio* when the first phase of the procedure concluded, see Новицкий И.Б., Перетерский И. С., (2000), Римское частное право, Москва, Юриспруденция,р. 57

rights and obligations in the ancient Rome did not exist[1]. The emergence of the dispute and the finding of a legal procedure for its solving, was the only recognition of a legally protected interest.

The lack of coherence between the changes in society, its environment and legal means for protection, led to a regulatory deficit in the organization. In parallel with this process, the population and the territory of the country grew, respectively the variety in the matter, requiring regulation too. Thus the more the external variety became, the less was met within the ius civile because of the limited possible states of the legal regulator which led to its inefficacy.

Because of the inability of this regulator to adapt to changes in the environment in relation to which it functions and which by definition is a dynamic category, the following question arises - to what extent the above-described advantage of the approach, giving the relative stability to the organization, was permanent?

The centralized approach to legal regulation, actually is a manifestation of the restriction of variety in the regulated system to the number of states, corresponding to the variety of the regulator. At it, the deficit of variety in the regulator is compensated by ignoring or suppressing the variety in the regulated object. By ius civile, acting in the manner described, it was impossible to be ensured the survival and development of constantly growing in territorial and demographic terms Roman state and to its complicated economic and social relations.

Roman rulers faced increasingly growing variety they had to deal with. This required increasing the variety in regulatory mechanisms. So they came to the idea of gradual decentralization, i.e. by redistributing power functions and deconcentration of the subjects of decision. The result was in place in no time.

The regulatory mechanisms having more variety were established. They were not trying to foresee the conditions of future public relations but delegated to new authorities the possibility to create ad hoc rules. The regulation was implemented a posteriori. The border of the autonomous judgment was the justice understood as a balance between the interests of those subjects involved in a conflict and those of the community. The centralized decision-making was not removed. In addition to it certain power functions were transferred to other entities thus extending the circle of participants in the creation and application of legal rules.

In the 4th century BC the institution of praetor urbanus[2] was created - magistrate holding imperium[3], which came after the two consuls in the hierarchy and had a year mandate. Besides political and military power, the praetor had also a judicial power, acting as the main jurisdiction in solving disputes in Rome. The latter function subsequently was established as a special one only for him and was dropped out from the prerogatives of consuls.

The urban praetor each year, at his inauguration, issued an edict, by which he formulated his management program for the duration of the mandate. The Edict gradually established itself as a source of law, in parallel with the laws voted by the people's assemblies.

In the middle of the third century BC, the functioning of one urban praetor proved to be insufficient for the needs of the growing state and the institution of praetor peregrinus[4] was created. His role was to carry out jurisdictional functions outside the city and to administer justice in disputes between foreigners ("praetor qui inter peregrinos ius dicit") and between

[1] In the material sense as we know today.

[2]About the development of the republican praetorship see Brennan C., (2000), The praetorship in the Roman Republic, vol 1, Oxford, Oxford university press,p. 3-34

[3]Berger Ad., fn. 8,p. 494: The magisterial imperium embraced various domains of administration, legislative initiative through proposals made before the popular assemblies (ius agendi cum populo), and military command. With regard to the administration of justice, imperium is sometimes opposed to, and distinguished from, iurisdictio, sometimes coherently connected with it.

[4]About concrete reasons for creation of the new magistracy, exist different opinions in the doctrine see Brennan C., fn.14,p. 85-89

foreigners and Roman citizens ("praetor qui inter civis et peregrinos ius dicit"[1]) Praetor peregrinus also issued an edict, but with significantly extended scope in terms of the addressees, as he acted in relation to foreigners too.

The praetors' activity gradually changed the legal system in the Roman state. The praetorian law called ius honorarium was subsystem acting in parallel with ius civile within the overall system of Roman law. Its role, as defined by classical Roman jurist Papinian (D.1.1.7.1 Papinianus 2 def), was to correcting, supplementing and amending ius civile. The praetorian law performed timely feedback between society and the regulator, so that the latter does not lag behind the needs of the regulated object. Therefore ius honorarium acted as a compensatory mechanism for overcoming the regulatory deficit of ius civile. By creation of praetorian law together with the centralized approach in decision-making was introduced also the decentralized one. The synchronization of the two parallel acting subsystems contributed to the rapid development of Roman law in the period II BC - I AC. The different approaches of regulation used by both subsystems, justified the different approaches in creating cognitive models, on the basis of which rules and procedures were made.

The praetorian law created rules using inductive method by identifying and solving specific cases, from which praetors extracted models of global social phenomena and on this basis supplemented their edicts. At ius civile is the opposite- the approach was deductive. The laws contained abstract models in the terms of which the future individual cases should be fitted.

The presence of praetorian institution, especially that of praetor peregrinus, caused the introduction in 140-120 BC by Lex Aebutia, of a new procedure for solving legal disputes called formulary[2] procedure. It acted simultaneously with the legis actiones and helped in compensation of the disadvantages of centralized approach in the creation of legal rules. Common feature between the procedures was that they were carried out in two phases, as described above. Under that formulary procedure, however the praetor had a great discretion, as guided by the principle of justice - aequitas.

An idealized model of the procedure is presented in Fig. 4

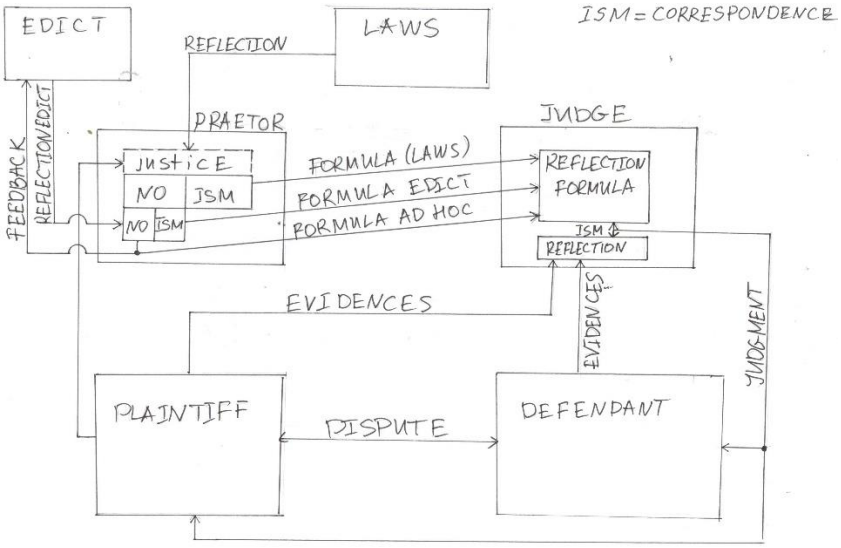

Fig.4

[1] see Brennan C., fn.14,p. 100
[2]About the praetor peregrinus see Talamanca M.,fn.9,p. 141-142

The innovation in the formulary procedure is that the parties could expose the dispute freely without being forced to use the expressions of law and the formula, created by the praetor, had a varied and flexible structure as it could include different elements which reflected most completely the problem[1].

Once the dispute was reflected in the magistrate's mind, he had several options:

- To look at the ius civile searching for applicable to the case rule by which to solve it. It was possible by using actio fictitiae, the magistrate to use fictions in the formula by which to accept the existence of a fact that is objectively missing in order to give civilian protection, with a view of justice.

- In case he did not find appropriate ius civile, the praetor could implement the edict; but even in case a civilian legal rule existed if the praetor decided it was contrary to the justice in the specific case, the discretion allowed him to apply the edict again.

-If the praetor did not find a rule in the edict, he could create a rule ad hoc. The last option was implemented by the so-called actio in factum[2]. This is exactly where the praetor used inductive cognitive approach because he perceived and analyzed the particular facts, assessed the existing law and other meta-juridical criteria for legitimacy, and based on this cognitive activity he a posteriori designed and created a regulatory mechanism.

The latter method was a novelty to the legal regulation in the country. The permanent feedback between society and the regulator was implemented by this method. Thus the latter was updated with timely incoming information about the state of society and the environment. Thus were created many new legal mechanisms for protection, which by their subsequent objectification in the edict, gave a permanent legal institutionalization of a wide variety of public relations. So the legal system managed to increase its internal variety, as extracting information from natural communication not only between Romans but also between them and the foreigners[3].

The problem of combining the two approaches

With the expansion of the Roman country also the number of praetors increased. From two in 220-230 BC they became four and in the next years due to the new conquests they increased even more. During Sulla's dictatorship they were already eight, and in the time of Caesar reached 16. The increase in their numbers on the one hand enhanced decentralization, but on the other, reduced their authority. The conflicts began between the praetors and their higher colleges - the consuls[4]. It was not an exception some praetors to abuse their powers to get personal gain. This hid a risk of detaching elements of state organization itself, due to a difficult control over the magistrates' activity and the local social processes. The decentralized approach, even though made it possible for more people to participate in the decision-making, due to its incompatibility with the hierarchical structure where it functioned, was a prerequisite for the conflict of interests. This was due to the difficulty in carrying out successful centralized control over the decision-makers' activity in order stability of the system to be ensured[5]. Perhaps this explains why the end of the Roman Republic was marked by on one hand the booming in praetorian legal creative activity and on the other - with increased centralization in the country, as evidenced by the government of the dictators in this period[6]. Therefore a natural reaction to the increased number and influence of

[1]About the structure of the formula see Pugliese G., (1991), Istituzioni di Diritto Romano, 3 ed., G.Giappichelli Editore-Torino,p. 286-306

[2]Such actio in factum conceptae was actio quod metus causa; see Ganeva E., (2014), The violent taking of property - VIS - ground for punishment or restitutio", (will be published), Poster session, Legal conference of Balkan countries and Turkey, Ozyeğin Universites, Istanbul, Turkey, (will be published soon)

[3]About some praetorian mechanisms see Ganeva E., 2015, The protective mechanisms against coercive impact in the form of violence (vis) – development and legal regulation in the praetorian law context, Сборник с доклади от Годишна научна конференция на ЮФ на УНСС 2014, София, Издателски комплекс - УНСС,p. 331-337

[4] see Brennan C., fn.14,p. 396-397

[5]For the crisis of the Roman Republic see Crook A., Lintott An., Rawson El., (2008) The Cambridge ancient history, IX The last age of Roman Republic, 146-43 BC, Cambridge, Cambridge University Press,p. 12

[6] For example: Sulla from 81 BC

the magistrates was the restoration of fully centralized decision-making as the only known manner of the rulers to overcome liberty and abuse of power.

The attempts to reconcile the two approaches, took to its decline with the transition in 1 AC to the sole government, called Principate, headed by Octavius Augustus. They were finally terminated with the codification of praetorian edict in so called Edictum Perpetuum in 138 AC, during the reign of Emperor Hadrian. Thus it was put an end to the praetorian legal activity. What the emperor accepted as the best achievement of praetorian law became an integral part of the objective law and ius civile and ius honorarium merged into one regulatory system of statutory law.

The transition from the Republic to the Principate and Imperia, according to some analysts of the mentioned historical processes, was a compromise[1] necessary to preserve the Roman state as an organization, since it was not possible otherwise to deal with the crisis at the end of the Republic. It can be assumed that probably the crisis was influenced by excessive decentralization, allowing more and different in their views interested individuals to participate in decision making. What is objectively observed, is that by transition to imperia, the Roman state returned to the sole leadership, characterizing its establishment as a monarchy in 753 BC, but with even greater intensity of the centralization.

From the review it can be concluded that: in hierarchically structured organizations two management approaches are applied - centralized and decentralized. Neither their individual use nor their reconciliation in the context of a hierarchical management structure, succeeded in achieving sustainability of the organization to changes in environment. The behavior of the organization is cyclical, as the most common reaction of the rulers was to pass from one to the another approach and vice versa[2]. Why is this so and why historically a persistent desperate repetition of the management tactics, respectively events is observed?

In the centralized regulatory approach, the decisions are made from the top of the hierarchy to the bottom level[3]. Thus, on one hand it is not allowed all interested to participate, and on the other, the subject of decision usually has no immediate impressions of the situation in respect of which it makes the decision. In this way it is the easiest to serve the interests of a limited part of the population that acts to the rest as regulator toward regulated. This of course is a prerequisite for discontent in the rest of the population that has no other mechanism for defending its interests except through non-institutionalized force. Under the influence of this process, the ruler makes a decision for a change by introducing a wholly or partially decentralization to all or certain issues. For a moment the deconcentration of power calms organization and the rebellion calms down. And this approach, however balance organization for a while, because the implementation of decentralization takes place in a hierarchical structure - praetor is one step after the consul in the ladder of power. Aware that he operates in a hierarchy of power, the praetor takes into account justice as a criterion for rulemaking in his edict, but against himself there is no effective control mechanism that prevents him from liberty. He also acts in relation to the matters within his competence as a regulator toward regulated. The result - in a hierarchical structure of power, the model of centralization is transferred by means of decentralization to a lower level of abstraction (using cognitive approach of induction)[4]. Historically, this has led to attempts for uncontrollable sole domination over certain territories and on certain issues.

History shows that decentralization, applied in a hierarchical structure, leads in a moment to the centralization of smaller territory in respect of certain issues, which carries a risk of detachment of the elements of the system. This problem has been treated millennia, and even today with the return of the centralization from a higher level at which the individual fully loses its meaning in the decision-making process.

The relationship between the approaches of regulation and the theories of natural law and legal positivism

An analogical repeatability is found in the interactions between explanatory models of natural law and positivism. In some periods legal science gives preference to natural law, and in others of positivism. The increased influence of natural law seems to match with the gain of the decentralized approach, and the influence of positivism with the one of the

[1] Андреев М., (1999), Римско частно право, София, Тракия- М; Mousourakis G., fn.7,p. 83
[2] see Crook A., Lintott An., Rawson El., fn. 23,p. 6
[3] Beer St., (1975, 1994), Platform for change, West Sussex, John Wiley and sons,p. 285-289
[4] Beer St., fn. 27

centralization. This indicates a relationship between the approaches of legal regulation and the explanatory models. The characteristics of the relationship are illustrated by the following example.

The two parts of a hypothetical city located on the shores of a river, for decades are connected by a bridge, which now needs to be repaired and significantly improved since it is no longer able to take the traffic of the growing city. The city's management gathers a team of engineers who may choose to repair the old one, to build a new bridge or to invent another way for connection between the two shores. The team mapped the area around the old bridge, examines the structure of the ground beneath the facility and performs many other studies. This way they build a model of the area where the old bridge is located. The team naturally gets familiar with the documents of the old bridge and explores its present condition - wasting of the materials, etc. Thus the team ends up with two models, one of the situation to be regulated (map of the area, of the traffic that will pass through, etc.) and one of the old bridge, currently regulating the situation (length, design, materials, etc.). A special feature of the model of the old bridge is that within itself, it contains a reflection of the situation to be regulated. For example, in the documents of the old bridge data are available about the distance between the two shores and everything else. Why then the team wastes technological time and resources creating two models, instead of creating only a model of the old bridge, which also contains a reflection of the object of regulation, similar to the reflection contained in the first model? The reason is that the reflection of the regulated object contained in the current regulatory mechanism is probably outdated (the bed, the river level and also the needs of the city have probably changed through time). It is also possible the builders of the old bridge to have done wrong measurements or the new builders perhaps have more precise measuring instruments. Furthermore, the selected engineering solution in the construction of the old bridge may no longer match the needs of the city (e.g. if the bridge is too close to the water then the new and higher vessels cannot pass under it) and a significant structural changes for its preservation might be required.

The situation during a legal study is similar. The object of study covers both the object of legal regulation (a defined set of social relations together with the environment in which they occur) and the legal regulatory mechanism operating at the time of the study. Indeed, through the analysis of the legal regulatory mechanisms one could build a model of the regulated object. But this is a model of the object as perceived by the creator of the regulatory mechanism, but not as it is at the time of the study. The object of legal regulation and legal regulatory mechanism operating at the time of the study are two different levels in the subject of legal study. Mixing them means that the model will not correspond in optimum degree to the reality. If the designers of the bridge mixed the situation to be governed with the existing regulatory mechanism, they might come to the conclusion that the construction of a bridge is the only opportunity for the parts of the city to be connected. This unreasonably excludes the possibility of building a tunnel under the river, which can be even more effective. And what is the possible effect of such level-mixing in a legal study?

The risks of mixing the subject of regulation and the regulatory mechanism in the legal research.

Differentiating of a bridge from its surrounding is easy, compared to the differentiation of the legal regulatory mechanism from the social relations and the environment in which they occur. One reason is that the object of regulation and the legal regulatory mechanism are physically inseparable. The latter is an ideal object. For its presence and characteristics we judge by the changes that it causes effecting on the human behavior and also by its partial reflection in the normative acts. The other reason is that the approach of legal regulation built into the logic of the regulatory mechanism, modifies the structure of the object of regulation.

From a cybernetic standpoint, the construction of a cognitive model in the law does not differ significantly from the creation of a legal regulatory mechanism – both the investigator and the designer has to deal with the variety of a situation. Therefore the legal research as a process also needs a regulatory mechanism. The researcher must generate as much controlling variety through the applied approach and methodology as is the uncontrolled variety in the object of research. Otherwise the cognitive model will not be adequate to the legal reality and the regulatory mechanism based on it will not be effective.

If the scientific research is a process of dealing with the variety of the researched object and its environment, then "scientific approaches" are the ways in which the researcher overcomes this variety. The approaches are the same. The researcher may limit the scope of the researched object and thus equalize the object's variety with this of the used approach and methodology. Another option is increasing the variety in the applied approach and methodology. The above-mentioned advantages and disadvantages of the approaches affect the explanatory power of the obtained models.

The physical inseparability of the legal regulatory mechanism, public relations and the environment in which they occur, must be compensated with a cognitive toolkit that allows the creation of multilevel model in which the above-mentioned are reflected in the appropriate levels. Without taking in to account the different levels and also that at the time when the reflection is created the structure of the legal reality is determined by the approach of regulation, it is likely for the researcher to interpret characteristics of the specific regulatory mechanism as characteristics of the object of regulation.

For example, in the examined above procedure of legis actiones, the legislature prerequisites a model of certain public relations, prescribing a priori how they would develop. Thus the rest of the public relations variety ceases to exist for law as a regulator. In such situation, if a researcher creates a model without using tools for multilevel structural representation of the object of research, it is likely that he could not be able to distinguish the legal regulatory mechanism from the social relations and the environment in which they occur. The model will identify as "law" only what the existing regulatory mechanisms recognize as such and as "legal regulation" only a regulatory mechanism built through a centralized approach. The rest remains outside the object of research as "non-law", just because the resulting cognitive model reflects the object of legal regulation, as it is applied according to the regulatory mechanism operating at the time of its creation. In terms of such model it is an incomprehensible assertion that the praetor could make rules ad hoc, guided by the principle of justice. Such rule-making is a posteriori regulation and contradicts one of the axiom of the model stating that the regulation is always a priori. It is the same as the team that had to come up with a new and more effective way of connecting the two sides of the city should seek a solution, using the model of the regulated situation constructed by the builders of the old bridge decades earlier. Thus the opportunity of building a tunnel under the river bottom automatically disappears.

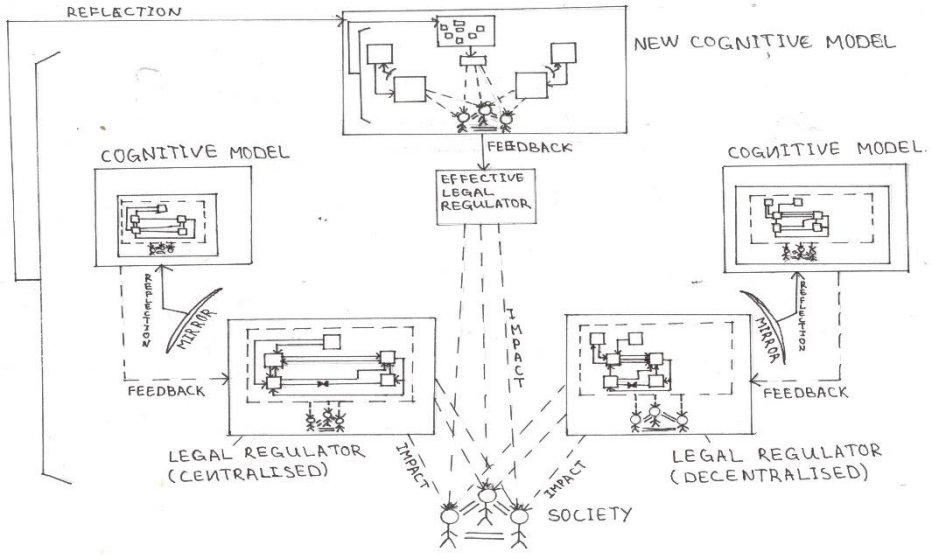

Fig.5

A question arises - whether the contradictions between natural law and legal positivism can be explained by their inability to compensate the physical inseparability of the legal regulatory mechanism and the object of regulation as well as to take into account that during the creation of the model the structure of the legal reality is determined by the regulatory approach. If the assumption is true the theories interpret characteristics of the regulatory mechanisms, established on the basis of mutually exclusive approaches, as characteristics of the object of regulation and thus each theory produces statements that logically exclude statements produced by the other.

The result would be that if we follow the axioms of one explanatory model, it is logically necessary to reject a considerable part of the statements of the other about "What is law?". The reason is that among the axioms of both explanatory models there will be such models that do not relate to the object of regulation, but to one of the two approaches of regulation: "Legal is the regulation, implemented by a centralized approach" or "Legal is the regulation, implemented by a decentralized approach."

Perhaps it would be productive some of the discussions between the natural law and the positivism to be analyzed in this context.

The paradoxes arising from the combination of different theories due to physical inseparability of the regulator and the regulated object as well as the structural determination of the legal reality by the applied at the time of study regulatory approach could be overcome by using the toolkit for multilevel structural analysis.

Necessity of correspondence between the structures of the object of regulation and regulatory mechanism.

It is proven that each simple and at the same time a successful regulator of a system should be isomorphic model of this system[1]. This is a mapping which not only involves a one-one correspondence between the elements of the sets of components, but also between the elements of the sets of functions[2]. A regulatory mechanism, built on a cognitive model that does not differentiate the acting regulator from the object of regulation, does not comply with the requirement of isomorphism and is not an effective regulator[3]. The problem is what the legal regulatory mechanism should be isomorphic to.

On a lower level of detail, the organisational mechanism could be viewed as natural and legal persons connected by relationships and performing appropriate activity, which could be interpreted as perception, decision and action, in its two manifestations: thought and consequences in the surrounding world. The algorithms of perception, decision and action through which the modelling of everything described so far is accomplished, are similar to cognitive architecture a network of a connectionist type. This model of thinking process can be interpreted as an atomic level of detail, which contains the genome characteristics of the studied system. The impacts of this level lead to changes in all other levels. Therefore, the legal regulatory mechanism should be isomorphic precisely to the described simulation model of the thinking process. The structure of thinking processes is heterarchy[4] possessing enormously greater variety than that of hierarchical structures. Therefore towards the legal regulation it is necessary to implement a variation of the approach of increasing variety in the regulated object, different from the approach of decentralization, so that the regulatory mechanism to be consistent with the theorem of Konant-Ashby. Such an approach is presented in the next part.

AI-approach, methodology and G-space architecture

An approach is need that would model the law as a tracking system, simultaneously changing with the regulated system. This is not an easy task because the model must be a snapshot-interpretation of the surrounding world that involves an active human presence, with a focus on law as regulatory system. The toolkit by which such a model can be constructed must be capable of dealing with the great complexity of the modeled object, because it presupposes studying the object-society, and the models of the decisions made in society, presented as a mechanism.

A researcher, who follows the developed by Goshev and Goshev AI-approach, is oriented towards an extended object of study, which contains not only the classical object – the legal regulatory system, but also the toolkit, the research methods and models of analysis, modelling and constructing the picture. This holistic approach leads to the construction of a world-like model, that reflects the picture of the object detailed to the necessary for analysis and construction level, interpreted

[1] Conant R. C., Ashby W.R., (1970), Every Good Regulator of a System Must be a Model of That System, Int. J. Systems Sci., vol. 1, No. 2,p. 89-97
[2] Beer S. (1994), Decision and Control: The meaning of operational research and management cybernetics, John Wiley & Sons, Ltd. (UK),p. 108
[3] Beer S. fn. 30,p. 120-121
[4] McCulloch W., (1945), A heterarchy of values determined by the topology of nervous nets, Bull. Math. Biophysics, 7,p. 89-93

as a mechanism. This is achieved by extending the structural isomorphism of Bertalanffy[1]. Thus the analyzed object is part of the correlated picture surrounding world, together with the object magnified through a conditional magnifying glass (depending on the interests of the analyst-constructor), which allows the identification of the necessary level of detail of the structure, elements and relationships assembled into the object (see Fig5). The obtained systemically identified world-like model which is a system with an active human presence can be analyzed using analytical methods of mathematical description and the methods of structural and analog modelling. The holistic cognitive picture of the integrated influences of the surrounding world and the person in an isomorphic-recursive interpretation, opens opportunities for transitions between levels of differing nature. A principle called the Principle of the relatively positioned observer allows the picture of the world to be closed together with the observer. In result, the researcher can work with the ideal (mental) model of the world, together with the observer within it.

Using combined methods of modelling and the creation of networks the mental model is represented as object-oriented semantic network of words or a table of codes showing the correspondences between words and elements. This useful semantic network is called the G-model.

Very important aspect of the G-model is that the procedures that regulate the finding and regulation of social relationships that motivate toward the realisation of a specified in the regulation system behaviour, are presented in it.

The G-model assures equilibrium in the variety of the regulated and regulating systems. Of the utmost importance for the quality of the motivational regulatory system, as a regulator of social relationships, is the provided opportunity for a quantitavely undefined global criterion of efficiency, logical integrity and unambiguity which could be interpreted and attached for testing through the use of G-space and specified in any given fragment. By this G-space allows simulation and transformation on the principle of one looks at a unit globally and makes a decision, but then acts on a separate fragment. In other words, the analyst-constructor has the opportunity to centralize his information about the regulated object, seeing it globally and to decentralize his influences on it acting locally, depending on the situation.

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