THE EUROPEAN COMMON GROUND OF AVAILABLE RIGHTS

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ALGORITHMICAL JUSTICE, WHAT IS CHANGING IN LAW

Abstract The pivotal point in the equitative algorithms, which differentiates them from other legal algorithmic systems, is the possibility of leaving it to the parties in establishing the order of interests, or, in general, of the values that they most prefer. Western legal systems have frequently taken away from the citizen the possibility to intervene in the process to modify the order of values established in the law, often even when this was not necessary for reasons of protection of the weaker party or for other constitutionally guaranteed reasons. The article discusses the theoretical framework for the possible integration of these ICT techniques into Western legal systems.

1. *Law and the Information and Communication Technologies*

The relationship between law and technology has changed with the advancement of cognitive science studies. It is a change that, although it was immediately evident in its future possibility[1], has waited until today for the full awareness of the jurist[2]. Today the jurist's gaze on his world no longer turns only to the immediacy and closeness of the normative utterance, the bearer of juridical meanings – of law – in the scheme considered necessary according to the legal methodology of the twentieth century, but scrutinizes horizons, unexplored distances unknown to the humanities: no longer man as a product of nature or God's creation, but man as adaptation to his own culture and nature as assimilation to his own nature; a man culturally and physically unknown to the past, a man whose physical features and cultural abilities are outlined by considering the future. In this transformation of man, even his essential characteristics become blurred, or fade, objectifying themselves into new technical realities[3]. Perhaps it is precisely the fears

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[1] LOEVINGER, L. (1949). "Jurimetrics the next step forward." *Minnesota Law Review* 33 (5): 455-493. FROSINI, V. 1968. *Cibernetica diritto e società*. Milano: Comunità

[2] CARLEO, A. (Ed.). (2017). *Calcolabilità giuridica.* Bologna: il Mulino; CARLEO A. (Ed.). 2019. *Decisione robotica.* Bologna: il Mulino.

[3] HARAWAY, D.J. (1990). *Simians, Cyborgs, and Women: The Reinvention of Nature*.Free Association Books: London.

or scepticism aroused by this distance of the new human representation from the image of man, as consolidated in the thought of modernity, combined with the alleged closeness of what are called 'intelligent machines', to its dianoetic virtues, that have contributed to sidetracking these studies in the legal field.

Indeed, just as in the culture, the cognitive sciences are working to disrupt the roles and rules in the legal field. These researches identify a method and play with it, distancing the wilful jurist in a continuous counterattack, the result of which is the increasingly evident disconnection between validity and enforceability of the law, a sign of that loss of coercivity that guides the most revolutionary moments in the control and management of normative power. The lost privacy is the prototypical example of this situation. The nineties of the last century saw the jurist busy in the elaboration of norms or rules to discipline the new digital realities, but the protective intentions did not take effect: the law failed its purpose. Information and communication technologies (ICT) have imposed their rules and state regulations have crumbled into general disregard. A crisis of normativity that directly affected law and legal science[4]. A crisis that would have required, instead, a normative intervention closely linked to the new techniques, different from the traditional instruments beloved of twentieth-century legal science[5]: a legal protection designed in the techniques themselves[6].But the crisis of effectivity of the past decades has been simultaneously a crisis in the predictability of the citizens' action and in the predictability of the legal response[7].

The original questions, which marked the cultural overturn of posmodernity[8], and opened the new direction, can be summarized in the following: "how does the human being think, reason, decide, choose

[4] ZUBOFF, S.(2015). "Big other: surveillance capitalism and the prospects of an information civilization." *Journal of Information Technology* 30: 75-89; ROMEO, F. (2019). "Il governo giuridico delle tecniche dell'informazione e della comunicazione." In *I dati personali nel diritto europeo,* Cuffaro,V.; D'Orazio,R.; Ricciuto, V. (Eds.). 1233 – 1274. Torino: Giappichelli.

[5] TALLACCHINI, M. (2012). "Scienza e diritto. Prospettive di co-produzione." *Rivista di filosofia del diritto* 2: 313-332.

[6] HILDEBRANDT, M.(2016). *Smart Technologies and the End(s) of Law.* Camberley Surrey: Elgar.

[7] IRTI, N. (2014). "La crisi della fattispecie" *Rivista di diritto processuale* 1: 36-44; IRTI, N., (2016). *Un diritto incalcolabile.* Torino: Giappichelli.

[8] GROSSI, P.(2018). "Storicità versus prevedibilità: sui caratteri di un diritto posmoderno." *Questione giustizia*. 4: 17-23.http://www.questionegiustizia.it/.

and act in the world of things and how is it possible to reproduce it in a non-biological artificial system?" The intersection of the two researches, and of the two kingdoms of nature, placed *in nuce* already in Turing's theorem, goes beyond the barrier of empirical proof on man, providing the artificial reproduction also the possibility of that proof. This opened the way to an empirical methodology, new in the research on the mind: if theoretically it is believed that man's thinking works in a certain way, then the theoretical model will have to be implemented empirically in an artificial system in order to provide the expected results[9]. But here science and technology run on the same track, the latter not being an implementing choice of theory in reality, but the empirical proof of the former. Technique enters into legal consideration as science, not as a new reality to be regulated according to political will, but as a truth of the world of which the law can only acknowledge it.

The new methodological approach in the studies on the mind has enabled us to falsify several theories considered undeniable until the last century and therefore to work out new ones. These new knowledge and these new techniques, on the other hand, have allowed the transformation of man, crossing him or hybridizing him with the result of them: the world of the inanimate comes into life and the human being gets mixed with it, it is this double junction, this cultural chiasma, the central point of today

Human culture thus arrives on new paths to a redesign of concepts and cultural cornerstones. We do not understand the cultural chiasma of pos-modernity, the change of path we are walking along, if we are not able to take a look at the set of fields involved in cognitive science research at the same time. Trans-humanism, post-humanism, cyberpunk and the cyborg manifesto are cultural expressions, extremely innovative, that derive directly from these researches and call into question, with different angles, the very origins of modern western thought[10].

Framing legal science in this methodology can open up a different understanding of the concept of law and today even the practitioner looks at these techniques and his profession with a new approach and innovating attitude. The conservative position, which can be summed

[9] PHILIPPS, L. (1989). "Gibt es ein Recht auch für ein Volk von künstlichen Wesen, wenn sie nur Verstandhaben?". In *Jenseits des Funktionalismus, Arthur Kaufmann zum 65. Geburtstag*, Philipps, L.; Scholler, H. (Eds.).119-126. Heidelberg: Decker & Müller.

[10] MARCHESINI, R. (2002). *Post-Human. Verso nuovi modelli di esistenza*. Torino: Bollati Boringhieri; BRAIDOTTI, R. (2013). The Posthuman. Cambridge: Polity Press.

up in the motto 'nothing can change in what most intimately concerns human reasoning and human beings in the field of law', is today certainly a minority position and remains what it was in the past: a backward operation.

Even the practitioner who shows considerable openness to these techniques, however, cannot completely distance himself from the position that 'however close these techniques may be to man and replicate some of his activities convincingly, they will never replace man in some activities'. The evident methodological error of 'never' stands out: scientifically everything is possible, but every possibility has a different degree of probability. Further errors are constituted by the fallacy that consists in accepting the falsificationist premises but denying the absolute possibility of it, or, again, in deriving the ought from the is: "it doesn't do it, can't do it and therefore shouldn't do it". These fallacies in reasoning, however, possess the advantage of demonstrating or laying bare the jurist's state of the mind, the individual emotional dimension.

The current knot are not the ICTs and what they do, can, should and should not do, but, together with all other cognitive sciences, their philosophical and scientific representation of man and his mind or spirit. More than their usefulness, the philosophy of law cannot fail to grasp their extraordinary importance as an instrument for theoretical reflection on law. This is true as long as we do not make the mistake of separating the processing tool, the computer or the robot or the bot, and its technical results, from the underlying sciences and their methodology. The new artificial world is a reality that is given to law. This world has its own laws, that legal theory must accept and make its own, or impose other laws, but at the moment in which this world is created. To regulate this world without taking them into account would be like prohibiting the falling bodies. It is a difficult task for the jurist and there is still no explanation, even just a glimpse, that tries to be systematic.

2. *Some defining or preliminary questions*

The name given to the whole of these researches, cognitive sciences, is due to its focal point: cognition. It is useful to remember that as such today we mean the process that uses and unifies the whole set of human faculties and abilities that allow the individual to have feelings of reality, through these to perceive and form mental representations of it and through these and his genetic, biological and cultural characteristics, including his beliefs, to decide and act. Therefore, the term cognition in this field is broader than the traditional concept that

linked cognition to knowledge. In some languages, such as German, the corresponding lemma, *Kognition*, officially entered the vocabularies in the last decade of the last century, differing from the one previously used: *Erkenntnis*. The cognitive sciences, more than a discipline in its own right, are made up of all this knowledge and the sciences that represent it, involving anthropology, psychology, philosophy, linguistics, neuroscience and artificial intelligence in the common theoretical framework of evolutionism.

In this context new theories and new cultural products have been developed. The mind and the mind-body relationship are today understood in a very different way, in an essentially monistic explanation. Thus, the mental representations of the individual do not seem to be detachable from his perceptive and sensorial abilities, nor from his cultural heritage, nor from his phenotypic and biological constitution, nor from his genetic predispositions. It is accepted today that human action is driven, in a necessarily joint way, by rational factors together with emotional and genetic factors, and that the representations of reality are always dependent on them as well and not only on factual circumstances.

I use ICT initialism, for information and communication techniques, collecting in it every scientific and technological sector dealing with the transformation of data into information and their communication, according to the definitions elaborated in the sector studies starting from Claude Shannon and to which I refer[11]. The term information, in particular, is understood as the result of a data processing operation[12].

Without going into the enumeration and classification, always temporary and quickly obsolete, of new ICT products, I provide a brief theoretical overview of their main characteristics, which can then be used in different application modes, many of which, for now, unimaginable: what is interesting here is not what they do, however wonderful or surprising, but what they simulate or emulate.

It should be made clearer that we are not talking about simple techniques, about simple transformations of the world with instruments of reality; we are talking about analyses and representations of the world and of man, which serve to understand them and, only con-

[11] SHANNON, C.; WARREN, W.(1949). *The Mathematical Theory of Communication*, Urbana, Illinois: The University of Illinois Press; LOSEE, R. M. (1997). "A Discipline Independent Definition of Information" *Journal of the American Society for Information Science* 48 (3): 254-269.

[12] ROMEO, F. "Il dato digitale e la natura delle cose." In *Diritto Interessi Ermeneutica,* Ballarini, A.(Ed.). 87-124. Torino: Giappichelli.

sequently, to act in them also with new and different instruments from man but which, like or similarly to man, explain and represent him.

No technique is as intimately linked to his science as this one, which I call here, following Herbert Simon, the science of the artificial[13]. In this science man himself is part of representation, he is the subject and object of scientific research and technical implementation, in all his abilities, expressions and manifestations, whether cultural, social or emotional. A new representation of man is opening the door in the intricate environment of the history of ideas; it is a broad representation, which includes new entities, halfway between the animal and the inanimate, between the human and the transhuman who nevertheless participate in its destination, to recall Fichte, to the definition of shared normativity, be it legal, economic or ethical. In the same way as science and technique of the artificial are intimately and inextricably connected, so also, in them, technical norm and juridical norm define and realize together the law in its validity and effectiveness, which no longer expresses, therefore, a normativity defined exclusively for and on that man who has been the principal actor of this change.

To the first clarification we add a second one. The legal predictivity is only part of the predictivity on man, and this is possible in a theoretical and hypothetical horizon different from the traditional representation of man. The philosophical telling narrates man in his freedom of choice, in his manifestations of free will, in his self-determination, but, in some parts, this tale is no longer sufficient to explain this change in the representation of man. The free will of individuals appears more in the theoretical needs than in human events, but on this side the jurists are already somewhat prepared, it is a question of completely reanalyzing the category of will in the juridical sphere[14]. Here the philosopher is no longer alone, scrutinizing man in his production of culture, he has science as his companion. It is a company that changes the object of study, man himself, intervening repeatedly on it, a companion that not only studies and proposes cultural instruments, concepts, classifications, reasoning, but also 'produces' new realities, transforms the real environment, including man himself, understanding also, in this expansion, his possibilities of producing culture.

[13] SIMON, H. A. 1980. "Cognitive science: The newest science of the artificial." *Cognitive Science* 4 (1): 33-46.

[14] SANTOSUOSSO, A. (2014). "Cognitive neuroscience, intelligent robots and the interplay humans-machines." *Rivista di filosofia del diritto*, numero speciale "Diritto e neuroscienze", 91-105, 92 ff.

The relationship, or its theoretical awareness, between law and technology or science has changed, and the separation between the cultural sciences and the sciences of nature has disappeared. In this new representation man is also subject to the same natural laws as other animals and things; man also has a causation of his own cultural representations, his own actions and his own will. Just as man acquires in determinability, artificial systems lose, in part, that deterministic characteristic that has distinguished them for a long time and allowed them to be classified in the category of machines. These horizons no longer belong to them, the use of the term machine and derived adjectives is misleading to say the least, since they lack the essential characteristic of determinism.

3. *Artificial learning systems*

By trying to reproduce human cognition in artificial systems in an isomorphic way, the procedures and structures that take part in this complex process are necessarily reproduced, and, as in man, these systems base their mathematical framework on stochastic (random) procedures of error minimization. This means, in technical terms, that the possibility of error is structurally embedded in them and remains so even after the learning process. Similarly, the inspiring purpose of artificial intelligence (AI) researchers was to build a system capable of simulating human behavior, including the ability to learn by imitation, attempt and error. Just as the target of AI researchers was to reproduce or simulate cognition, and with it the human mind, so too the ideal of the machine that is not wrong, perfect, objective, that reproduces reality 'in the mirror for what it is', has never even been taken seriously, at least in the field of machine learning. This, rather, is a typical representation of the scholars of the humanities who approach these studies; it accompanies the error of identifying mathematical calculation with exactitude and its use with objectivity. Statistical and probabilistic calculations are also mathematical, abduction and induction are logically representable and computable, so are analogy or similarity reasoning and all heuristic procedures, so are perceptual inference and Bayesian inference. They are eternal truths, they belong to the world of objectivity, not the results of their calculation. Especially if applied to reality, here they do not elaborate immutable truths and unquestionable objectivity, but approximate, categorize, classify, induce, abduce, suggest, believe, elaborate forecasts, extract, interpolate, generalize: therefore they make errors. Nevertheless, they are also mathematical calculations and models. Mathematical calculation, ob-

jectivity and exactness are not terms of an indissoluble endiatrion: these calculations approximate; even the integral calculation approximates, as well as differential analysis and stochastic analysis. On the other hand, a quantitative evaluation can also be made without numerical symbols or numerical quantities[15]. Perhaps a brief explanation of these systems may be useful.

Since the first moment the questions to which it was important to give an answer for a correct artificial simulation of the human being were clear: besides the development of adequate hardware, it was necessary to understand which mathematical functions could be implemented on the available hardware and which algorithmic structures could be created in order to obtain the execution of certain tasks. While all the major fields of investigation were outlined as early as 1956, with the Dartmouth Summer Research Project on Artificial Intelligence, subsequent research focused only on a few fields, i.e. logical machines and automatic systems. Here it was already possible, according to what was technically and scientifically available, to arrive at surprising results. Other aspects outlined at Dartmouth, such as the pain/pleasure system, the ability to learn by error, the ability to recognize real objects autonomously through autonomous sensations and perceptions, the ability to autonomously control oneself, were postponed to future research because there was a lack of computational structures and mathematical functions capable of performing those tasks. Only one type, rather simple, of Artificial Neural Networks (ANNs) was ready for the technical demonstration of artificial learning[16], but it seemed to show big limitations. So, the researches on the learning systems, the ANNs, the cybernetic systems and the robots, slowed down the pass, almost stopped. Scholars also realised that these systems were closely connected among them, because a system that could control itself autonomously in any environment, needed the ability to recognise any kind of object with any kind of shape and that this would have been possible only by developing ANNs able to learn to recognise any kind of environment in any kind of environment. The programming with the knowledge already predisposed in the programming and all the necessary logical inferences, on the contrary, did not appear able to develop autonomous systems.

The ANNs, rather than being a logical structure dependent on log-

[15] SARTOR, G. (2012). "La logica della proporzionalità. Ragionamento con magnitudini non numeriche." *Rivista di filosofia del diritto*, 2: 337-373.

[16] ROSENBLATT, F. (1958). "The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain." *Psychological Review* 65 (6): 386-408.

ically structured knowledge and on the behaviours to perform, are structures realised to simulate the cerebral structure. It can be adapted to the most different needs, changing only some of the rules of learning and, from case to case, the complexity of their structure. However, the beginning based on the part of the research outlined at Dartmouth, consisting in simplelogical structures and deterministic algorithms, has led the common user to identify the part with the whole and to attribute the characteristics of these to all the ICT, robotics and ANNs included.

The research on ANNs, the so-called distributed artificial intelligence, found a turning point in the second half of the 1980s, by a group of cognitive scientists led by two psychologists[17]. The newly developed mathematical functions for the learning of the ANNs finally offered the concrete possibility of implementation on artificial systems. Scientific research and technical realizations definitively started: the artificial systems that are able to represent themselves autonomously the reality, endowed with instruments of perception and conceptualization valid for each reality, able to act autonomously in them begin to originate and begin their development. The first legal realizations date back to the early nineties[18].

An artificial neural network is a dynamic logical structure, mathematically a graph, which simulates the structure of the brain. Usually a network is formed by a series of input units that receive the data related to a certain state of things, the description of a certain reality, for example a car accident. There are then one or more layers of hidden so-called units that serve for the calculation of the learning function, and at the output there are the units corresponding to the reality concerning the answers that must be given, for example the division of responsibility between drivers or owners of vehicles involved in an accident.Each unit of each layer is connected to each unit of the following one. There is then a set of prototypical examples of accidents accompanied by the relevant precedents on which the network must train and learn to give results similar to those of the precedents every

[17] RUMELHART, D. E.; MCCLELLAND, J. L. AND THE PDP RESEARCH GROUP, (Eds.). (1987). *PDP, Parallel distributed processing: explorations in the microstructure of cognition*. Cambridge MA: The MIT Press.

[18] ROMEO, F.; BARBAROSSA, F. (1994). "Simulation of Verdicts in CivilLiability". *Atti del Convegno della Società Internazionale di reti Neuronali, WCNN, San Diego California USA 5-9 Giugno 1994*, I: 432-436. Hillsdale N.J. USA: L. Erlbaum.GIACCIO, M.,ROMEO, F.. (1993). "Simulation of the human subjective judgement with neural networks, the computer plays the classifier, the sommelier and the judge". *Informatica e Diritto, 19, 2, 2:* 85-120

time the case is described. Learning works through error minimisation procedures. Once the network has learned to provide the correct answer for those examples, if they were representative of the whole, the network will be able to provide similar judgments to the jurisprudence even in cases not foreseen in the learning phase. For complex realities many layers of hidden units are needed and learning is called deep learning.

These structures are conservative, they report each new case to the past examples, to the precedents, and they judge in a proportionate (analogous) way to them. For this ability to adequately proportion the new solution to the new case the networks are called the science of the right weight.

The networks, however, provide a solution similar to that of jurisprudence, but do not justify it. The justification is reconstructed ex post with classical AI systems.

4. *Prediction and law: what changes*

In the context of the social and legal changes caused, feared or desired, by ICT and its scholars, a separate survey must be conducted on the use of these techniques in the activity of expressing, using or creating law. We can distinguish the six main roles in the legal field as a legal normator (or legislator), executor (or controller), judge or arbitrator or judicial mediator, lawyer, legal theorist, and citizen (or user). Six different roles and six different groups of needs to which the law must provide solutions. However, they are connected by the function of law itself, aimed at maintaining human social cohesion. A delicate and thoughtful role of meditation, as much as a layman closer to the cleric.

In the investigations on the subject, there is a fundamental questioning of whether the former can ever replace the judge or generally the jurist in all his current competencies and the way in which they are expressed. The question corresponds in the answer, in my opinion, to the question whether they will replace the man, and again, it seems to me, it is a road of long distance, for now.I would say, they will be mixed up with him.

There are several questions that we must ask ourselves today about these techniques, not whether they can replace man, but how they can be implemented in law and what are the primary and secondary effects of their use and of the innovations introduced. They must be thought of as a set of tools, but any introduction of them will generate changes that are necessary for them and unrelated to the will of the lawgiver.

The law will certainly change also because new operational horizons will be opened up in making and using the law and reality.

However, the concept of law itself changes. If we consider the most conservative theories on law, i.e. the natural law theory, from whatever perspective we look at it and with whatever purpose we do it, there is no longer any point of reference to which to fix our gaze – and the theory – because the nature of the thing changes, the nature of law changes and human nature also changes, i.e. the three roots of natural law change: there is no scientific horizon in which this can be denied.

It may seem bizarre to say that we are in presence of a change in human nature, but the cyborg manifesto was already a detector of it and with it transhumanism posed it as a desirable must be. The change is due to the possibility of continuous interconnection of individuals among themselves and with artificial systems, as well as hybridization between artificial and natural cognitive systems. That in this way the dignity of the person is violated is confirmation of the change1. The person, which is relationality, is now defined in his or her increased interconnection, which allows him or her to be 'enhanced', and therefore to differentiate himself or herself, as a potentiality, from an 'old type'. But at the same time, the person becomes more known and predictable, right down to the most exclusive intimate part. It thus necessarily changes the social coexistence of the old type. It is a question of their presence, rather than the actual exercise of these greater powers, this gives the result of a changed human nature that differentiates and does not make individuals as persons equal any more. Even not accepting the interconnection, as well as accepting it, would end up damaging human dignity, preventing a shared relationality. The problem is therefore the change of human nature, towards a new state that we are unable to outline. But neither are we able to reject these realities nor to forbid them: here the traditional legal technique based on norms as hypothetical judgments, or even binding precedents, if you prefer, is powerless.

The evergreen methodological debate on the possibility of a legal science, or of law as a science, must also be reviewed in the light of today. If it is true what I have said, that the legal rule can, and indeed must, be designed together with the technical rule, in order to preserve coercivity, then the creation of a legal science is certainly possible, but it must face the obstacle of the different cultural skills required, of the knowledge of methods and languages, including the logical and mathematical one, until now removed from the studies of the jurist. Loevinger with the Jurimetrics and Frosini with the Giuritecnica already proposed the change of horizons, but

with little success. If they had been listened to, today we would have a class of jurists able to think about the new rules, it did not happen, it is always worth the example of the unrealistic discipline of privacy and its failure[19].

Law theorized as science would give full meaning to legal predictivity, so legal statements would have, like scientific ones, their own predictive content on the occurrence of future events. It would be a recovery of the hypothetical evaluation of the rule on the occurrence of an event as a consequence of the occurrence of another event considered as a condition, in the scheme if A then B. The predictive function of law is nothing new, but the union between law and cognitive sciences would allow to recover, in a different way, also that predictivity towards the behaviour of the citizens that law has assured until now with the instrument of the threat of coercion and that in postmodernism has entered into crisis[20].

As far as the judging bodies is concerned, the image of the neutral judge, deeply rooted in history, and until today considered unshakable, must be revisited in the light of the cultural junction previously described. Neutrality means equal distance of the decision-maker with respect to two or more values. A position that can be logically resolved only if an event external to the decision-maker quantifies the importance of the two values differently. If the external determinant event is random, the unpredictability of the result is total. In any other case, however, we have different degrees of predictability. If a judge's ideological orientations are known, it is also possible to make more reliable predictions about his judgments. However, perfect equidistance is an ideal case and does not describe a probable human position. No judge, no arbitrator is neutral with respect to all the prejudices involved in deciding on the resolution of a dispute, nor on the judgement on the laws to be applied, nor on the weight to be given to principles in the interpretation of the provisions1. The challenge of today's machine learning is precisely to recreate in an artificial environment the same prejudices, the same non-neutrality of a human being, in our case a judge, possibly a set of judges representative of the judging class, that can be considered as prototypes. Speaking about neutrality in ICT, and particularly in the ANNs, is a real non sense: it is on the results of the discussion on the lack of neutrality, on the inev-

[19]LOEVINGER, L.(1949). "Jurimetrics the next step forward." *Minnesota Law Review* 33 (5): 455-493.; FROSINI V., (1975). "La giuritecnica: problemi e proposte." *Informatica e diritto* 1 (1): 26-35 1975.

[20]IRTI, N. (1979). *L'età della decodificazione.* Milano: Giuffrè.

itable subjectivity of the individual representations of the world and therefore on the subjectivity of the judgement, that these sciences are built today. The epistemological and methodological debate on human cognition, which took place within the cognitive sciences, of which AI studies are part, since the second half of the 20th century, has been decisive. It is a debate that has changed the scientific conception of man but also of reality. The hypothesis of cultural representation as a mirror to reality can be considered definitively rejected.

The non-neutrality developed in artificial machine learning systems is not without legitimacy. It concerns a set of subjectivity, therefore it finds legitimacy both in the sharing of the group used as a sample for learning, and in the results provided, in the case that they are equal to those of the subjects taken as prototypes. In this case the result of the judgement, more than simply the object of prediction, can become immediate. It is true that machine learning systems argue after the event. In them the justification of the decision is not the result of an argumentative process based on natural language, but of the calculation of a configured network and this is trained on jurisprudential instances, not on legal norms. In the decision of the ANN the rules serve only to communicate the decision and are used to communicate which legal reference brings or can justify the decision. This, however, is not a decisive point. The role of argumentation in the judge's decision has always been discussed and there is no evidence that it has heuristic relevance.

What stands out, however, is the more or less central role of a motivational or emotional part of the judge in the judgment, which cannot logically be inferred from legal provisions. Here the ANNs can help to bring out the role of the prejudices, of the emotions and of the subjective representations. The juridical research has removed or set aside or forgotten these hidden decision makers. It is also necessary to remember that the father of contemporary logic, Gottlob Frege, did not discredited their existence and their role in the argument, but declared them outside the possibilities of the logical research. The importance of this part of judgment in law has yet to be scientifically investigated and these systems can help the researcher to bring light[21]. The unpredictability of the legal solution released at the moment of interpretation and the crisis of the traditional instruments of legal certainty, such as, for example, the nor-

[21] FREGE, G. (1892). "Über Sinn und Bedeutung." *Zeitschrift für Philosophie und philosophische Kritik* 100 (1): 25-50, 29-31. GUASTINI, R. (2012). "Manifesto di una filosofia analitica del diritto."*Rivista di filosofia del diritto* 1: 51-65, 55-56.

mative technique based on the description of the fact[22], which have characterized the pos-modernity, seem to be turning towards the sunset. The cultural chiasma of cognitive sciences acts as an exchange and leads on another path. These sciences offer the jurist the possibility to efficiently regulate the behaviour of the individual by once again linking the validity of the provisions with the enforceability of the rules. The predictive tools of AI, such as, for example, the artificial legal advisor ROSS, are not only databases to be consulted, but also interpretations of databases in relation to concrete cases operated algorithmically. They provide case centered answers, adaptations of jurisprudence to new cases. This is a further step forward, which also allows for a significant increase in responses to the question of legal certainty.They also allow a preliminary legal request by the citizen on the behavior. The innovation also concerns law firms which, by offering advice online, can become an almost daily point of reference for the citizen. Even the evaluation of the opportunity to apply for a judgment would be influenced by the possibilities of alternative resolution offered by these techniques and by the forecasting of the results.

Predictivity can refer both to a judge's judgment and to the behaviour of individuals, as well as to events caused by individuals. Until now, these have been predictions about large numbers and not about isolated individuals, but today what was underlying them, namely the possibility of direction and prediction of individual behavior, comes to light. Already introduced with jury-making and with the use of statistical calculations in the analysis of human behavior, the prediction of a judge's judgment becomes reality with the collection of data in massive quantities, associated with their analysis on models of cognitive psychology. The profiling of a judge, based on his precedent, is an activity recently prohibited in France. Although motivated by the need to protect privacy, the full meaning of the prohibition emerges when considered in conjunction with the use of such data by judges' judgment prediction programmes to assist law firms. This activity of statistical analysis, which is at the heart of predictivity, was evident from the very beginning of jury-making, in its possibilities of technical use: today the possibility becomes real thanks to the computing power of computers.

As far as the prediction of the behaviour of individuals and of the facts caused by them is concerned, the present passage towards the society of Big Data and the Internet of Things offer really massive scenarios of control and direction.

[22] IRTI, N. (2014). "La crisi della fattispecie" *Rivista di diritto processuale* 1: 36-44.

5. The new procedures towards the values of the individual

The sensitive point of normativity remains to be analysed. These artificial systems turn to humans' past and base their experience and learning on it. Human beings are certainly also built on this past, but their tension towards the future is an expression of the needs of the entire genetic-biological-cultural whole that constitutes them. On this man desires and places the teleology of his own action, his own normativity. Artificial cognitive systems bring each new experience back to the past, humans build their future in a different way from the past.

It is possible to imagine a hybridization but not a normative unity, a sharing in the same destination but not a unity of paths. The dissonance between the two systems, biological the one and artificial the other, remains.

A new path, partly resolving the dissonance, can be offered by a more radical change in law, rethinking its current limits, which are those of an all-human system, in which even the third party of the judge is unable to resolve itself in an absence of emotional involvement.

The law is designed on these limits. It would be otherwise, but it is also now in some cases, if value appreciation were completely separated from the formal or procedural moment and left to the parties themselves, instead of the judge and the law.

Each party would retain its exclusive authority in the evaluation of its own purposes, interests and values in the judgement and the judge – or the algorithm – would be the guide in a path that would lead to the coincidence and satisfaction of the different positions.

This is what is proposed in procedures based on equitative algorithms, where the parties establish their own interests and values and the algorithm devises a procedure that would bring the parties' demands to satisfaction.

The field is well researched and there are already some proposals of legal relevance1. The interest of these procedures is clearly limited to civil and commercial law, but here a general rethinking on the role of public intervention in the administration of justice is possible. Certainly, in such cases, would justice be individualized, tailored to individual value judgements and interests, a return of unpredictability?

The expression 'equitative algorithms' refers to a set of algorithms that can be used in the legal field for the resolution of conflicts in which it is possible for the parties to freely assess their own interests and values to be protected. In other words, we are faced with equitative algorithms whenever a dispute is algorithmically resolved and the parties, freely and independently of each other, have established their

own order of values with respect to a set of assets and rights. It is possible that there are external limitations, coming either from the market or from the law or from the *de facto* relationships between the parties, but these can sometimes be taken into account by the chosen algorithm.

Equitative is a neologism in the English language, created by the CREA group, which launched the project with the same name[23]. The neologism helps for purposes of univocity of meaning. The words equity and equitable have a very long history behind them, which intertwines, and sometimes knots, with that of law and justice[24]. Since the second half of the last century, their meaning has been enriched with new dimensions thanks to the studies carried out in Decision Theory, Game Theory and Economic Analysis of Law. We considered it appropriate to find a new word to focus and bound this new branch of legal studies.

Equitative algorithms are daughter and debtor of fair division theory and algorithms[25], as outlined by Steve J. Brams and Alan D. Taylor[26]. Fair Division has an original approach, which naturally leads it to budding branches and secondary theoretical suckers in many disciplines. In fact, according to them, its methodological approach "involves

· setting forth explicit *criteria*, or *properties*, that characterize different notions of fairness;

· providing step-by-step *procedures*, or *algorithms*, for obtaining a

[23] The project CREA has received funding from European Union's Justice programme 2014-2020, under grant agreement No. 766463. This book provides some of the most important achievements of the research, www.crea-project.eu.

[24] The history of the idea of aequitas is well investigated in literature. This research regains the connection between the emotionality of the parties and the rationality of the legal order in the formation of the judgment. In this insight, it is perhaps a return to the Roman concept of aequitas, before Irnerio and the school of glossators in Bononia.

[25] The origins of the FD, like every origin, are discussed and can be traced back to the starting point of European philosophy: the philosophers of ancient Greece, in particular Aristotle. MOULIN H. (2004). *Fair Division and Collective Welfare*, The MIT Press, Cambridge (MA).

[26] BRAMS S. J., (1990), *Negotiation Games, Applying Game Theory to Bargaining and Arbitration*, Routledge, Oxon.; BRAMS, S. J.; TAYLOR, A. D. (1996), *Fair division: from cake-cutting to dispute resolution*. Cambridge University Press, Cambridge (MA); BRAMS STEVEN. J., (2012), *Game Theory and the Humanities. Bridging two worlds*, The MIT Press, Cambridge (MA).

fair division of goods or, alternatively, preferred positions on a set of issues in negotiations; and

· illustrating these algorithms with *applications* to real-life situations[27]".

Beyond the considerations specific to each of the scientific fields involved, from Decision Theory to Social Sciences, from Economic Analysis of Law to Political Theory and Legal Science, Brams and Taylor's Fair Division is important for bringing these three steps together in a single theoretical moment.

The Fair Division is applied to conflict resolution, but lacks a theoretical-practical legal basis that can make it an instrument of general application in the legal field.

The problems that arise when comparing these procedures with traditional legal dispute resolution procedures are manifold. Among others, it is necessary to clarify immediately those arising from the meaning of fair and equity, which have, in the legal field, strong theories dating back a considerable length of time and which cannot be ignored.

Equitative algorithms theory intends to apply the Fair Division in the legal field, analysing and hopefully solving the legal problems related to its application.

As said before, the choice of the neologism, equitative instead of equitable or equity, serves, in the legal field, to separate the concept from the traditional connection with ethical or historical legal issues, avoiding misunderstandings. It also avoids misunderstandings with the rigorous definition adopted by Brams and Taylor for equitable in the Fair Division theory: "[a]n allocation is equitable for two players if each player thinks that the portion he or she receives is worth the same, in terms of his or her valuation, as the portion that the other player receives in terms of that player's valuation. If the two players have different entitlements, equitability means that each player thinks that his or her portion is greater than his or her entitlement by exactly the same percentage[28]".

A proposed dispute resolution that can be accepted as fair by the litigants requires conditions that are often less stringent or limiting than those imposed by Brams and Taylor's equitability, since those required by envy-freeness are sufficient: "An allocation is envy-free if every player

[27] BRAMS, S. J.; TAYLOR, A. D. (1996), Fair division: from cake-cutting to dispute resolution, cit., p. 1.

[28] BRAMS, S. J.; TAYLOR, A. D. (1996), Fair division: from cake-cutting to dispute resolution, cit. p. 241.

thinks he or she receives a portion that is at least tied for largest, or tied for most valuable and, hence, does not envy any other player[29]".

6. *The last step forward: equitative algorithmic systems and the law*

Every theory of law gives it only a partial look, closed within the limits useful for the methodology's validity. The use and development of a future equitative algorithms theory is possible only by giving the law an overall view; however, while new and wider boundaries are valid for equitative algorithms, it still has to take all the necessary steps to transform fair division systems into legal procedures. We cannot limit ourselves solely to the utterances, neither to their meanings, nor to their validity nor to the effectiveness alone. We need all of that.

The pivotal point in the equitative algorithms, which differentiates them from other legal algorithmic systems, is the possibility of leaving it to the parties in establishing the order of interests, or, in general, of the values that they most prefer. Western legal systems have frequently taken away from the citizen the possibility to intervene in the process to modify the order of values established in the law, often even when this was not necessary for reasons of protection of the weaker party or for other constitutionally guaranteed reasons. Reasons of streamlining and speed of proceedings have supported this choice, or even the principle of uniformity of law. The judge, after hearing the parties, after hearing the experts, assesses and decides, attributing assets and rights according to his own evaluation, together with that of the experts.

Equitative algorithms, instead, allow a new kind of stating law or giving justice, in which the individual and subjective emotional and value part, different case by case, is present and often diverging from the one contained, as standard, in the legal texts.

In the representations of jurists on how Artificial Intelligence or even, simply, algorithms, would be inserted in the trial, the image that arose was always that of a replacement of the different actors of the trial, from the judge to the lawyer, with artificial systems able to carry out those mental operations that, until then, were considered peculiar to man. In our case, such representations don't hit the mark, they are misleading. The change can be much more radical. These algorithmic systems do not follow the legal solutions already socially and politically shared, but, instead, they

[29] BRAMS, S. J.; TAYLOR, A. D. (1996), Fair division: from cake-cutting to dispute resolution, cit. p. 241.

create new ones. These systems do not simulate human action or the human mind artificially; they are not a copy of the human being, whether of the judge, the lawyer, the legal advisor, or the administrator. They find new solutions tailored to the parties, their needs, wants, interests and values.

Here the parties do not delegate to the legislator how to protect their own interests, because they decide, scale, order interests and values, remaining the legislators in their own right. It is immediately clear to the jurist that much discussion is needed here about the admissibility of these systems in Western legal systems. Justice would again become a justice of the individual case, where different orders of interests and values will lead to different legal solutions in the same case.

The contemporary state's paternalistic role would crumble, granting a generalised 'age of majority' to its citizens. At the same time, the right, the solution of the case, would be charged with all that emotionality that the parties, in the current procedures, must remove.

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RIMANTAS SIMAITIS* – MILDA MARKEVIČIŪTĖ**

INTRODUCING EQUITATIVE DIVISION ALGORITHMS INTO THE LEGAL REALM

Abstract Dividing assets are a common task of legal dispute. However, it is not purely legal task due to the fact that the law regulates (i) the substantial rights of interested parties and (ii) the procedure pursuant to which the dispute shall be governed. The decision how the assets shall be divided is usually up to the good-will of the parties or up to a judge/arbitrator/mediator and is not regulated by procedural rules because it is not a question of law. On the other hand, legal rules are supported by or integrated with advancements in other fields by limited scope only. Fair and equitable division as a mean to solve everyday issues related to division of assets have been analysed for more than a century and even become an object of new scientific fields but their findings are not being used in order to develop legal system. In this article we discuss the challenges and opportunities that are to be faced if a decision to integrate fair division algorithms into mediation and civil procedure. Firstly, we analyse different aims and different approaches that parties/agents have in purely legalistic or algorithmic field. Secondly, we discuss potential benefits of algorithmic approach. Thirdly, we present main challenges and risks that such integration might have. After this analysis we draw the conclusions and recommendations related to introducing equitative algorithms into the legal realm.

1. *Introduction*

For more than a couple of decades equitative division algorithms are being developed. Many mathematical models have been created. Some prototypes of software where such models are implemented are available as free samples or integrated already into web applications offered for users. Nevertheless, these achievements of mathematics, economy and informatics sciences are barely known to the legal science and practice. It was among CREA's[1] project aims to investigate field and scope of possible use of fair division algorithms, create new type of algorithmic division models that would be more easily adopted

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[1] For more information please see http://www.crea-project.eu/.

by legal practice. In this article we focus on examining of main roadblocks for introduction of CREA and analogous types of algorithms into legal realm and elaborate on methods and means to overcome them. This analysis is a part of a more complex attempt to pave a way for innovation transforming legalistic methods of division of assets, increasing their efficiency and user-satisfaction.

We will start our analysis by comparing aims, criteria and methods that are applied in the legal way and the algorithmic way of division of assets. Analysis is furthered discussing benefits that may be used for advancement of legal methodology and instruments related to division of assets. In the third part we expose types of key issues and their solutions to integrate algorithms-based property division methods into legal field. After this analysis we draw the conclusions underlining main ideas of the analysis.

Both authors have legal background. Therefore, they use legal analysis methodology in this paper.

2. *Differences of legalistic and algorithmic division*

For purposes of this part of analysis it is sufficient to compare one example of division of assets in one jurisdiction and one type of disputes how this problem would be settled by legal means and in contrast by algorithmic means. Let us take a case of division of assets owned jointly by spouses. We will base our analysis on Lithuanian legislation and legal practice.

Division of such assets in accordance to Lithuanian legislation may be achieved by parties making agreement on the subject though a premartial or a post-martial agreement, or by a judge handling a dispute in case of parties' disagreement[2]. Judicial control and a power to decide over the matter in case of disagreement of parties is established as a mandatory rule. Lawyers, mediators, experts and/or other professionals might be invited to assist, but the last word on the final resolution of a problem of division of assets lies within discretion of a judge. We can draw an important conclusion from such a legal setup. A power of qualified independent judge to rule upon a legal problem of division of assets is perceived as a fundamental guarantee safeguarding fairness and legality of this exercise.

From substantial point of view division of assets shall satisfy certain criteria established in the statutory law. Articles 3.116-3.127 of the

[2] Article 3.116 of the Civil Code of Lithuania. Available via Internet: <https://www.e-tar.lt/portal/lt/legalAct/TAR.8A39C83848CB>.

Civil Code of Lithuania[3] set up a number of relevant criteria and rules. Below we will point out the most significant ones for our purposes of comparison of legal and algorithmic division of property:

1. assets are divided in kind if this is possible not damaging items that have to be divided, taking to account value of items and shares of spouses in joint ownership;
2. value of goods is determined as a market value;
3. if it is not possible to divide in kind, monetary compensation will be established;
4. shares in join ownership are presumed to be equal, but it is possible to deviate from this on the basis of important circumstances, such as interests of minor children, health condition or wealth of one of the spouses or other relevant factors.

These criteria put a legal, logical and economic framework to a discretionary power of judge to rule upon the issue. Nevertheless, some rather significant questions remain unanswered by the law. To what extent parties' preferences have to be taken to account? Is maximisation of utilisation of assets after division by the parties is relevant? How to determine market value? Needless to say, such soft questions as emotional side of the distribution is not considered as legally relevant. If parties agree on these additional hard and soft criteria, they may apply them. If not, judge's subjective assessment of formal hard criteria established in the law and of all other criteria which judge finds relevant will determine the final result of division.

Legal style solution of division problem aims at ensuring legality, equality, efficiency and fairness of division within a reasonable time frame and at a reasonable cost. Intervention of a judge with decisive power ensures that the division task will be efficiently accomplished even in situations of stalemate of parties or default of one of them. Authority vested by law in judicial decisions out-weights possible disagreement of any party. In exercising its decisive authority judge has toprovide motives for particular result explaining and substantiating it. Obligation to give motives acts both as a tool to convince parties to accept the decision on one hand, and to justify the decision in eyes of society or any outside observer on the other hand.

In case of algorithmic division of assets parties' preferences are the most significant factors. Algorithm designed in the CREA project allows to express such preferences by numeric value of bids in a predefined range or by qualitative value of five stars. Possible range for bids might correlate to approximate marked value of particular items, but

[3] Available via Internet: <https://www.e-tar.lt/portal/lt/legalAct/TAR.8A39C83848CB>.

do not have to match it exactly. Parties place their bids or stars individually on each idem included in poll of assets for distribution. To increase efficiency, fairness and reduce manipulation as well as envy, values of preferences are assigned confidentially, not disclosing them to the other party before calculation of the final result. Allocation is performed by mathematical calculation and comparison of values of preferences allowing for fair, *Pareto* optimal, envy-free and manipulation-free allocation.[4]

Let us give more examples of fair division algorithms designed earlier. In the end of the last century Steven J. Bramsir Alan D. Taylor created an algorithm called the *Adjusted Winner*. It enables fair division of any number of items between two persons. First of all, goods or issues in a dispute are designated. Then parties indicate how much they value obtaining the different goods or "getting their way" different issues by distributing 100 priority points across them. This information might be or might not be confidential. Priority points are used determine winners of specific assets/issues who gave more priority points. In the adjustment phase transfer of items or fractions of them is made to achieve equitable allocation until points of both parties put on items of parts of them become equal. The order in which items are transferred is determined by certain fractions corresponding to items that the initial winner has and may have to give up. They start adjustment transfer from the item with a smallest fraction and continue until both parties get items corresponding to equal number of points. This algorithm is characterised by authors as ensuring fairness, efficiency and elimination of envy.[5] Software prototype is available online.[6]

B. Knaster and H. Steinhaus developed the *Sealed Bid* procedure, which consists of distributing various quantities of indivisible items among any number of participants based on who offers the highest price for each particular item. The discrepancies between values are mathematically smoothed by monetary compensations.[7]

The *Nash Product Maximizer for Divisible Items* is developed by A. Bogomolnaia, H. Moulin, F. Sandomirskiy, and E. Yankovskaya. It is designed to divide any number of divisible items between any number of participants on the basis of the public price assigned to each prod-

[4] CREA Handbook containing the result of the research. *CREA project materials*, 2019.

[5] Adjusted Winner Website – NYU. Avalaible via Internet: <http://www.nyu.edu /projects/adjustedwinner/>.

[6] Ibid., *Try It* chapter.

[7] DALL'AGLIO, M.; DI CAGNO, D., FRAGNELLI, V.*Report on State of Art of the Game Theory Tools. CREA project materials,* 2018, p. 16, 17.

uct (such as the market price) and the portion of the total budget allocated to the participants in the distribution. The distribution is made to the participants in the process using their assigned budget, indicating the cost of the items or parts they wish to receive, and the allocation is made to each participant based on the maximum *Nash* social welfare function calculated by *convex* programming techniques. This asset allocation ensures result which is *Pareto* optimum, proportionate, envy-free, manipulation safe and *Competitive Equilibrium with Equal Income (CEEI).*[8] There is also the *Nash Product Maximizer for Indivisible Items*.[9]

By contrast to the legalistic approach, algorithmic approach to division of assets has several important distinctive features:

1. Active inclusion and participation of parties to evaluate and express their preferences;
2. Identification of individual utilities of particular asses to the parties;
3. Parties preferences is the most significant factor affecting allocating of items;
4. Significance of ensuring fairness by maximizing utilization of goods after distribution, reduction of envy and safeguarding from manipulation;
5. Application of mathematical transparent methods for allocation, that are based on achievements of mathematics, economy and informatics sciences.

The algorithmic division method revolves around parties' choices, preferences and sympathies. It is built around parties and try to satisfy their needs instead of pleasing a judge's. Parties are the ones who control it. Such method is focused on facilitating parties' agreement on solution of the problem. This is quite significant difference between the two analysed approaches, focus may shift from judge-centric to parties-centric when you replace legalistic method by algorithmic.

In current stage of evolution algorithms themselves are not capable enough to provide a finite set of rules and procedure on how to divide assets from the start of solution of related issues to the very end. They can offer only one piece in the larger spectrum of actions that have to be performed by parties and other persons. The legalistic method is more elaborated. It offers full-cycle of comprehensive procedures to resolve division of assets issues from beginning to the end.

As was mentioned in the introduction of this article, fair division methodologies and prototypes are developed for many decades al-

[8] Ibidem, p. 26.

[9] Ibidem, p. 26, 27.

ready. By now this movement is still alien to legal realm. Techniques and procedures used on an industrial scale do not include algorithmic division element.

The landscape of practicing law in recent years started to change dramatically. Digitalisation and automation of practicing law became and remains hot topic in field of transformation of legal practices. This tendency is growing. Fair division algorithms represent one type of algorithmic decision-making tools. In this classification it is relevant to note, that algorithms as described above are pre-defined and transparent. On one hand, it means that they are less flexible and adaptable. On the other hand, such features create less issues of ethics and legitimation connected to lack of transparency, explainability and human control.

3. *Potential benefits of algorithmic approach*

Use of algorithmic tools for division of property as discussed above are aimed at improvement of satisfaction of parties to a dispute and transforming a division problem into a mathematical task. Among other things, it aims at achievement of more optimal distribution of utilities. On the other hand, such mathematical exercises strive to reduce envy, ensure better efficiency and safeguard from manipulation. These features create better user experience in the process of distribution and higher reliability of the final result. Undoubtedly, such features can be regarded as benefits.

Another meaningful angle to discuss here is combating uncertainty. Algorithmic way of dealing with a problem provides for a higher level of definability, certainty and parties' control. In general, these are the same aims legalistic division of assets pursues as well. Clients of legal system resort to legal means to overcome uncertainty and provide them clear predictable answers to their claims, but in conventional context of distribution of assets certainty quite rarely might be offered. Let us take a closer look at that.

In litigation process parties are expected to combat over proving their rights and different positions in front of a judge. Decisions on the substance of a matter is made by a judge, not by parties themselves. And these decisions do not necessarily match propositions of decisions and offerings brought by the parties. This in reality leads to escalation of tensions, growth and deepening of a dispute. Fighting-mode result is generated depending on multitude of variables. Many of them, such as subjectivity and discretion of a decision maker, does not give up for exact calculations, predictions and control by parties as ultimate beneficiaries.

In conventional negotiation process which is positional bargaining parties play a game of "selling" discounts. Some commentators call this as a manipulation or "dancing" over discounts. Uncertainty, unpredictability and distrust normally accompany such interaction. Mediation processes and interest-based negotiations try to mitigate these negative aspects by amplifying positive emotions and focusing on true interests and needs of the parties. Providing parties more control and understanding about their dispute create higher level of certainty. This at the same time relieves tensions and empower settlements.

Distribution of assets via predefined algorithmic tools such as designed in CREA project presuppose users' agreement to apply mathematically exact rules. By enabling this algorithmic way of solution of a problem it has *a priori* higher level of certainty. Parties actively participate placing bids or preferences so triggering application of formulas for calculation of a result. They are more involved in shaping final decisions. Their choices directly affect the result. These links can be traced down and exposed whenever needed.

Disputes' avoidance and de-escalation are other positive features that deployment of the analysed tools may bring. When parties' interaction for solving of a problem is channelled to application of exact rules and procedures, this by itself close a gate for a conflict to grow. Establishing clear rules, procedures, introduction of institutions, active involvement and common interaction are classical measures applied for prevention of conflicts. Direction of parties' energy towards using procedures and user-friendly engaging tools of constructive resolution of a problem may solve a problem in the very initial stage of its evolution. One the other hand, the same effects can heal an already existent conflict.

Finally, cost-saving and time-saving effects can also be achieved. Properly selected and balanced algorithmic tools may offer simple and fast procedure to resolve complicated issues. If successful, parties will spend less time and money. "More for less" and "time matters" are significant pressure factors on all providers of services in a modern XXI century context. In this environment introduction of algorithmic means would be very timely to answer that pressure.

4. *Challenges and risks*

There are many roadblocks in bringing any innovation into life. They might be of economical, technical, psychological and legal nature. We can distinguish three groups of main challenges that stand on a way of introduction of algorithmic division of property into the legal field:

1. Technical;
2. Legitimation;
3. Integration.

The first set of challenges - technical issues. In our perception as law experts this group encompass defining the field of use of using algorithms (a "playground") for fair division, designing suitable and efficient algorithms, their adaptation, solving issues with automation, creating software, funding of these R&D activities and maintenance of new tools.

As was elaborated in the first part, methodologies and criteria significantly differ between legal and algorithmic division tools. Therefore, one of the main tasks is identification of a scope in which algorithmic division would be valid and meaningful. Issue on definition of a "playground" for algorithmisation as a legally adding value means may be elaborated in two directions.

The first one – application of algorithms in the field where parties have wide discretion for an agreement and where they may be interested to opt in for using algorithmic tools. In private law sphere such field is quite wide. In the example analysed above about division of joint property owned by spouses mandatory, rules normally are switched on only in situations of parties' disagreement. In this context algorithmic tools would be valid as a smart assistance technology in negotiations, mediation and conciliation. *Ex post* adjustments of results of algorithmic division would be necessary only if parties would be dissatisfied with them, if they would create results deviating from previous parties' agreements (e.g. pre-marital or post-marital) or if such results will contradict to a few mandatory rules limiting parties' free discretion.

Another direction – possible integration of algorithmic methodologies as assistance tools for judges and parties in litigation. This task is more complicated because of the existent tight legal framework. Algorithms are still obscure to laws on division of assets. Both procedural rules and substantial rules do not prescribe them.

Legal analysis performed in the context of the CREA project uncovered that there are significant differences in legal regimes among European Union countries of distribution of property even in quite narrow fields, such as division of property owned by spouses and division of inherited assets. On top of that, regulatory regime prescribing set of default rules to follow might be modified *a priori* by such instruments as pre-marital and post-marital contracts. This creates more complex legal framework for deployment of any automation methodologies and technologies. Results generated by the CREA algorithms have a much higher chance to deviate from this complex of mandatory

statutory law and contractual special rules. Thus, in very restrictive substantial law framework applicability of algorithms such as CREA's tools or analogous in their pure current state would be quite limited. *Ex post* adjustments performed by a judge to the algorithmic allocation results seem to be unavoidable. What methodology should be applied for these adjustments, to what extent they could fix problems or create more of them is still untested and unclear.

Another option of using fair division algorithms in courts - to treat results of algorithmic allocation as a part of relevant material among multitude of other facts that may be considered and assessed by the judge making his/her own discretionary decision. In this case legal framework and existent patterns of courts' work would require less modifications. Piloting may be performed without any legal modifications. At an initial integration stage, it seems more appropriate and easier to handle.

Designing, testing and adaptation of fair division algorithms for many years was a non-legal task. In a context of the CREA project the CREA team tried to consider this issue as an interdisciplinary one, including legal dimension. In course of the project decision was made that in order for the algorithms not to lose their positive implications they should not be squeezed into a narrow framework of rules for legalistic division. More prospective vector was to improve existent algorithms following the same pattern of their design based on game theory and behavioural economy rules. CREA algorithms were intended to be more user friendly and flexibly applied in variety of contexts. Therefore, they can be used for division of property among two or more persons/agents and can cope with division of both divisible and indivisible items. Such methods of division of goods might fit into the legal playground as elaborated above in this chapter.

Needless to say, designing of workable automation patterns, creation, upgrading and maintenance of the software, R&D and piloting activities require substantial funding. Recent attempts to launch commercially sustainable IT products were not very successful and, to the best of knowledge of the project team, they do not extend to Europe. It would seem more promising that at least part of the total cost comes from public funding, allocated for designing and upgrading of e-justice and ODR platforms.

Another challenging dimension is legitimation. Dispute resolution in courts is a domain where public law rules apply. One of the fundamental principles here stipulated that allowed are only actions that are permitted by law. As a consequence direct prescription is necessary in procedural and substantial laws of all of the procedures, tools and rules that may be used for dispute resolution.

In substantial law it would be useful to establish that preferences of parties and better / maximised utilisation of items after distribution should be added to a list of criteria for allocation of property. Such modification would not be very significant on a large scale, but it would be sufficient to open a gate to introduce tools and methodologies to extract this information on a scientifically reliable basis. Further transformation of laws might come as automation and modernisation of this field will develop. It would be difficult to speculate what changes would be reasonable before thoroughly testing and piloting algorithmic property division tools.

From a procedural point of view judges in conventional civil procedure setup do not have right and power to invite or obligate parties to use algorithmic division tools. Unless in pilot projects courts and individual judges would lack sufficient procedural legal ground to introduce use of any algorithms in their cases. Rules and procedures shall be created enabling judges to invite or obligate parties to express their preferences by using special tools such as CREA or analogous tools.

In negotiation and mediation processes techniques and tools might be used more freely and flexibly. On the other hand, in order to avoid any doubts or speculations about possible manipulations or any other flaws in using game theory-based methodologies and tools it would be purposeful to allow their use in special laws or bylaws.

Risks connected to potential breaches of fundamental human rights shall be considered and dealt with. Automated decision-making systems has to be transparent, explainable, safe from manipulation and discrimination. One of the ethical principles for use of AI in judicial field, recently promulgated by the bodies of the Council of Europe, is "under human control"[10]. This principle by analogy may be extended to non-AI decision making systems and methodologies as well. Fundamental rationale behind "under human control" principle is equally valid for all automatic decision-making tools.

In a long run accreditation schemes on certifying of algorithmic tools for use in official proceedings may be useful. At current stage when only a small handful of prototypes exist and their use in practice come as an experiment, such accreditation would create unnecessary burden. But if these practices will grow in variety and numbers, accreditation may ensure reliability and trust.

The third group of challenges is connected to issues of integration into ways how legal procedures of division of assets are organised and

[10] CEPEJ European Ethical Charter on the use of artificial intelligence (AI) in judicial systems and their environment. 3-4 December, 2018. Available via Internet: <https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c>.

managed. Automation brings disruption of existent *modus operandi* of legal professionals. It inevitably faces doubts or resistance in critical cases. These problems are not easy to deal with. Change of attitude and transformation of patterns of professional activities into new ones requires creativity and time.

Creating demand and awareness for new technologies, as well as promoting of benefits cannot be concentrated on users only. True gatekeepers for transformation of ways how law works are judges and lawyers. They should be treated as equal targets for modernising ways how their business is organised and operate. If algorithmic tools will be integrated into daily activities as positive novelties in comprehension of legal professionals, these novelties can claim to take root. On the other hand, tools and methodologies extinguishing participation of lawyers and judges, taking down their control over matters traditionally entrusted and valuable to them have many risks and chances to be blocked.

Training, education and piloting with an aim to create and transpose new models of work comfortable for judges and lawyers shall accompany introduction of algorithms into legal field. On top of education various incentives for users and legal professionals to start and continue using algorithmic tools might be necessary to ensure success.

Efficiency of such strategy to apply complex measures of incentivizing, raising awareness, training, creating motivation targeted on the first hand at legal professionals, creating their new modern work patterns has not only theoretical roots. It is also confirmed by a real success' stories. Let us briefly discuss one of them. In the middle of 2013 Lithuanian courts launched an e-filing service connected to the Lithuanian e-courts IT system LITEKO. No obligation was imposed on any private litigant or their legal representatives to file documents digitally. Instead of that, start of the system was marked by introducing a statutory right to submit any procedural document to court in civil and administrative proceedings digitally through this new at that time service of LITEKO system, a statutory right to get documents from courts digitally through access to e-files kept in the LITEKO system and corresponding obligation of courts to digitalise all procedural documents received in courts in civil cases within three working days.[11] Litigants were incentivized to file documents digitally by introducing 25 percent discount on state filling fees in case of pure digital filling. At the same time obligation to receive service of procedural documents from courts was introduced to "professional" litigants - lawyers, notaries, bailiffs, financial institutions and insurance compa-

[11]Article 37[1] of the Law of courts of the Republic of Lithuania.Available via Internet: < https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.5825/asr>.

nies. In designing, tuning and piloting of the new e-services judges and lawyers were heavily involved. Launch of the system was preceded and followed by massive training and awareness raising campaign targeted at all judges, court staff, lawyers, notaries and other "professional" litigants. This led to success rates designers and administrators of the system had only in their brave imagination. Number of civil cases filed and handled only digitally reached 33,91 percent in 2014, 50,35 percent in 2015, 65,59 percent in 2016, and stabilized at figures over 72 percent in 2017 and the following years.[12] Initial resistance and doubts mainly expressed by the same target group in quite short period of couple of years shifted radically to high support to the e-filling and digital files. Analysed e-services of LITEKO swiftly became recognized not only as formal statutory rights, but as indispensable tools in everyday work of every Lithuanian lawyer acting in courts.

5. Conclusions

Bringing equitable division algorithmic tools into legal realm might invoke significant benefits for users. It can ensure more optimal distribution of utilities, better satisfaction of parties' interests and needs, reduction of envy, safeguard from manipulation. On top of that, allocation of assets based on scientific methods and last achievements of economics and mathematics can reduce uncertainty, increase reliability, save costs, time and prevent from escalating of conflicts. Nowadays all service providers are highly concerned with improvement of user experience. Introduction of algorithms into division of property can offer this.

However, recognition of such benefits for one group of payers active in a field – users/parties – is not sufficient to make this transformation happen and bring all the benefits to life. There are number of multifaceted roadblocks to deal with on a path to innovation of legal practice. Besides challenges of pure technical and legal nature there are issues of attitude, inert *modus operandi*, and possible resistance of legal professionals to any disrupting of their patterns of work.

Creative and sensitive style of dealing with these issues can pave a way for transformation of legal reality. Authors suggest that legal professionals should be actively included into testing, piloting and bringing to life of new tools that will be transforming their activities in the fu-

[12] LITHUANIAL NATIONAL COURTS ADMINISTRATION. Annual reports of performance of Lithuanian courts of 2014-2018. Available via Internet: <https://www.teismai.lt/lt/visuomenei-ir-ziniasklaidai/statistika/4641>.

ture. Judges, lawyers and other legal professional are strong gatekeepers for any innovation in dispute resolution field. Providing opportunities to adapt methods of how judges, lawyers and other legal professionals create value and earn for living is essential element for success. It would not be wise to introduce new algorithmic tools as job-takers. Such initiatives have high chance to end up with nothing or lead to a long-lasting distress which would be even more embarrassing. Enabling legal professionals to maintain in the loop, perform more efficiently with help of modern technologies would create right environment for fair division algorithms to root into legal reality.

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USE OF ALGORITHMS IN DISPUTE RESOLUTION: ASSUMPTIONS AND METHODOLOGICAL COMMENTS

Abstract Use of Artificial Intelligence (hereafter AI) techniques in order to resolve disputes (a task traditionally and strictly reserved to judicial organs) and not only as a tool, e.g., for legal research, affects our deepest convictions and long-standing practices about what the law is and how it is applied; however, use of such techniques (as within CREA project[1]), with appropriate caveats, can be fruitfully accommodated within our legal and philosophical tradition and assist law's efficient operation: the CREA algorithm is a human artifact: the algorithm does not think autonomously and "by itself", but only processes data introduced by humans; the "cognitive subject" is ultimately, always "human". It assists in the resolution of disputes arising in the process of distribution of goods in divorce and inheritance; it is not an overall proponent of wholesale application of AI in dispute resolution in every field of law. In a prejudice-free manner, it is fruitfully based on principles of classical economics (such as Pareto optimality), respects the volitions and rights of the parties (in line, e.g., with R. Dworkin's conception of law, but, also, with ideas of governance and legal pluralism), while, at the same time, being realistic (in line with principles of legal realism and of a largo sensu utilitarianism). The model fully respects the existing legal framework (both substantive and procedural) in force, providing a complementary tool within relevant common frameworks at European level; while respecting positive law, it aims at satisfying the need of quick and efficient resolution of disputes.

1. *Introduction*

Use of artificial intelligence (in the form of algorithms or other) in legal processes is gradually acquiring an overriding significance; in particular, use of AI techniques in order to resolve disputes between parties (a task traditionally and strictly reserved to judicial organs only) and not only as a tool, e.g., for legal research, affects our deepest convictions and long-standing practices about what the law is and how it is applied; and it is certain that for a wide part of legal theorists (especially between the ones that insist on the close connection between evaluative or moral principles and the law) and practitioners this

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[1] Conflict Resolution with Equitative Algorithms.

sounds somehow shocking and worrying; in the present, and with particular reference to the "CREA project", we will try to "de-mystify" such processes and alleviate such worries, drawing from theories and practices of this very same legal tradition: in our view (and though we initially share the same worries), use of such techniques, with appropriate caveats, can be fruitfully accommodated within legal theory and philosophy, while providing an important assistance to the implementation of law's operational framework.

2. *Preliminary remarks: Artificial Intelligence (AI) and law*

2.1 The expression of concern and worries on the potential application of AI in resolving legal disputes, tacitly presupposes that the application of law cannot be "automatic" or mechanical; it rests, i.e., on the assumption that legal reasoning is part of practical reasoning in general; and that this latter, as expressing a fundamental reflective or quasi-reflective relation between thought and (human) action cannot be reduced to a mechanical, automated process: human affairs, the domain of application of practical reason, "could always be otherwise", and the changing circumstances and particularities of every decision do not allow their standardization and, a fortiori, formalization in mathematical terms and models: usually, when it rains, we go out with an umbrella or wearing a raincoat; this is the "rational" thing to do, also according to the relevant predominant practice; but, on the other hand, for any reason (equally rational), maybe because I love the purity of the rain or because I want to be "singing in the rain", I decide to go out with no umbrella or raincoat; in a similar way, relevant-to-law actions present individualized, particular characteristics; this is particular acute in penal law cases; but even in more simple cases, e.g. while sharing goods in the process of a divorce, one party may value, e.g., a book or a record (of a petty market value) more than a luxurious sport car; and, accordingly, the judge or the mediator has to understand these choices and particularities in order to reach a relevant decision and resolve the dispute. In general, as law has to do with human action and practical reason, it inevitably necessitates the understanding of human action from an internal to the actor, **"hermeneutic point of view"**[2]; obviously, the first, prima facie objection, to the application of AI in resolving legal disputes stems from the view that human action cannot be "understood" (and, a fortiori, "empathized')

[2] Cf, totally indicatively, Hart (1961), Mac Cormick (1978) and (1981), Ricoeur (1977), Winch (1958)

by a machine and practical reason cannot be classified with the use of mathematical models.

2.2 A second, prima facie objection, is related to the so called **"defeasible character"** of legal rules and concepts (also connected to their "open texture")[3]: legal concepts cannot be analyzed and defined in terms of necessary and sufficient conditions of their application and the word "etcetera" is indispensable in "any explanation or definition of them"[4]; equally necessary in this effort, is the word "unless": though

[3] I would like to thank Andreas Takis, Assistant Professor of Philosophy of Law in The University of Thessaloniki, for pointing out this contradiction between the defeasibility of legal rules and the binary logic used by computers. Indeterminacy of meaning as related to open texture of relevant linguistic rules is denoted by various concepts: "cluster concepts", e.g., are concepts that cannot be smoothly applied even in ordinary situations; their sense (if equivalent to their applicability conditions) cannot be analyzed in terms of necessary and sufficient conditions - for such an analysis of law as a cluster concept, see Sartorius in Gavison (1987); this vagueness is, strictly speaking, to be distinguished from the "open texture" of a concept, that denotes the possibility of the presence of a doubt concerning its application on novel situations (i.e. the potential vagueness of words), not yet present (hypothetical) and maybe extreme but foreseeable or imaginable; despite that difference the presence of open texture has the same result, namely, it does not allow for an analysis in terms of necessary and sufficient conditions – for the notion of open texture and the related notion of "porosity" of a concept, see Waissman (1945).

[4] See Hart (1949), p. 174. H.L.A. Hart seems to use the term of "open texture" - cf. Hart (1961) - especially pp. 120-132 - in order to denote both vagueness and open texture (Moore 1981); see also Bix (1991) for an original approach to the relation between open texture and judicial discretion in Hart's work; nevertheless, it seems that there are two sources of vagueness to which Hart refers without discrimination: first, an "intensional vagueness" (close to the notion of open texture, with the difference just noted) due to the inherent ambiguity of any criterion that could be used for the determination of the sense of a concept ("intensional ambiguity"); second, an "extensional vagueness", an absence of clarity due to the (extensional) ambiguity of the denoted objects; this second vagueness is tied to the fact that "fact is richer than dictum", according to J.L. Austin's expression: language is incapable of apprehending the totality of factual situations (in principle, infinite) whether they are present or future. The concept of "family ressemblance" (cf. Wittgenstein 1988, par. 65-71) at least shares with the "cluster concept" the idea that it is impossible to assign essential properties to a certain concept; nonetheless, Wittgenstein seems to indicate that every concept is a concept of "family ressemblance" (Moore 1981) or leaves the question open (Baker 1980), while only certain concepts are "cluster"; Hart uses the similar concept of "defeasibility" thus denoting the impossibility of an analysis of legal concepts in terms of necessary and sufficient conditions (as someone cannot exclude the possibility that conditions that "defeat" the rele-

the "positive conditions" for the existence of a contract, e.g., are an offer, acceptance and consideration, a contract may still be void or voidable due to some not known "defence" (or "*exception")* such as fraud or incapacity; and a legal decision that declares the validity of a contract is subject to these "defences", as legal rules are subject to being defeated in particular circumstances or under particular conditions. This "defeasibility"[5] of legal rules and concepts, is prima facie incompatible with the **binary logic** predominantly used in AI; from another point of view, law is not identified to a "set of rules" but, more importantly and fundamentally, to a coherent unity of principles; and principles, contrary to rules, do not function in an "all-or-nothing", but in a "more-or-less" fashion[6], which is, again, distinct from computer's binary logic; and, though recent developments in AI enables computers to apply "quantum computing", expressing outcomes statistically and not in a purely binary form, still statistical reasoning is mathematically construed and distant from practical reasoning and elaboration of complex interpretative judgments.

2.3 A fortiori, computers lack the distinctive human skill of accumulating experiences (and not only "raw data"), of combining various elements of different nature in the process of deliberation (practical, sentimental, utilitarian, evaluative, political etc.); paradigmatically through "age" and "maturity", living in interaction with others develops a certain sense of a proper way of understanding and acting, which is not identical to formal knowledge, but includes "practical" elements as well: an illuminating sense of "what is right", connected to the respective "form of life", , which is not formal yet neither totally intuitive and, certainly not irrational; it is characterized by a certain **"reasonableness"** (a typical example of which is interpretation of dicta and appraisal of actions in the legal and judicial domain)[7], by a certain

vant application of the concept do arise) - see, also, Baker (1977); Hart's difficulty in demonstrating the irreducibility of legal concepts to empirical ones via their supposed particular, "defeasible" character probably stems from this Wittgensteinian obscurity: if every concept is "family ressemblant" or "defeasible", then no concept is particularly intelligible as such (according to Wittgenstein's principle of significant negation) and, consequently, this characteristic cannot demonstrate their particularity; along these lines, we could analogously distinguish between two sorts of defeasibility (intensional and extensional) - see also Stylianidis (1994), especially pp. 379 ff.

[5] See also Baker (1977). From a logical point of view, the problem seems identical to the more general problem of induction.

[6] See Dworkin (1978).

[7] On the relation between "rational" and "reasonable" see, indicatively, Aarnio (1987), Perelman (1979).

deeper sense of understanding of "how things are" that transcends formal logic and is guided by reflection on accumulated experiences; this particular ability of taking into account various elements in order to form a "wise" judgment through the Aristotelian "phronesis": practical (in general) and, more particularly, legal decisions do not solely rest on formal criteria, but on multi-faceted considerations and interpretations that would not mechanically subsume a particular case to a legal rule, even if relevant formal conditions are satisfied, also in order to protect higher-order rights or the so called "common interest": besides penal law (where the complex estimation of the accused personality is vitally important), this is often the case in other fields of law, as, e.g., public law, where a "contra legem" interpretation has to be advanced, in order to best serve crucial public interests. This largo sensu comprehensive faculty, probably grasped by the Aristotelian term of «σοφία», allows for the formulation of considered judgments or assertions that transcend the computer's formal – even cognitive – capacities.

2.4 In this line of thought, we should distinguish between two separate questions, often conflated in the relevant discussion:

a) the factual ("is") question: can computers think (act, decide) like humans?

b) the normative ("ought") question: should computers think (act, decide) like humans?

On the first question, we should succinctly note that, at least for the moment (and for the mid-term future), AI cannot reach the level of human reflection: computers are still dependent on the information provided to them (by humans), do not recognize existence and external objects as such (as particular, individualized objects), lack self- awareness or self-recognition[8], do not experience "consciousness"[9], cannot use their intelligence for an infinite, non pre-determined number of issues or problems and the exact way in which they reach a certain conclusion is yet unknown. In more technical terms, it seems that current status of AI is still at the level of "artificial narrow intelligence"[10] and that computers do not

[8] The "know thyself" («γνώθισαυτόν») dictum - maxim (presumably) of Socrates.

[9] See, e.g., Wikipedia, Artificial General Intelligence (AGI).

[10] KAPLAN and HAENLEIN (2019) structure artificial intelligence along three evolutionary stages: 1) artificial narrow intelligence – applying AI only to specific tasks (ANI); 2) artificial general intelligence – applying AI to several areas and able to autonomously solve problems they were never even designed for (AGI); and 3) artificial super intelligence – applying AI to any area capable of scientific creativity, social skills, and general wisdom (ASI).

have the faculty of "understanding" (in Kantian terms) or of "high level perception" (in contemporary terms)[11].

Given that the answer to the first, factual question is, at least according to the current state of affairs, negative, further examination of the second (and, possibly, even more crucial and debatable) question, seems quasi-redundant; in the legal domain, a fortiori, assigning a decisive (and, not, simply, an assisting) role to computers in deciding cases faces even more acute, substantive and procedural obstacles and constraints, at least within the current legal and institutional framework of the European Union[12]; at least for the moment, computerized techniques are used in order to help, and not replace, judges or lawyers [13].

2.5 Computers in the (future) stage of AI denoted by the term "artificial general intelligence" could appear as candidates for occupying, apart from humans, an overall cognitive - epistemic standpoint, i.e. the (transcendental or empirical) standpoint from which knowledge is possible; nevertheless, and independently of whether computers could ever acquire the necessary reflective capacity and understanding just described and of whether they could be seriously denoted as "intentional" "beings" (something which is extremely problematic)[14], any such com-

[11] See Chalmers et al. (2006), p.5: "Corresponding roughly to Kant's faculty of Sensibility, we have low-level perception, which involves the early processing of information from the various sensory modalities. High-level perception, on the other hand, involves taking a more global view of this information, *extracting meaning* from the raw material by accessing concepts, and making sense of situations at a conceptual level. This ranges from the recognition of objects to the grasping of abstract relations, and on to understanding entire situations as coherent wholes."

[12] See relevant contributions of distinguished colleagues in this collection of papers.

[13] It seems, though, that in some states of the U.S.A., computers do defer "decisions" on prima-facie "typical", minor offences, also based on data and record of the offender, with a considerable "success" (estimated at 70% of the cases); the issue is vital and obviously involves crucial questions of eventual violation of fundamental civic and human rights, on the basis of utilitarian considerations and calculations; adequate discussion of this extremely important, multi-level issue exceeds the scope of the present.

[14] As, among others, P.M.S. Hacker has rightly pointed out (Athens' lecture, 2014); things could be different in case computers were capable of autonomous reproduction; even this, from the point of view of the present, would not prima facie signify a crucial, significant difference; in any case, matters of artificial intelligence and relevant recent developments cannot be adequately explored within the limits of the present; probably R. Dreyfus' (1972) is also still pertinent.

puter would still be *the creation of a human being/mind, a human artifact*; consequently and fundamentally, from a purely abstract point of view, the ultimate cognitive subject would still be human.

3. *The CREA project*

In view of the previous remarks (of a more general scope), it is necessary to concisely examine the main relevant, more particular features of the CREA project:

3.1 The CREA project aims at facilitating the reaching of an agreement between two parties through the use of algorithms, in certain, limited areas of law's intervention, i.e., for the moment, in civil law and, in particular, on issues related to divorce and inheritance; *so, it is not an overall proponent of wholesale application of AI in dispute resolution in every field of law*.

3.2 The algorithm under elaboration mainly tries to assist in the resolution of disputes arising in the process of distribution of goods in divorce and inheritance; based on models known from economic theory (such as Pareto optimality models), *it respects the volitions and rights of the parties, while, at the same time, being realistic*: parties do attach values on the goods to be shared according to their personal preferences, but these "personal" values have to somehow conform with current market values; this, quasi objective measure of these (otherwise "mythical")[15] volitions, allows for their de-mystification.

3.3 Most importantly, the model *fully respects the existing legal framework in force*: aspiring to its application all over the European Union, the project carefully examines, in its first phase, the set of relevant mandatory rules and respective requirements in these fields in the legal systems of a variety of European countries: the model will be a complementary tool within these common frameworks; it does not purport to ignore or modify them, but only to assist in their more quick and efficient application, according to the existing procedural and substantive rules.

Consequently, the CREA project advances the application of a **limited purpose-specific algorithm**; it is a technique of ad hoc application of mathematical logic to facts within a given framework of thought and rules[16] (and not, properly speaking, a creation of Artificial Intelligence); it assists judges, parties and other actors in the dispute resolution process, does not replace them; it does not "understand" the par-

[15] In A.J. Ayer terms, cf. Ayer (1973).

[16] And it does not seem to have the ambition of "machine learning".

ties' intentions, but only helps then in clearly expressing them; it does not issue a rational or reasonable judgment by itself; but it contributes in its quick, non-ambiguous, fair elaboration.

4. *Theoretical / Methodological Assumptions and Affinities*

In this context, it is further useful to concisely but more closely examine some of the project's implicit or explicit theoretical and methodological affinities with relevant traditions in legal and social theory.

4.1 *Legal realism: law in action*

An obvious source of inspiration and theoretical basis of the CREA project is legal realism; especially in its U.S.A. version, American Legal Realism[17] identifies the "core" of the legal process with the outcome of legal decisions and legal theory with "predictions" about judge's behavior in particular cases[18]. This view is backed up by:

a) Emphasis on the indeterminacy and "open texture of rules"[19] that does not allow rules to provide adequate, binding guidance for their smooth, definite application; rules are, in extremis, assimilated to "pretty playthings"[20] in the hands of judges that, contrary to the prevailing formalist doctrine, actually decide cases according to their personal preferences, idea of fairness or, even, feelings of the moment[21].

b) Adoption of a form of behaviorism: human action is assimilated to behavior, to complex socio-psychological facts that can be observed and asserted from an external point of view; accordingly, it is possible to predict behavior of officials, judges, parties etc. involved in dispute resolution.

c) Adoption of a type of "pragmatism" that values rather the efficiency of legal operations than law's coherence (which is, in any case,

[17] "American Legal Realism" is used in order to denote a very wide variety of views and motivations, ranging from Karl Llewellyn to J. Frank; in the 1970's, the Critical Legal Studies Movement partly continued this tradition, mainly by equally severely criticizing legal formalism. See, indicatively Twining (1973), Unger (1983).

[18] Cf. the famous dictum of Oliver Holmes: "The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law". American Legal Realism mainly focused on the judicial practice, while the so-called Scandinavian Realism systematically exposed an "ontology of law", roughly assimilating law to complex socio-psychological facts. See Olivercrona (1939), Ross (1958).

[19] See supra, footnote 3.

[20] In Llewellyn's expression – see Twining (1973).

[21] The so-called "breakfast theory of law".

unattainable in view of the open texture of rules) or the protection of rights and conformity of decisions to moral/evaluative standards. [22]

The above theses have been (often justly) criticized along the following lines:

Independently of the importance of the judiciary for the overall operation of the legal system, any such system would still be in need of a Rule of Recognition that would recognize and identify judges and officials as such (the so-called 'realist paradox") [23]; besides, predictive theories of law can, maybe, explain the outcome of ad hoc disputes, but cannot account for the continuity of the legal order. In addition:

a) Despite their open texture, facts and history show that rules have a core of meaning that cannot be reasonably questioned in practice, allowing them to provide definite solutions in the vast majority of (de facto) "easy" cases; the judge or mediator of the dispute "strikes on its own" (but, again, not arbitrarily but based on general principles and values embodied in the legal system and recognized as part of this system) only in "hard", "penumbra" cases.

b) Identification of law to feelings of compulsion or socio-psychological facts would ignore the distinctive legal normativity, grasped from an internal to the actor/speaker point of view and linguistically evidenced in the existence and difference in meaning between the expressions "I am obliged" and "I have an obligation"; normative legal statements (as the latter) cannot be reduced to empirical statements about law, i.e. to statements that would constitute "prophecies" about the future behavior of legal authorities.

c) Priority in the efficiency of legal operations is itself an evaluative judgment; further, efficiency presupposes the principled unity of the legal order and is rather assisted than threatened by the coherence of the legal regulative structure[24].

Notwithstanding the plausibility of such critiques, legal realism as a descriptive (and not normative) theory of law, often accurately describes legal practice; it is true, e.g., that from a practitioner's point of view[25] what is crucial is the "success in the courtroom", the issuing of a decision that would be favorable to her (his) client's interests; and it is also true that

[22] A non-cognitivism in ethics/values is thus presupposed.

[23] In Hart's version of positivism, rules are legal because they are established, "enacted" according to criteria provided by an ultimate rule which is (meta) legal and social at the same time: this rule allows for the identification, the recognition of the legal realm that is thus rooted in social (and not natural or moral) facts alone; that is why it is called "Rule of Recognition" (R of R).

[24] For these critiques see Hart (1961), Dworkin (1986).

[25] And it is not accidental that many of the legal realists were practicing lawyers.

judges often decide a case according to their general idea of what the law is, in conformity to their feeling of justice and fairness, political preferences or even out of sympathy for the one or the other party; and it is only ex-post that they subsume their (already formed decision) to the regulative era of a certain valid legal rule; "pragmatic" as it may be, this picture is often confirmed by the methodological flaws in the reasoning and justification of legal decisions, so familiar to legal practitioners; from this point of view, legal realism is a honest, "down to earth" theory, that reveals "brute" legal reality, often obscured and hidden behind the veil of formalism; it rightly draws the attention of legal theory to this pragmatic, often chaotic reality of legal practice, which is quite distanced from the "heaven of concepts" of traditional perceptions of law; it thus provides useful tools for the understanding and systematization of law in action.

Further, legal realism reminds us that the law is a practical tool of smooth societal life and interaction, it is a mechanism of dispute resolution, of performing what Llewellyn named "law-jobs" in order to regulate societal life; law in context, in the vast majority of cases, is not concerned with abstract problems of justice, duty or morality, nor with complex interpretative arguments; it is a significant part of a social regulative network that tries to accommodate opposed interests, resolve contradictions and provide solutions that crucially affect everyday life and status of citizens[26]. In executing these tasks, dispute resolution mechanisms (strictosensu judicial or other) have to be fair, equitable, quick and efficient; while the art of legal argumentation is long, life is short - "ars longa, vita brevis".

The CREA project shares exactly these very concerns: it purports to facilitate dispute resolution, assist the parties in finding non-biased, fair and mutually accepted, viable solutions to their practical problems, to avoid long, time and money-consuming processes; simultaneously, it innovatively introduces new computing techniques in order to serve these practical legal functions in action.

4.2 *Algorithms and Preferences in practical reason*

The introduction of algorithms in the process of practical reasoning and decision making is related to another, long-standing debate in the domain of the theory of action: as also analyzed supra, human action is distinctively normative and prima facie irreducible to mathematical calculations; there is always a "normative gap" between motivation, intention and action; humans are not like robots, they are driven by a variety of mo-

[26] See, e.g., the establishment of an almost immediate eviction process for tenants in the U.S., with the assistance of relevant data bases and computerized records.

tives, sentiments, evaluations that are unique and impossible to predict; preferences cannot acquire a definite mathematical value and any such preference scale ignores the richness and normativity of human agency, being, by definition, imperfect and methodologically erroneous[27].

However, models of preferences have long been widely elaborated (at least since the beginnings of the 20th century) and used (with relative practical success), especially in economic theory; in this classical view, "**preference** is the order that a person (an agent) gives to alternatives based on their relative utility, a process which results in an optimal "choice" (whether real or theoretical). Instead of the prices of goods, personal income, or availability of goods, the character of the preferences is determined purely by a person's tastes. However, persons are still expected to act in their best (that is, rational) interest"[28].

Despite the prima facie plausibility of such critiques, in the modern technological era, we all use (consciously or not) such elementary preference "scales", e.g., when bidding in Amazon or e-bay for a book or good; such scales, in spite of their theoretical deficiencies, do have an undeniable practical usefulness; and it is practice and technology, the developing necessities of real life that impose their wide-spread acceptance and use; besides, the CREA model is very careful in being applied in the repartition of quantifiable goods, where the process of "quantification of preferences" is relatively safe; in this line of thought, a further categorization of goods to be divided within the CREA model could be elaborated, as well as relevant "filters" and a method of determining a "valid" range of preferences that, while respecting the parties' needs and wants, could "objectify" their criteria, also in order to exclude "malicious" choices impeding agreement[29]. In any case, the smooth function of the CREA algorithm presupposes that both parties share the intention and sincere volition of finding a mutually acceptable, beneficial solution; and that they do not intend to impede or block the agreement process.

4.3 *Models of Rational Utility*

As mentioned in the above definition, scales of preferences are related to and presuppose that the parties involved are capable of rational choices, based on utilitarian calculations; obviously, creators of such models are aware of their inherent limitations: by default, models

[27] On this distinctive character of human agency see, indicatively, Taylor (1985).

[28] See Wikipedia, "Preferences" (with further references).

[29] In the line of thought already incorporated in the CREA model and reified in the important role of the "market value" of goods in the negotiation process.

are perfect, while reality (especially social, non-natural reality) is imperfect; no human being, e.g., disposes of a flawless rationality, and parties lack the perfect equal amount of information required for the absolute success of such "optimal" **models**; nevertheless, these defects do not make them useless; on the contrary, even deeply normative theories on the creation of the social bond of Kantian inspiration, as, e.g. and famously, Rawls' "Theory of Justice", do apply "models" in order to establish the principles that should govern social structure and are presupposed by its current status; Rawls' famous original position is such an abstraction and, in this line of thought, all social contract theories constitute largo sensu "models".

Similarly, the perfect **rationality** of the involved individuals – parties which is crucial for the function of such models should best be considered as an optimal (and quasi-evaluative) standard of behavior, as a sort of "regulative idea" of proper social action, presupposed by and necessary for the assessment of actual action in real life; it is interesting to note that, while probably oscillating between a purely transcendental and an empirical foundation of his major argument, Rawls himself has initially characterized his decision-making model as a "model of rational choice"[30].

This rational choice is presumably based on the relative **utility** of goods and related alternatives; even against the prima facie most plausible view of "rule-utilitarianism"[31], numerous critical arguments have been raised: even if we assume that "pain and pleasure" (according to the classical, Bentham's utilitarian principle) could be assessed by using complex, even psychoanalytically informed, structured criteria, it is always an open question whether these are "quantifiable", measurable entities and whether the "good" (either individual or collective) could be "measured", in view of the normative complexity of human agency and volition succinctly described supra; the priority attached to the "good", as the desired consequence of action is itself an evaluative position, that is in need of further justification (and, on pain of circularity, on non-utilitarian grounds); "good" is not a value measurable only in material (e.g. financial) terms; for competing moral theories, an act (or rule) should be judged on its per se value and character, independently and in abstraction of its particular consequences; last but not least, utilitarianism seems to presuppose non-necessarily utilitarian values (e.g. liberty, equality etc.) as constitutive of this very fundamen-

[30] See Rawls (1999), Gaus (2015), a characterization that he later disavowed.

[31] According to which the rightness or wrongness of a particular action is a function of the correctness and consequences of following the rule of which it is an instance – as opposed to act-utilitarianism that focuses on the utility of ad hoc actions.

tal decision-making framework (e.g. of public argumentation) in which the utilitarian position is also, inevitably inserted[32].

Despite, again, these often plausible critiques, it is undeniable that utilitarianism has a prima facie, common-sense plausibility which is vital for practical purposes; independently of the soundness of its theoretical foundations, it is a model of decision-making that can enjoy a wide acceptance by the vast majority of the community members of our form of life; and it is not accidental, again, that Rawls' normative model "takes utilitarianism seriously", his critique being "internal" to the utilitarian standpoint: in view of the veil of ignorance of individuals in the "original position" the choice of the principles of justice that should govern future social structure is also based on calculations of a quasi-utilitarian type; in slightly different accounts, law as type of regulative social contract is imposed by "natural necessities" [33] and older contractarian theories clearly stand on a utilitarian basis [34].

In this line of thought, utilitarian considerations are have to be taken into account in legal reasoning and efficiency of legal operations in action; at least, they have a significant practical relevance and they are not to be totally rejected; as just stated, refinements of the CREA algorithm would facilitate both parties in assigning relatively fair values to the goods to be divided; and, ab initio, the CREA model adopts an advanced and qualified version of utilitarianism, allowing for a wide range of motives and values, of personal preferences, of factors of "pain and pleasure" to be incorporated in the decision-making process.

4.4 *Source, Validity and Normativity of "CREA rules"*

In Hart's, predominant version of legal positivism, legal rules **are rules primarily because of their origin** (and not obligatorily because they are themselves directly and per se respected in view of their content), i.e. because they are established, "enacted" according to criteria provided by an ultimate meta-rule (the Rule of Recognition) [35]. However, the rules that govern such processes of "mediation" (as the process exposed in the CREA project), as well as the CREA algorithm itself and the bilaterally binding rules that emanate from the agreement – via the use of the algorithm – between the parties, seem apt to

[32] That cannot be themselves justified solely on utilitarian grounds, also on pain of circularity. On utilitarianism see, indicatively, Sen and Williams (1982).

[33] See, e.g., Hart (1961), Chapter IX.

[34] As, e.g., the classic Hobesian exposition of social contract.

[35] See Hart (1961).

regulate aspects of societal affairs, not so much because of their source, "pedigree" or authoritative origin, but because of their **content,** because **they are actually accepted** as appropriate, binding standards of decisive action within a communal, public sphere of human activity; these rules (that we could name "CREA rules" – **CRs**), neither have a particular source, nor are they enacted according to a particular formal procedure; they seem to lack such strict formality and they are not always "posited' in the above sense; as opposed to "proper" legal rules, that are prima facie state-driven, CRs' main source is **the volition of the parties themselves,** as the parties voluntarily subject themselves to the CREA procedure, proposed to them by their legal advocates; this characteristic of the CRs roughly assimilates them to new conceptions of regulation, such as "governance rules", that could have a wide variety of informal sources (such as civil society organizations, international organizations and associations, NGOs, or totally informal societal formations as "pressure groups", "groups of interest" or even individuals – e.g. through internet and social media); such modes of regulation of societal affairs, are emerging in relatively recent years: non-state sources of (as, at least "soft" law) are gradually recognized, even within traditional conceptions of law, as, e.g., the so-called "law of contracts", the source of which is rather to be found in the prevailing legal practice (and developed jurisprudence), e.g. of big, international, legal firms; despite their private source, relevant rules have acquired a certain compulsory character, in virtue of their continuous application and acceptance by participants in the relevant practice, though they are not, *strict sensu*, enacted by state(s) or "enforceable"; in this line of thought, legal theory can have the flexibility of conceiving, as part of its subject-matter, rules of a non purely state origin (as the CRs): apart from the theory of *"legal pluralism"*[36], a positivist, "sociological" theory of law could conceptually accommodate the existence of non-state legal rules by considering that, in different societal contexts (as, e.g. in the field of contractual relations), different Rules of Recognition of legally binding rules can be actually followed and accepted; and it is crucial to note again, that the CREA model *fully respects "proper" legal, mandatory rules in force, rather aiming at facilitating their efficient application, than contesting their binding, authoritative status.*

[36] The term refers to the presence of multiple legal orders within one social field, such as state law or customary law based on culture or religion or other value systems; the theory was tied to German romanticism, according to which law's source is the "geist", the "spirit" or "soul" of people and cultural traditions within a certain community; it is also backed-up by anthropological remarks on the operation of relatively primitive societies, where co-existence of multiple regulatory systems can be observed.

Besides, legal theory distinguishes between different types of validity (formal, substantial, de facto …) of legal rules[37]. A legal rule, e.g., can have a formal validity (as being enacted according to formal, predetermined criteria), without being actually applied in social life (cf. the various examples of the so-called "black letter laws")[38], without, i.e., being "de facto" valid. On the other hand, though CRs may seen as usually lacking "formal" validity, they do possess a "substantive" and de facto validity, as their content is accepted by the involved parties they are thus de facto applied in the relevant practice and "govern" relevant relations. No doubt, the ensuing normativity of such CRs seems thin or "weak", as compared to the strict normativity of formally enacted legal rules, within a supposedly closed, hierarchically structured legal order; in the famous, Kelsen's conception of the legal order as a pyramid[39], the top of which is occupied by constitutional rules (followed by laws, administrative acts etc.), CRs would probably occupy the lower positions; nevertheless, as legal realism (as supra analyzed, especially in its US version) has persuasively argued, this de facto normativity of CRs, even if not inspired by deep moral considerations but by practical necessities of regulation, is crucial for the effective operation of the societal relational system in its actuality.

4.5 *Substantial Affinities*

In spite of its "technical" character, certain affinities of the CREA model with substantive claims of justice and fairness can be depicted:

Notwithstanding its impartial character, the CREA algorithm is inherently designed in order to provide optimal and simultaneously fair solutions that correspond to the (rational) choices, mutual interests and expectations of the parties[40]; these views suggest solutions of the general type "first cut, second chooses" to the problem, e.g., of the optimally fair division of a cake; it is, thus, in an important sense, committed to fairness and equal treatment of parties; similarly, it is connected to classical, but still pertinent substantive conceptions of "distributive justice", as, ultimately, the parties seem to get a fair share of goods, and "what they deserve", in view of their particular preferences. Further, "technical" application and systematization of already provided data by the CREA algorithm, promotes "procedural justice",

[37] See, e.g., Weinberger (1984).

[38] As, e.g., at least till recently, the rule for the prohibition of smoking in public establishments in Greece.

[39] See, indicatively, Tur and Twining (1986).

[40] Following relevant traditions, as analyzed supra under 4.2, 4.3.

as, at least to an extent and according to their external characteristics, it assists in treating "like cases alike", in conformity to the fundamental common law maxim.

While not contesting the validity of mandatory rules in force, the CREA model secures and promotes the (individual) rights of the parties, and, actually, to a "deeper than the usual" level, as even their personal preferences (and not only their formally protected possibilities of action) are being taken into account (with proper caveats, though, as, e.g., the "market value of goods"); in this aspect, the model coincides with rights – based theories of law, that consider "rights" rather than rules as the ultimate sources of the legal order; this view assigns a proper, interpretative coherence to the legal system and the ensuing legal decisions, otherwise left to the officials' arbitrary discretion when the clear guidelines – solutions engendered by rules "run out"[41]. In a related manner, the model seemingly reflects the fundamental idea that each member of the society has a sphere of "autonomy" and, certainly, the right to choose her own path toward happiness, toward what she considers a "good life"; and that this choice, as a fundamental expression of the idea of the autonomy of a person/individual, should not be impeded by any form of external restrictions.

5. Concluding remarks

The CREA model is best characterized as an instrument of technical assistance, complementary to the existing regulatory framework; it fully respects legal mandatory rules in force, rather aiming at enhancing their efficient application, than contesting their binding, authoritative status. It does not make foundational, justificatory claims and is limited to disputes that are quantifiable, constituting a fair, impartial, technique of distributing goods at stake; it does not intervene in the legal, real or substantive data of a case (procedural rules, values of the parties, nature of the case etc.) but provides a method of systematizing these data in order to quickly reach an efficient, mutually beneficial agreement; it draws from the reality of legal practice, aiming at satisfying practical needs of the legal agents; it purports to facilitate relevant practical decisions, and not to impose the decision itself.

Especially in consideration of these characteristics and caveats, the CREA project can be fruitfully accommodated and inserted in the continuum of the relevant legal and political theory tradition; these affinities (as supra analyzed) endow the project with a secure episte-

[41] Paradigmatically in the so-called "penumbra cases". See Dworkin (1978), (1986).

mological and theoretical foundation, also thus providing a prima facie plausible defense (if not quasi-immunity) against potential accusations, particularly from the standpoint of normative legal theories.

Obviously, the present is to be considered rather as an attempt to sketch, from a detached, unbiased point of view, a comprehensive theoretical and methodological framework of the CREA project (also in view of its future, more extended application in other fields of law) than as an exhaustive treatment of the major particular issues involved.

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FERRUCCIO AULETTA*

A QUANTITATIVE APPROACH TO STUDY THE NORMATIVITY OF THE JURISPRUDENCE OF COURTS IN COUNTRIES FROM THE CIVIL LAW TRADITION

Abstract Considering the difference between jurisprudence and precedent in civil law systems, the study focuses on the measurability of the factors determining jurisprudence. Using examples selected from French, Italian and Brazilian law, the author aims to assign a non-arbitrary quotient to each element concurring in the normative value of a decision in order to ascertain when a single judgment (non-binding precedent) could be objectively considered jurisprudence. Without any quantitative parameter to weigh jurisprudence and its elements being set, in the civil law systems – where the normative value of jurisprudence is quickly increasing – the efficiency of case management could impact the most effective judicial protection of individual rights.

1. *The measurability of the factors determining the jurisprudence and the difference between jurisprudence and precedent*

In countries from the civil law legal tradition, algorithms are sometimes used to *predict* the outcome of judgments. Some have even gone as far as suggesting that one day they might replace the human judge. However, a less controversial use of algorithms in civil justice is to increase the *foreseeability* of a single judgment.

Indeed, predictivity and foreseeability are cognate but distinct concepts. Predictivity is the condition of being predictive, that is to say the condition of having value for making predictions. Foreseeability means the capacity of being anticipated. Thus, they are cognate because they both «*affect the meaning and function of jurisdictional activity*»and«*concern the requirement of legal certainty, the rule of law and equality*». They are distinct concepts because predictivity goes beyond foreseeability, often to the point of becoming a self-fulfilling prophecy: «*The judge, to make decisions, uses the '*prediction*' of the algorithm, so that the prediction itself becomes the decision*»[1].

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[1] D. DALFINO, Foro italiano, 2018, V, 385.

The use of algorithms to foresee judicial outcomes «*is not foreign to the very concept of jurisprudence as comprehended by the Romans, for whom* 'prudence' *was a contracted version of* 'pro-videntia'*, derived from the Latin* 'pro-video'*, meaning to* 'foresee'*. According to Cicero, prudence implied elements such as* 'memory, intelligence and foresight' *and referred to forecasting risks; therefore,* 'jurisprudence' *dealt with foreseeing what consequences would result from applying the law to specific facts*»[2].

Of course, resort to algorithms to foresee the outcome of judicial proceedings presupposes the measurability of the factors underpinning the judicial ruling. That begs the question of whether measurement can be objective or whether it is inherently subjective. It also begs a vexed question of quantum physics, which is whether the very act of measuring changes what is being measured. These are just some of the philosophical and practical questions that a study of the use of algorithms to foresee judicial outcomes entails.

Measuring the factors underpinning a judicial ruling presents several challenges. The first one is access to manageable data, possibly organized as an electronic database. The digitalization of the work of courts and tribunals that took place in most developed countries during the past two decades has generated a trove of digital information that can now be mined, down to the specific components of the given ruling. The next question is: what exactly should be measured and to what end?

In common law system, the answer could be straightforward: to find what case law is on any given issue and in any given case. However, in civil law systems, the answer is more complicated, since in civil law systems there is no binding precedent, no *stare decisis* principle, but rather *jurisprudence* (*jurisprudence constante* in France, *orientamento della giurisprudenza* in Italy, or *jurisprudência dominante* in Brazil). While in common law legal systems a single decision could be binding precedent and change the law, in civil law legal systems no ruling can change the law *per se*. Typically, it takes several decisions to achieve the same result. It is the cumulative effect of several decisions, sharing the same legal rationale, that creates the *jurisprudence*. In systems of common law, the judicial precedent has its own intimate normative ability, the discovery of which by the judge is a matter of factual cognition. In Cardozo's words, «*there is a tendency toward the re-*

[2] A. FAUCHIER DELAVIGNE, A. GAJZLER, A. MARIN, The Challenges Facing Justice in the Future Judges Confronted with the Advent of Big Data Analytics, Team France: Trainer L. Vuitton, Semi-Final D, Budapest 3-6 luglio 2017, 2.

production of kind. Every judgment has a generative power. It begets in its own image»[3]. In the civil law tradition, the recognition of the "normative momentum", which can result in jurisprudence, requires the judge to interpret the relevant case law to find the "normative track" that s/he must follow in the pending case.

2. *Examples from civil law systems*

Let's consider three civil law legal systems: the French, Italian and Brazilian. Each approaches the problem of the normative nature of judicial decisions differently. France has an ancient tradition denying normative power to judicial decisions. Italy recognizes the normative value of the jurisprudence. Brazil's new Code of Civil Procedure combines the idea that some precedents are strictly binding with the idea that only jurisprudence as a whole might have normative value.

2.1 *France*

Since the adoption of the Code Napoleon, on March 15th, 1803, France prohibits *arrêts de règlement*(regulatory judgments). Under article 5 of the Civil Code, «*It shall be prohibited for the courts to pronounce orders by general and legislative provisions on causes which are their subject matter*». The ban of regulatory judgments has been interpreted as implying that the judge cannot decide solely on the basis of a single precedent.

However, at least since the 1960's, in France, the *jurisprudence constante*, that is to say is a long series of previous decisions (as opposed to a single decision) applying a particular legal principle or rule that are highly persuasive, is equalized to a source of law. Indeed, when the Court of Cassation (*Cour de Cassation*), the last instance of jurisdiction in the French legal system, is asked to rule on a case that follows la *jurisprudence constante* the case is assigned to a panel of three judges (*formation restreinte*) instead of five, to expedite proceedings.

Clearly, the Court of Cassation, but also all lower courts, have the need to know what decisions are important, because they either affirm or divert from settled jurisprudence, and which ones do not add or detract anything. For certain purposes the Court distinguishes between: a) decisions that specify the scope of a rule; b) decisions that create

[3] The Nature of the Judicial Process, Yale University Press, 1921, 141.

new case law; c) decisions that affect or modify an old solution; d) decisions that recall principles that have been established, so that they are not lost sight of or to show the Court's commitment to them[4].

In addition, when deciding which decisions should be published and where, the Court of Cassation weighs the «*normative interestof the decision*» (*l'intérêtnormatif de la decision*), distinguishing between five categories of decisions:

D = Decisions for internal **d**issemination within the Court only. These are the judgments that do not add anything to the jurisprudence of the Court. They are usually called «*individual judgments*» (*arrêtsd'espèce*). They are not published;

B = Decisions that the Court deems necessary to bring quickly to the attention of all judges in France. They are published in summary in the Bulletin of the Court of Cassation (*Bulletin d' information de la Cour de cassation* – **B**ICC, which is distributed biweekly to all judges);

P = Decisions that are noteworthy because, for instance, they contain novel solutions, or are an evolution of the Courts' jurisprudence, or because the Court deems it necessary publish them to recall a point of law that had not been recalled in a long time (about ten years). These are **p**ublished in full in the Bulletin;

I = Decisions that the Court deems of interest for the public. These are decisions that touch on issues of general concern or that can broadly affect the life of citizens. These are published on the website of the Court of Cassation (**i**nternet).

R = Lastly, decisions with high normative impact. These are the decisions that could change the law. They are discussed in the annual **r**eport of the Court of Cassation, and they are accompanied by an explanation of how jurisprudence of the Court has evolved[5].

Every time the Court issues a decision, it also determines the degree of publicity it should give it. It does so that everyone who needs to know (court itself, judges in the legal system or public) is alerted about what the jurisprudence of the Court is on any given issue. By doing that, it weights the normative impact of each decision (about 20,000 in total), creating the basis of an empirical measurement of the given decision's impact on the overall legal system.

Granted, this is still very different from so-called "predictive justice", which is what is currently being experimented in the Courts of

[4] See A. LACABARATS, Rec. Dalloz, 2007, 889.

[5] J. F. WEBER, Comprendre un arrêt de la Cour de cassation rendu en matière civile, www.courdecassation.fr.

Appeal of Rennes and Douai[6]. There, digitalization and artificial intelligence are used in aggregate to distill from the mass of cases specific orientations on given issues. It is a mass analysis, which is antithetical to the calculation of a single decision's normative weight the Court of Cassation does.

2.2 *Italy*

In Italy, as in France, the judge is not bound by precedents. Under the Italian Constitution, the judge is subject only to statutory law. However, the judge is arguably constrained by jurisprudence, that is to say, settled case law, too. A recent amendment of the Italian Code of Civil Procedure has raised the question.

Article 360-bis provides that the Court of Cassation (*Corte di Cassazione*), the country's last instance of jurisdiction, can reject an appeal on a procedural ground if the challenged judgment is based on principles of law established by the Court of Cassation, and an assessment of the grounds for the appeal does not suggest a reason to change the «*orientation*»of the Court. What is the *orientation* of the Court?

According to a 2016 *Programmatic Document* of the Prime President of the Court of Cassation, the «*orientation*» of the Court is determined by «*a decision by the United Chambers; when there is a consolidated orientation of any Chamber; when there are a few judgments of one or more Chambers, if convergent; when there is only one decision, if considered convincing*»[7].

Clearly, this is an extremely empirical estimate of the normative value of the Court's judgments, since, for example, it does not take into account *obiter dicta*, even though the Court of Cassation itself considered them normative factors and the Constitutional Court considers them capable of shaping the «*living law*».

2.3 *Brazil*

The need to measure the "marginal normativity" of a decision also arises in other civil law countries. Brazil has faced the same problem[8]. Indeed, it seems to be a constant of the evolution of all procedural systems.

[6] See – for example – Predictice (www.predictice.com).

[7] April 22nd, 2016: http://www.cortedicassazione.it.

[8] See T. Arruda, Le pouvoir normatif du juge – la motivation des décisions et le précédents à force obligatoire, d'après le nouveau Code de Procédure Civil (2015), ZeitschriftfürZivilprozess International, 21 (2016), 259 ss.

In 2015, a new Code of Civil Procedure entered into force, requiring a reliable measurement of the normative impact of any given judgment. It required the introduction of «*measures, aimed at using jurisprudence as a parameter for the elaboration of decisions*». «*The idea of enhancing the value of jurisprudence and encouraging the issuance of uniform decisions is not new since there is a repeated orientation of the courts, especially the higher ones, such as the Supreme Federal Court and the Superior Court of Justice*»[9]. However, the novelty is the formalization of the process.

The objective measurement of the normative degree of a single decision would increase foreseeability, stability and efficiency of the entire system, as well as foster the coherent development of the institutions that refer to the *uniform jurisprudence*.

Under article 926 of the new Code, «*the courts must conform their jurisprudence and keep it stable, intact and consistent*». Therefore, it has been stated that «*the new code no longer tolerates the existence of different positions on the subject matter within the same court*».

According to article 927, «*the judges and the courts shall comply with [some specific] decisions*» to which they are properly bound, such as the «*enunciados de súmulavinculante*» that are stated in case of «*jurisprudênciadominante*». In this case, among others, a new lawsuit can be rejected *prima facie* because of the consolidated orientation of the courts (see art. 332).

All in all, Brazil's new approach is to combine the idea that some precedents are strictly binding with the idea that only jurisprudence as a whole might have normative value. The impetus for the reform has been the need to reduce courts caseloads, by giving them the chance to dispose of repetitive cases through one single judgment. That makes objectively determining the weight of cases paramount because it becomes a determinant of access to justice.

3. *The quotient to be assigned with non-arbitrary criteria to each element concurring to the normative range of a decision*

In each of the three legal systems discussed, judicial decisions impact jurisprudence, providing normative guidance to further rulings. The question is whether in a system where precedent is not binding is possible to determine the "normative coefficient" of any given decision, its impact on future decisions. In other words, whether it is possible to measure the im-

[9] P. LUCON, Rivista di Diritto Processuale, 2018, 1271.

pact of any given decision on future jurisprudence, whether it contributed to open new pathways or confirm the jurisprudence.

The task is not as straightforward as it is in common law legal systems. In systems based on binding precedents, facts are determined first, and then, if they are the same of a previous decision, the rule is applied as it was applied before. Thus, as far as later cases are concerned, the rule is an exogenous factor; it is a given. Conversely, in civil law systems, precedents do not have binding force but, as it was said, jurisprudence has normative value. This means that two cases can never be considered identical, because even the slightest increase to the case law brought by the previous judgment creates a new and unique context for all subsequent decisions. The law (*i.e.* the rule plus the normative addition of the previous decision that shapes jurisprudence) applied in the first case is not the same applied in the second one. In civil law systems, law is never just applied. The very act of applying the law changes the normative context within which the next case will be decided. Determining objectively, or at least agreeing on the specific value of each element of the case, and the aggregate weight of the relevant case law, is necessary to make it possible to foresee the outcome of future cases.

In my opinion, jurisprudence (*jurisprudence constante* in France, *orientamento della giurisprudenza* in Italy, or *jurisprudência dominante*- in Brazil) must be always identifiable and measurable. It must be determined *ex ante*. The identification of the driving jurisprudence cannot be left to the judge in the given case. As in physics, the observer could be «*even destructive, in the sense that it irretrievably and irreparably disturbs the observable*»[10]. The judge could create a normative reality that does not exist in the observed jurisprudence.

What are the factors of a given decision and surrounding it that should be measured? At a minimum, one should take into consideration rank of the courts that issued the decision; the content of the decision; how many times it was echoed by other courts; the social or cultural impact of the decision, etc. In addition, the time factor is particularly important because the longer a given judgment stands unchallenged, the greater its weight. Other crucial factors are the density of use (*i.e.* the number of judges who refer to the prior judgment); the frequency of use (*i.e.* the number of times other judgments, in a given period, refer to it), and the reach and scope (*i.e.* the range of cases that the given decision impacts or whether it applied a general rule or a

[10] S. IANNACCONE, March 3rd, 2019, https://www.galileonet.it/: this is because «the process of measurement and the observer who makes it are in no way separable from the measured object».

specific one). A decision that has limited reach or applies only an extremely specific rule will have little or no value to adjudicate further cases.

The normative impact of a decision is ultimately determined by whether it changed the *status quo*, and, looking ahead, with regard to the effects on other fields, as well as with regard to duration and intensity of its use. In any case, what needs to be assessed is whether there is a change, either in the set of legal statements or in the behavior of their makers or recipients. This defines the extent of the legal change, that is to say the normativity of the decision.

4. *The measurement's technique: an analogue scale «0 1»*

As to the how these factors should be measured, an analogue scale is preferable to a digital one. An analogue scale has the advantage of being able to take into account all variables mentioned. A continuous interval (0 *to* 1) accommodates a theoretically infinite number of analytical and quantification possibilities, while a series of discrete numbers (0 *or* 1) allows for a more limited number of possibilities. It could help distinguishing, for instance, between the *obiter dictum* elements of the judgment from those that pertain to its core (the *ratio decidendi*), or how many commentators welcomed or rejected it. Second, it makes it possible to use mathematical calculus (for instance, mathematics of dynamical systems or vector calculus), which leaves the door open to still unknown variable, and allows for extrapolations, interpolation *etc.*

To take as an example the system the French Court of Cassation uses to decide what decisions it should publish and where, judgments in class **D**, the so-called «*arrêtsd'espèce*», will be given the value 0, since they have no impact whatsoever on the legal system. Any other judgment will be attributed a value higher than 0 up to 1. Granted, even *arrêtsd'espèce* do have an impact, at least because they restate what the law is. Therefore their value should be higher than 0. However, for the sake of simplicity we should attribute them the lowest possible value in the scale. At the other end of the spectrum, 1 should be attributed to judgment that, *inter alia*, have been passed in a complete legal void, in the absence of precedents and thus, created, in a sense, new law.

5. *The proposal's impact on the idea that a single decision (or precedent) could be considered jurisprudence*

The importance of introducing a system to weigh objectively the

normative value of judicial decisions is illustrated by a recent case ruled by the Italian Court of Cassation. The Court was asked to rule on the admissibility of an appeal. Under the Italian Constitution (art. 111), appeal to the Court of Cassation is «*always*» possible when the law has been allegedly violated. Nevertheless, the Court dismissed the case because article 360-bis of the Code of Civil Procedure, as it was said earlier, allows it to set aside the appeal when the Court already has an established jurisprudence on point and it deems there is no reason to change it. However, in this instance, the Court's jurisprudence amounted to just one single precedent. The Court argued that even a single precedent, if unambiguous, clear and convincing, can determine the «*orientation*» of the jurisprudence referred to in art. 360-bis[11]. The Court also added that since it had ruled only once on the issue, it meant that it had never felt the need to change its orientation.

There are a number of factors that arguably could have led the Court of Cassation to the conclusion that one single decision can be weighty enough to warrant considering it «*orientation*» of the Court's jurisprudence. For instance, the case concerned a temporary norm that had already lapsed, relating to enforcement proceedings pending two decades earlier (September 8th, 1998) and the Courts' judgment that established the *orientation* had been passed a decade before[12]. Since then, the Court had had no chance to return to the issue again[13]. The transient nature of the law applied, the limited scope and the timing of the question considered, and the fact that the Court of Cassation is the last instance of jurisdiction in the Italian legal system are all factors that could justify calling even one single decision "jurisprudence", which otherwise would appear to be simply «*absurd*»[14].

Still, the decision was remarkable and debatable because it makes confusion between precedents and jurisprudence. Yet, precedents are not jurisprudence. Jurisprudence is more than just one or more precedents. What makes jurisprudence is not just one or more precedents but also several more factors that should be objectively determined and weighted. In civil law constitutional systems, there must be a separation between those who make the law and those who apply it. If a single precedent is *jurisprudence* the distinction between lawmakers and adjudicators no longer holds true. Scholars have also noted that

[11] Cass., february 22nd, 2018, n. 4366.

[12] Cass., october 11th, 2006, n. 21733.

[13] These are factors all considered for the purpose of the publishing regime of Court's decisions in France (§ 2.1).

[14] G. PILLOT, ibid.

admissibility of an appeal should be objective and technical. It cannot depend on a subjective assessment of the Court of its own jurisprudence. Assume two plaintiffs appeal before the Court, facing the same objective situation. Everything else being equal, both appeals are either admissible or are not. The fact that one appeal could be admissible but the other not contravenes the egalitarian spirit of the Constitution, which provides that access, at given conditions, to *one* Supreme Court is «*always*» permitted. As it has been noted, the Court's reasoning has distorted the concept of the Court's *orientation*, making it difficult to measure it quantitatively, since it seemed impossible to trace it to a single previous decision[15].

Yet, if the normative weigh of judicial decisions could be measured and a system to do so was agreed upon, even a single Court's decision could substantiate jurisprudential orientation as long as its measured normative weight is heavy enough.

These are the reasons why it is now crucial, in the civil law systems, to set the quantitative parameters to weigh jurisprudence and the elements that constitute it. That is necessary if efficient case management and effective judicial protection of individual rights are to be balanced.

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[15] G. PILLOT, Giusto proc. civ., 2019, 795 ss.

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THE IMPROVEMENT OF THE ACCESS TO JUSTICE THROUGH THE INTEGRATION OF THE ICT IN THE EU LEGAL ORDER

Abstract This study describes the improvement of the accessibility to justice through information and communication technologies (ICT) and defines the prospects for integrating the results of the CREA (Conflict Resolution with Equitative Algorithms) research projects into the EU legal order. In the initial part of this study, the Author will provide a brief introduction about the competence of the EU in the area of judicial cooperation in civil matters and will outline the prospects in the development of electronic justice from an EU point of view, specifically through the use of ICT in the area of justice at European level. Afterwards, the paper will propose an analysis of the concept of access to justice, considering its possible declensions in four phases that make up the solution of a legal issue. It will then examine the potential improvement in the access to justice by CREA software, as a helpful tool in the solution of cross-border disputes as well as national ones. Finally, the Author will define the perspectives in the integration of this alternative dispute resolution in the EU legal framework through the adoption of a legal act.

1. *Introduction*

Twelve years ago, the European Council called for the promotion of the use of information and communication technologies (ICT) in the area of justice at European level. The need to integrate ICTs into the management of justice has grown in parallel with the development of the European area of security and justice.

According to the European Commission, e-Justice can be defined as the use of ICT to improve citizens' access to justice and the effectiveness of judicial action. The European action in this area has been implemented along the lines of the e-Justice action plans and strategies, elaborated by the European institutions. The most recent European e-Justice strategy (2019-2023) aims to develop portals such as e-Justice, e-Law and Eur-Lex to improve access to information and, in this sense, to improve access to justice intended in a broad sense. The

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action plan defines how to implement the objectives of the Strategy, mainly the development of e-communications, facilitating interactions between judicial authorities as well as between citizens and practitioners, and the enhancement of interoperability between Member States' systems. There are also several possible innovations which are not currently considered in the strategy, but that are encouraged by funding research projects, also with a view to defining the prospects for their use. This is the case of the CREA project, which aims to introduce an alternative dispute resolution system using equitable algorithms.

The purpose of this work is to describe the improvement of the accessibility to justice through the ICT and to define the prospects for integrating the results of the CREA research projects into the EU legal order.

2. *The EU competence in the area of judicial cooperation in civil matters*

Investigate the matter about the new frontiers in the improvement of the E-justice in the EU legal order necessarily requires the definition of the competence of the European Union to regulate judicial cooperation.

According to the principle of conferral, the Union shall act only within the limits of the competences conferred upon it by the Member States in the Treaties[1]. It follows that, under this principle, the European Union can only adopt legal acts aiming at enhancing the use of the ICT complying with the limits of the competence established by the article of the Treaty on the Functioning of the European Union (hereinafter TFEU) dedicated to the judicial cooperation in civil matters[2].

[1] See art. 5 TEU.

[2] About judicial cooperation in civil matters see, inter alia, M. Andenas, *National Paradigms of Civil Enforcement: Mutual recognition or Harmonization in Europe,* in *European Business Law Review*, 2006, p. 529; R. Baratta, *Art. 81 TFUE*, in A. Tizzano (edited by), Trattati dell'Unione europea, Milano, 2001, p. 241; S.M. Carbone, *Lo spazio giudiziario europeo in materia civile e commericale. Da Bruxelles I al regolamento CE 805/2004*, Torino, 2009; M. Freudenthal, *Attitudes of European Union Member States Towards the Harmonisation of Civil Procedure,* in C.H. van Rhee, A. Uzelac (eds), *Enforcement and Enforceability - Tradition and Reform*, Oxford, 2010, p. 3; C.N. Kakouris, *Do the Member States possess Judicial Procedural "Authonomy"*, in CMLR, 1997, p. 1389; X.E. Kramer, C.H. Rhee (eds), Civil Litigation in a Globalising World, L'Aja, 2012, A. Maffeo, Diritto dell'Unione europea e diritto processuale civile nazio-

The competence in the area of judicial cooperation in civil matters has been established by the Maastricht Treaty and in 1997; the Amsterdam Treaty has "comunitarised" the area, establishing that the Council shall act unanimously on a proposal from the Commission and after consulting the European Parliament[3].

At present, according to Art. 81 TFEU, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall adopt measures, *inter alia*, aimed at ensuring the mutual recognition and enforcement between Member States of judgments and of decisions in extrajudicial cases; an effective access to justice; the development of alternative methods of dispute settlement.

However, the first paragraph of this article establishes also the boundaries of this competence as it states that «The Union shall develop judicial cooperation in civil matters having cross-border implications».

Therefore, the European Union, using this legal basis, shall only adopt acts in civil matters that are related to cross-border issues. Moreover, in the adoption of measures concerning family law with cross-border implications, a special legislative procedure shall be observed[4].

Considering the topic of this contribution, between the various acts adopted to improve the judicial cooperation in civil matters, it

nale; verso l'adozione di norme minime comuni?, in Diritto dell'Unione europea – Osservatorio, 31 marzo 2018; A. Maffeo, *Diritto dell'Unione europea e processo nazionale*, Napoli, 2019; O. Porchia, *Principi dell'ordinamento europeo. La cooperazione pluridirezionale*, Bologna, 2008; E. Silvestri, *Toward a European Code of Civil Procedure? Recent initiative for the Drafting of European Rules of Civil Procedure*, in academia.edu; M. Storme, *A single Civil Procedure for Europe: A Cathedral Builder's Dream*, in *Ritsumeikan Law Review*, 2005, p. 87; E. Storskrubb, *Civil Procedure and EU Law. A Policy Area Uncovered*, Oxford, 2008; G. Tarzia, *Harmonization ou unification transnationale de la procedure civile*, in *Rivista di diritto internazionale privato e processuale*, 2001, p. 869; M. Tulibacka, Europeanization of Civil Procedure: In Search of a Coherent Approach, in CMLR, 2009, P. 1527.

[3] This legal procedure has been afterwards modified by the Nice Treaty.

[4] See Art. 81, par. 3, TFEU, establishing that in such a case the Council, on a proposal from the Commission, may adopt a decision determining those aspects of family law with cross-border implications. The Council shall act unanimously after consulting the European Parliament. Moreover, the proposal of the Commission shall be notified to the national Parliaments. If a national Parliament makes known its opposition within six months of the date of such notification, the decision shall not be adopted. In the absence of opposition, the Council may adopt the decision.

could be interesting analyse the EU legal acts on the alternative dispute resolution (hereinafter ADR). The Directive 2008/52 on certain aspects of mediation in civil and commercial matters[5] aims to facilitate access to ADR and to promote the amicable settlement of disputes by encouraging the use of mediation. As explained by the title, the directive applies to disputes in civil and commercial matters, and it does not extend to revenue, customs or administrative matters and to the liability of an EU country for acts and omissions in the exercise of State authority (*acta iure imperii*)[6]. It is important to underline that, according to the legal basis established by Art. 81 TFEU, this Directive shall apply only in cross-border disputes, that is one in which at least one of the parties is domiciled or habitually resident in a Member State other than that of any other party. Nonetheless, as stated in whereas n. 8, even if the provisions of this Directive should apply only to mediation in cross-border disputes, nothing should prevent the Member States from applying such provisions also to internal mediation processes[7].

Therefore, it could seem strange that the Directive 2013/11 on the alternative dispute resolution for consumer disputes[8], which aims at introducing a fast and fair alternative dispute resolution procedures for consumers, has a different scope. More in depth, according to this directive Member States shall ensure that all kinds of contractual disputes that arise from the sale of goods or provision of services (both online and offline) can be submitted to an ADR entity as to obtain a simple and fast way of resolving disputes. This Directive applies to all the disputes, such as when a trader refuses to repair a product or to make a refund to which a consumer is entitled, also where consumer and seller reside in the same Member State. In this case, the scope is not limited to transnational disputes. That is because this directive, even if rules an aspect of the judicial cooperation in civil matters, has as main objective to ensure the proper functioning of the EU's single

[5] Directive 2008/52/EC of the European Parliament and of the Council of 21 May 2008 on certain aspects of mediation in civil and commercial matters, OJ L 136, 24.5.2008, p. 3-8.

[6] See art. 1 of the Directive 2008/52, cited.

[7] In Italy, for instance, the mediation attempt has been established as mandatory in several civil matters.

[8] Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Directive on consumer ADR), OJ L 165, 18.6.2013, p. 63–79.

market. For this reason, the proper legal basis is Art. 114 TFEU[9], about the approximation of laws, that allows rules for internal and transnational issues.

The same is for Regulation 524/2013[10] on online dispute resolution (hereinafter ODR), that aims to create an ODR platform (website) at EU level where consumers and traders can resolve disputes that arise from online transactions. The platform allows consumers to submit their disputes online and operates in all EU official languages. This Regulation is based on art. 114 TFEU, also considering that Art. 169(1) and point (a) of Art. 169(2) TFEU provide that the Union is to contribute to the attainment of a high level of consumer protection through measures adopted pursuant to Art. 114 TFEU.

In general terms, recently there was a debate about the adoption of common minimum standards of civil procedure in the European Union. In this regard, the European Parliament has released a resolution with recommendations to the Commission[11]. The European Parliament has supported this legal act considering that the piecemeal nature of the harmonisation at Union level of procedural rules has been repeatedly criticised and the emergence of sector-specific Union civil procedure law challenges the coherence of both civil procedure systems at Member State level and the various Union instruments. Therefore, a system of Union common minimum standards in the form of principles and rules, would serve as a first step for convergence of na-

[9] According to Art. 114 TFEU, the European Parliament and the Council shall, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee, adopt the measures for the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market.

[10] Regulation (EU) No 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR), OJ L 165, 18.6.2013, p. 1–12. See also Commission Implementing Regulation (EU) 2015/1051 of 1 July 2015 on the modalities for the exercise of the functions of the online dispute resolution platform, on the modalities of the electronic complaint form and on the modalities of the cooperation between contact points provided for in Regulation (EU) No 524/2013 of the European Parliament and of the Council on online dispute resolution for consumer disputes, OJ L 171, 2.7.2015, p. 1–4.

[11] European Parliament resolution of 4 July 2017 with recommendations to the Commission on common minimum standards of civil procedure in the European Union (2015/2084(INL)).

tional regulations concerning civil procedure[12]. However, the European Commission in its reply[13] has stated that will determine whether and to what extent further action is required in this area and, in this case, will take Parliament's proposal into account in its future work.

This overview of the legal framework in judicial cooperation in civil matters makes a display of the boundaries of the EU competence in establishing legal acts on the judicial cooperation in civil matters and allow us to define how the EU can improve the development of the electronic justice.

3. *Perspectives in the development of Electronic justice from an EU point of view*

In 2007, the European Council invited the Council to promote the developing of the use of ICT in the area of civil justice at European level[14]. Following this pointer, the Council of European Union on Justice and home affairs underlined that the work in the area of E-Justice should be carried with a view to creating a user-friendly access for citizens, economic operators, practitioners of law, judicial authorities and courts[15]. According to the Council, the EU action should cover, among other objectives, the set-up of a European interface (E-Justice portal); start the preparations for the use of IT for the European payment order procedure; improve the use of video-conferencing technology for communication in cross-border proceedings.

The European Parliament too has given his contribution, inviting the Commission to complement the European area of justice, freedom and security with an area of e-Justice [16].

In response to the Council, the Commission presented its communication "Towards a European e-Justice Strategy"[17], highlighting that e-Justice represents a response to the threefold need to improve access

[12] See letters K and W of the cited European Parliament Resolution.

[13] Suite donnée à la résolution du Parlement européen du 4 juillet 2017 contenant des recommandations à la Commission relatives à des normes minimales communes pour les procédures civiles dans l'Union européenne, 2015/2084(INL).

[14] European Council Conclusions of 21-22 June 2007, point 30.

[15] JHA Council Conclusions of 12-13 June 2007, page 43 of document 10267/07.

[16] European Parliament Resolution on e-Justice at its Plenary meeting on 18 December 2008, 2008/2125 (INI).

[17] European Commission communication "Towards a European e-Justice Strategy" of 5 June 2008, (COM(2008) 329 final.

to justice, cooperation between legal authorities and the effectiveness of the justice system itself. Therefore, the European Commission has defined the priorities for action in the period 2008-2013 and, following the indications of the other European institutions, pointed on the creation of an e-Justice portal for the public and enterprises to improve access to justice in Europe.

This portal is intended to refer visitors to the other existing sites[18], to European legal institutions and is also intended to give direct access to certain European procedures such as small claims procedure[19] and payment procedure[20].

The EU action in the improvement of electronic justice has developed over time: the need to integrate ICTs into the management of justice has grown in parallel with the development of the European area of security and justice and with the development of the technologies.

The European action in this area has been implemented along the lines of the e-Justice action plans and strategies. The Council has adopted, over time, a European e-Justice Strategy and an Action Plan for the duration of four years. Therefore, these programs have been renewed as they come to the end of their terms. Actually, it has been published the e-justice Strategy and the Action plan 2019-2023.

In the 2019-2023 Strategy on e-Justice[21] the Council has recognised that Procedures carried out in a digitised manner and electronic communication have become an essential component in the efficient functioning of the judiciary in the Member States.

Nowadays, we can affirm that the European e-Justice Portal has been built up with information pages, search tools and dynamic forms. Furthermore, electronic tools now allow for digital judicial proceedings, secure communication between judicial authorities and access to certain national registers under the responsibility of the Member

[18] See, for instance, Eur-lex, Pre-lex, SCADPlus, Eurovoc and IATE.

[19] Regulation (EC) No 861/2007 of the European Parliament and of the Council of 11 July 2007 establishing a European Small Claims Procedure, OJ L 199, 31.7.2007, p. 1–22 as emended by Regulation (EU) 2015/2421 of the European Parliament and of the Council of 16 December 2015 amending Regulation (EC) No 861/2007 establishing a European Small Claims Procedure and Regulation (EC) No 1896/2006 creating a European order for payment procedure, OJ L 341, 24.12.2015, p. 1–13.

[20] Regulation (EC) No 1896/2006 of the European Parliament and of the Council of 12 December 2006 creating a European order for payment procedure, OJ L 399, 30.12.2006, p. 1–32.

[21] OJ 2019/C 96/04.

States or professional organisations[22]. However, it is still valid the aim at developing e-justice in order to improve access to information in the area of justice in the European Union.

In the Strategy, it has been defined three objectives of European e-Justice: the improvement of the access to information, of the e-Communication in the field of justice and of the interoperability. Considering the topic of this contribution, we will focus on the first subject.

In the view of the Council, the improving of the access to justice lies in the amelioration of the information on the rights of citizens, on EU law and on procedures.

In this purpose, the Action Plan, which is intended to deliver the vision of the Strategy, consistently develops this point in two lines: general information on Justice and access to legal information[23].

Under the first objective, the improvements are intended to make the e-justice Portal more usable and complete and reinforce its role as a one-stop-shop for European e-Justice.

Under the second objective, EU will finance the projects aiming at facilitating the access to legal data. In this purpose we know that at now EUR-Lex gives access to EU law, national law transposing EU law, case law coming from the Court of Justice of the EU as well as national case law related to EU law. Therefore, access to legal data should be facilitated by the use of identifiers for legislation and case law, which allow for easier analyses of legal data.

It is particularly interesting that, under this objective, the Council has also outlined the employment of artificial intelligence, even though in a very embryonic stage. Artificial Intelligence (AI) is considered as one of the major developments in ICT in recent years. Nonetheless, the Council reckons that, even if its use should be further developed in coming years, at this moment its implications in the field of e-Justice need to be further defined.

Therefore, the CREA project is at the very frontier in the application of AI to justice. As will be pointed to hereinafter, the CREA Software aims to provide an alternative system of dispute resolution through equitable algorithms and this kind of solution should be considered as a tool facilitating the access to justice. In order to explain the grounds of this assertion, in the next paragraph will follow an analysis about what should be meant as access to justice.

[22] See point 1 and point 5 of the 2019/2013 Strategy, cited.

[23] See 2019-2023 Action Plan, cited, p. 2 ff.

4. *The broad concept of Access to justice and the use of ICT for its improvement*

With the sole aim to lift the major preliminary remarks and without any ambition to exhaustively tackle a so general argument, this paragraph proposes an analysis of the concept of access to justice[24].

In particular, the access to justice should be assessed considering all its possible declensions. Therefore, it should be envisaged the real possibility to demand and obtain justice evaluating all the phases that make up the solution of a legal issue.

The first phase is made up of the awareness of own rights: the access to justice is first of all the access to information about one's right and to the information about how to exercise one's rights.

At EU level, this function is mainly performed by the EU websites[25]: portals such as e-Justice, e-Law and Eur-Lex. E-justice portal,

[24]In the EU legal order, the Access to justice is guaranteed by the European Convention of Human Rights (Hereinafter ECHR) and by the Charter of Fundamental Right of the European Union (hereinafter CFREU). More precisely, art. 6 ECHR states the right to a fair trial and art. 13 is dedicated to the Right to an effective remedy while, in the CFREU, the chapter VI is dedicated to the Justice and its art. 47 states the right to an effective remedy and to a fair trial.

About the access to justice see, inter alia, N. Carboni, *From Quality to Access to Justice: Improving the Functioning of European Judicial Systems*, in Civil and Legal Sciences, Vol. 3, No. 4; A. Doobay, *The right to a fair trial in light of the recent ECtHR and CJEU case-law*, in ERA Forum, Vol. 14, No. 2, pp. 251–262, 2013; F. Francioni, *Access to Justice as a Human Right*, New York, 2007; B. Rainey, E. Wicks, C. Ovey, The European Convention on Human Rights, Oxford, Oxford University Publishing, 2014; C. Timmermans, *Fundamental rights protection in Europe before and after accession of the European Union to the European Convention on Human Rights*, in P. van Dijk, M. van Roosmalen, et al (eds.), *Fundamental Rights and Principles*, Antwerp, Intersentia, 2013; D. Vitkauskas, G. Dikov, *Protecting the right to a fair trial under the European Convention on Human Rights*, Strasbourg, Council of Europe, 2012; A. Ward, *Commentary to art.* 47, in S. Peers, A. Ward, et al (eds.), Commentary on Charter of Fundamental Rights, Oxford, Hart Publishing, 2013; European Union Agency for Fundamental Rights, *Access to justice in Europe: an overview of challenges and opportunities*, Luxembourg, Publications Office, 2011; European Union Agency for Fundamental Rights, *Handbook on European law relating to access to justice*, Luxembourg, Publications Office, 2016; Council of Europe, *Guide to a fair trial: criminal limb*, Strasbourg, 2014.

[25] Recently, DG Justice and Consumers of the European Commission has launched a campaign aiming to make EU citizens become better aware of their key

in particular, is conceived as a one-stop-shop in the area of justice[26], while Eur-Lex is a database providing legal acts, judgments and institution's acts. As explained above, the most recent EU e-Justice strategy has announced the aim to improve access to information and, in this sense, to improve access to justice[27].

The access to justice's second phase could be considered as the material accessibility to the tools and to the procedure to obtain justice. This concept can include several issues. First of all, we have to consider the procedural aspects, especially if the procedure can be initiated directly by the natural and legal persons without the assistance of a lawyer. In this case, the access to justice is strictly connected to the feasibility of the complaint and of the handling of the subsequent steps.

Moreover, we have to evaluate the costs of the procedure. In several cases the costs are decided by the Member States implementing the procedure. In this regard, the European Court of Justice has stated that fees and costs must be defined so that it is not in practice impossible or excessively difficult to exercise the rights conferred by European Union Law[28].

consumer rights and provide them with guidance on how to implement them, see https://europa.eu/youreuright/home_en and https://www.youtube.com/user/EUJustice/videos?disable_polymer=1. The information to the citizen is also provided through the Europe Direct desks established in several cities of the European Union.

[26] See https://e-justice.europa.eu/home.do?plang=en&action=home. As explained by the European Commission in communication "Towards a European e-Justice Strategy", cited, the portal will have the function to provide European citizens, in their language, with data on judicial systems and procedures. It is well-known that ignorance of the rules in force in other Member States is one of the major factors preventing citizens from asserting their rights outside their home country.

[27] In the 2019-2023 Strategy, cited, at point 13 the Council has affirmed that the objective to improve the access to justice includes information on the rights of citizens, which helps to raise their awareness; information on EU law, as well as national law transposing EU law; information on procedures which helps citizens to use the various tools put at their disposal for the sake of conducting such procedures, such as dynamic forms or search tools for practitioners and (judicial) authorities; information on competent authorities which helps citizens to identify competent authorities and relevant national laws, in the framework of judicial or extrajudicial proceedings; publicly available information contained in national registers and data relevant to the use of e-Justice and e-Law.

[28] See Judgment of the Court, 13 December 2012, Iwona Szyrocka, C-215/11, EU:C:2012:794. About the division of costs see also Judgment of the Court of 14 February 2019, Rebecka Jonsson, C-554/17, EU:C:2019:124.

Nowadays, the ODR is the only EU procedure that can be initiated online through an EU website[29]. In this regard, the European Commission has affirmed that the ability to complete specific steps in the judicial procedure by electronic means is an important part of the quality of justice systems because the electronic submission of claims, the possibility to monitor and advance a proceeding online can ease access to justice and reduce delays and costs[30].

The access to justice' third phase should be made up by the obtaining of a fair decision[31]. In each national legal order, as in the EU legal order, this result is guaranteed by the application of the law. Nonetheless, in civil matters, considering the length of the judicial process, this result can be better achieved through an ADR. This kind of extrajudicial solution can provide a cost-effective and quick result. Furthermore, as will be see in the following paragraph, ICT can play a role in the improving of the access of justice intended as access to a fair decision[32]. In particular, AI can be applied in order to develop a new kind of decision.

Agreements resulting from mediation are more likely to be complied with voluntarily and are more likely to preserve an amicable and sustainable relationship between the parties[33]. This leads us to consid-

[29] See https://ec.europa.eu/consumers/odr/main/?event=main.complaints.screeningphase.

[30] See the Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions *The 2018 EU Justice Scoreboard Brussels*, COM(2018) 364.

[31] As mentioned at the beginning of this paragraph and in footnote No 24, this overview on the phases of the access to justice has been carried out following a practical approach, without prejudice to the legal content of this fundamental right. The respect of all the aspects of the access to justice and, in this sense, to the fair trial and to an effective remedy, are summed up as "the application of law". Between the several declensions of the right to a fair trial it can be recalled the right to a fair and public hearing before an independent and impartial tribunal, to a legal aid, the right to be advised, defended and represented.

[32] More in detail, in the next paragraph it will be underlined the improvement to the access to justice through the use of a software developed by an algorithm able to find the best solution in the division of goods. In general terms, the ICT can also help in accessing judgments: ensuring access to judgments online increases the transparency of justice and helps citizens and businesses understand their rights.

[33] See whereas n. 6 of the Directive 2008/52, cited. These benefits become even more pronounced in situations displaying cross-border elements.

er the effects of this kind of solution with respect to the problem that usually belong to the fourth phase of the access to justice, that is to say the obtaining an effective execution of the judicial decision.

The execution of a judgement in another Member State is complicated by the need to start the procedure in the State of execution applying the national law.

The EU has introduced several instruments in order to facilitate the cross-border solution of disputes relates to monetary claims[34]. Through this procedure, the part can obtain a title that can be executed in another Member State without the need of an exequatur. Even if this result facilitates the circulation of the judgements, an effective easy execution trough Europe is complicated by the difficult, also for practitioners, in obtaining information on the competent jurisdiction, the procedure and the cost.

5. *The implementation of CREA Project results in the EU legal order*

The CREA project (Conflict Resolution through Equitative Algorithms), funded by European Union's program Horizon 2020, aims to introduce new mechanisms of dispute resolution as a helping tool in legal procedures for lawyers, mediators and judges with the objective to reach an agreement between the parties.

At the end of the project, it has been developed a software applying game-theoretical algorithmic mechanisms to the solution of certain national and cross-border civil matters concerning the division of goods between co-owners. This methodology can be applied to the allocation of goods in areas such as inheritance, divorce and co-ownership in commercial law.

The objectives and the functioning of the CREA Software have been better explained in other publications. Nonetheless, for the purpose of this contribution, it is important to underline that in this project ICT has been applied by demonstrating the efficacy of an algorithmic approach in leading the parties to a friendly solution before or during the trial. Therefore, the CREA software must be con-

[34] For a very general recognition of the instruments adopted by the EU for the Judicial cooperation in civil matters, see paragraph 2. In order to simplify and speed up cross-border small claims litigation in civil and commercial matters and cut costs, it has been also adopted the European Small Claims procedure. See Regulation No 861/2007 of the European Parliament and of the Council of 11 July 2007 establishing a European Small Claims Procedure, OJ L 199, 31.7.2007, p. 1–22.

sidered as an instrument based on the application of Artificial Intelligence that improves the access to justice, especially in cross-border disputes.

The CREA software brings to a solution to the dispute that is not only proportional but also «envy-free». This way, it produces allocations in which each participant believes he or she receives the best portion of the goods being divided, based on its subjective references.

The parties express their preferences via web and the procedure leads to the best solution in a short time. Therefore, the CREA software improves the access to justice considered both as an access to material accessibility to the tools and to the procedure to obtain justice, the obtaining of a fair decision and the obtaining an effective execution of the judicial decision.

The use of the software is intuitional and easy, and it is sufficient a web connection, for this reason, this instrument allows an easy material access to the procedure.

Furthermore, in suggesting an envy-free solution, the CREA software brings the parties to the best solution. The fairness of the decision will be verified by the respect of the mandatory law.

Lastly, an agreement has higher chances of being executed quickly and of one's own accord, without the need of an execution procedure.

The CREA software will be a helpful tool in the solution of cross-border disputes as well as national ones. Evidently, in the first case, the gain in time and cost is more remarkable.

In any case, this instrument shall guarantee the complying of the solution proposed with mandatory rules of applicable law.

One of the objectives of the CREA project was the creation of a «European common ground» of available rights, different from standard legal principles in order to develop a software that uses algorithms that rapidly implement better settlements with consistent rules so that the settlement complies with the mandatory rules established in the Member States.

At now, a common ground has been created and the Law Unit has underlined the relevant question related to each field in every Member State involved. However, the algorithm implemented in the software does not include legal aspects. For this reason, at the present time the CREA software should be used under the guide of a mediator (or a lawyer, or a judge) that verifies the consistency of the settlement with the mandatory rules established by the national law. Nonetheless, when the software will be completed under this aspect, it should be used also by citizens autonomously, without prejudice to the need to submit the agreement to the judicial authority, if required by national law.

In any case, the CREA software is a useful tool for resolving disputes and it responds perfectly to the needs expressed in the European e-justice strategy and Action Plan. Therefore, it would be appropriate to include this tool, as ADR tool, on the e-justice portal.

Moreover, the new procedure could be integrated in the EU legal framework through the adoption of a legal act.

In this purpose, it should be considered art. 81 TFEU as legal basis, where it establishes that «European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall adopt measures, particularly when necessary for the proper functioning of the internal market, aimed at ensuring: […] (e) effective access to justice; […] (g) the development of alternative methods of dispute settlement». As explained above[35], according to the first paragraph of the cited article, the development of judicial cooperation in civil matters is limited to the disputes having cross-border implications. For this reason, a legal act adopted on this legal basis, aimed at facilitating the access to ADR and at promoting the amicable settlement of disputes relates to the division of goods by encouraging the use of CREA software, will be limited to cross-border disputes. Nonetheless, as established in Directive 2008/52[36], nothing should prevent the Member States from applying such provisions also to internal disputes.

It should be considered that this limitation could be bypassed adopting an act on the legal bases provided by art. 114 TFEU: measures for the approximation of the provisions laid down by law in the Member States. In such a case, the EU legal act could only dispose for measures which have as their object the establishment and functioning of the internal market. Therefore, such a legal act should rule division through CREA software for co-ownership of companies, considering the close relationship to the functioning of the internal market.

The adoption of a legal act requires, of course, the handling of the legal procedure by the European Institutions and this process requires times and implies an important positive impact for the parties.

We are sure about the positive impact from the use of the CREA software and for this reason we strongly recommend the inclusion and the promotion of this tool on the e-justice portal. The use of this instrument and the feedback by the parties will allow the improvement of this instrument in order to define the best use, also in the light of the adoption of a legal act.

[35] See paragraph 2.

[36] Directive 2008/52/EC of the European Parliament and of the Council of 21 May 2008 on certain aspects of mediation in civil and commercial matters, cited.

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Regulation (EU) No 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR), OJ L 165, 18.6.2013, p. 1–12.

Regulation No 861/2007 of the European Parliament and of the Council of 11 July 2007 establishing a European Small Claims Procedure, OJ L 199, 31.7.2007, p. 1–22.

The 2018 EU Justice Scoreboard Brussels, COM(2018) 364.

IRENE KALPAKA*

EUROPEAN UNION'S ETHICAL AND LEGAL FRAMEWORK FOR TRUSTWORTHY ARTIFICIAL INTELLIGENCE[1]

Abstract Nowadays, algorithms are increasingly used to support decision-making, inter alia, in the field of civil justice. However, their use raises some questions concerning their efficacy to achieve the result sought as up to now algorithmic transparency and technical accountability are not always feasible. Therefore, some main guarantees should be established in order to avoid faults and fallible results. European Union's existing ethical and legal framework can play a decisive role towards that aim. And as trustworthy artificial intelligence is a continuous process, a new European legislation should be enacted that would be capable to maximize the benefits of algorithms and minimize their risks.

1. *Introduction*

Artificial intelligence is the aim of scientific methods and techniques to reproduce the cognitive abilities of a human being by a machine[2]. It is distinguished between strong artificial intelligence and weak but only the latter is feasible nowadays as the scientific progress is not in that level in which the machines could function in a completely autonomous way.

Examples of weak artificial intelligence are the algorithms. The latter can, inter alia, be applied in the field of civil justice and its environment, for instance in a dispute resolution through mediation. They play a decisive role in the execution of the mediation's process and contribute to its implementation, as they solve specific problems through specific range of actions.

However, their use raises some questions concerning their efficacy to achieve the result sought in each case as it is not the ingoing data that prescribe the outcome but the way that the data are analyzed by the algorithms. We can understand the input and the output but not what

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[1]Delimitations: The present document concerns only the automated/algorithmic decision-making systems for conflict resolution in civil law matters.

[2]There is not yet a commonly accepted definition for artificial intelligence.

goes on inside, namely between these two stages[3]. In other words, which is the process behind the algorithms' decision? They elaborate the input in a way that comes out the output? If not, what is the decisive factor that leads to the output? And is the latter fairly or not?

Up to now, it is not always possible to create a tool in order to understand how the system worked, what reasons are behind each decision and what actions are taken and why (algorithmic transparency and technical accountability).

However, it is feasible to define the "undecidable" problems, namely those questions for which are impossible to create an algorithm that always gives a correct answer. This is the so-called halting problem which looks for the limit of what can be computable[4].

Therefore, some main ethical and legal guarantees should be established in order to maximize the benefits of artificial intelligence and minimize its risks.

2. *Ethical Framework*

The European Union in order to be faithful to its cultural history, it should develop a "human-centric" approach of artificial intelligence that respects the European values and principles.

The European Commission's High Level Expert Group on Artificial Intelligence (hereinafter mentioned as AI HLEG) published ethic guidelines for trustworthy artificial intelligence[5] according to which European Union should promote the creation of a trustworthy artificial intelligence that fulfills three characteristics: It is lawful, ethical and robust.

The document of AI HLEG provides insight on how artificial intelligence's systems (hereinafter mentioned as AI systems) could become ethical and robust.

The fundamental rights as they are defined in the EU Treaties and the EU Charter of Fundamental Rights provide guidance on what technology should do in order to be ethical.

[3] FRANK P., *The Black Box Society: The Secret Algorithms that Control Money and Information*, Harvard University Press, 2016.

[4] DEVEN R. DESAI AND JOSHUA A. KROLL, *Trust but Verify: A Guide to Algorithms and the Law*, Harvard Journal of Law & Technology, Vol. 31.

[5] *Ethics Guidelines for Trustworthy AI*, Independent High-Level Expert Group on Artificial Intelligence, Set up by the European Commission, European Commission, Brussels, 8 April 2019.

AI HLEG sets the families of rights that are appropriate to cover that field:

- Respect for human dignity, Freedom of the individual, Respect for democracy, justice and the rule of law, Equality, non-discrimination and solidarity including the rights of persons at risk of exclusion, Citizens' rights.

From the aforementioned rights the AI HLEG derives four ethical principles:

- The principle of respect for human autonomy, The principle of prevention of harm, The principle of fairness, The principle of explicability.

Moreover, the AI HLEG points out that all these abstract rights and principles should be converted into a concrete and non-exhaustive list of requirements of equal importance for the realization of trustworthy artificial intelligence. So, AI HLEG proposes to European stakeholders to follow seven key requirements when they are developing and using AI systems:

- Human agency and oversight

To ensure that this requirement is applied in practice, a fundamental rights impact assessment prior to each AI system development should be taken. Also, humans should put in place mechanisms and measures to ensure human control and should always have the possibility to abort an operation that is problematic, for instance by the use of a stop button.

- Technical robustness and safety

That requirement concerns the cyber-security and the effort to understand and reduce the different kinds of cyber-attacks. For that reason, a series of steps should be realized in order to increase the AI systems' accuracy. Besides, humans should monitor and test those systems in order to assure that the latter meet their purposes and operate properly.

- Privacy and data governance

Namely, measures should be taken to ensure privacy, for instance via encryption, and quality of the data. Also, relevant standards for data collection, protection and governance should be followed.

- Transparency

According to this requirement, technical methods that ensure traceability should be used, namely why and how an algorithmic system is designed and developed and how it shapes the decision-making process in order to answer if that system is valid and if its outcomes are fair or produce a bias.

Moreover, the users of AI systems should always be aware that they interact with an AI system and not with another human.

- Diversity, non-discrimination and fairness

This requirement is fulfilled when the algorithms of an AI system are designed and the data are used in a way that avoids unfair bias. Moreover, such systems should take into account a wide range of individual preferences and abilities and provide a mechanism to different stakeholders in order to participate in their development and use.

- Societal and environmental wellbeing

That means that AI systems should be sustainable, environmental friendly and monitor their social impacts and effects.

- Accountability

An AI system is accountable only when justifications can be given about the occurred actions. An impact assessment tool should be used in order to measure the outcomes and to report and minimize the negative impacts of an AI system. Also, mechanisms that give the opportunity of redress if any harm would be occurred should be established for compensate users and/or third parties.

The methods to implement the requirements mentioned above can be both technical and non-technical ones and should encompass all levels of the development process of AI systems.

To sum up, AI HLEG underlines that trustworthy artificial intelligence is a continuous process that requires constant evaluation and justification of the systems. For that reason, it poses a Trustworthy AI Assessment List (Pilot Version) with a not exhaustive list of questions[6] that should be considered by those who accomplish the assessment in order to answer if their systems correspond to the seven key requirements mentioned above.

3. Legal Framework

Beside the ethical framework a legislative one appropriate for artificial intelligence should be implemented as well in order to avert or at least diminish faults and fallible results of AI systems.

AI HLEG elaborated another document[7] which complements its

[6] AI HLEG invites all stakeholders to pilot this Assessment List and to provide feedback, as based on that feedback the AI HLEG would propose to the Commission a revised version of the aforementioned list in early 2020.

[7] *Policy and Investment Recommendations for Trustworthy Artificial Intelligence*, Independent High Level Expert Group on Artificial Intelligence, Set up by the European Commission, European Commission, Brussels, 26 June 2019.

ethic guidelines since the latter do not refer to the first of the three components of a trustworthy artificial intelligence system ("lawful", "ethical", "robust").

AI HLEG provides insights on how regulation should be enacted in order to respond to artificial intelligence's needs.

Regulation should be based on proportionality, namely the higher the individual or social risk of an AI system the stronger the regulatory response should be.

For unacceptable impacts a precautionary principle-based approach should be adopted.

Principled-based regulation is preferable instead of an analytic and descriptive one, as the technological change is rapid and unpredictable.

Also, an evaluation of all existing European Union's laws relevant[8] to AI systems should be conducted in order to ascertain the following:

To what extent and in which ways those laws are affected by AI systems, to what extent there are frameworks for enforcement and monitoring of the legislative measures concerning AI systems and to what extent existing legislation protects against risks posed by AI systems and ensures the ethical principles.

In case that the current legislation does not provide an adequate protection, then, new regulation for AI systems should be enacted from European Union, always in compliance with the principles of subsidiarity and proportionality, in order to avoid fragmentation of rules at member-states' level.

Concerning the existing legislation of European Union, Regulation 2016/679 on the protection of natural persons with regard to the processing of personal data (hereinafter mentioned as GDPR)[9] is applicable in the field of artificial intelligence too. The use of algorithms raises the question of the protection of personal data as the latter are the crucial element for the usage of an algorithm. Particularly, as the supply of data increases as the efficacy of the algorithm increases, since there is much more information to be processed and combined. For

[8] For instance, legislation that concerns cyber-security, civil liability and accountability, consumer protection, competition, data protection, criminal matters and non-discrimination matters.

[9] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), Official Journal of the European Union L 119/1, 4.5.2016.

that reason, it emerges a conflict between the function of an algorithm and the "*purpose limitation*" and "*data minimization*" which are defined in article 5, par. 1 (b)and (c) of the GDPR.

However, the interested person has the right to obtain the information mentioned in GDPR, for instance in which way the data are collected and with which specific data the algorithm is provided in order to lead to a decision. The GDPR explicitly mentions in article 13, par. 2 (f), article 14, par. 2 (g) and article 15, par. 1 (h) that the data subject should be aware of the existence of a solely automated decision-making, including profiling, and at least in those cases should be provided with meaningful information about the logic involved, the significance and the envisaged consequences of such processing for the data subject.

Also, GDPR stipulates in article 22, par. 1, that "*The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly affects him or her.*", therefore it enhances the right of the concerned person to access to litigation and debate in front of a judge (adversarial principle). Also, the latter should not be affected by the results conducted so far (impartiality and independence of judges)[10].

The provisions relating to processing of personal data as they are stipulated in GDPR should be applied also during the design stage of AI systems. Further, a prior risk assessment during that stage shall minimize the impact of their use on the rights of data subjects according to the precautionary principle.

In particular, according to article 35, par. 3 (a) of the GDPR, a data protection impact assessment is required especially when decisions that produce legal effects for the data subject or affect the data subject are based on automated processing of personal aspects.

4. *Challenges*

Concerning the ethical framework of European Union, AI HLEG's ethical guidelines are acceptable as a first step but still are not clear enough and they do not take long-term risks into consideration. Also, they do not determine which principles are not negotiable, in

[10]*European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment*, European Commission for the Efficiency of Justice (CEPEJ), Council of Europe, Strasbourg, 3 December 2018.

other words what should not be done with artificial intelligence in Europe (the so called "Red Lines"). An example of "Red Line" could be the prohibition of use of AI systems that humans can no longer understand and/or control[11].

Further, the aforementioned guidelines are not legally binding, so, there is a need for European Union's response through legal provisions that implement and complement them and ensure their implementation.

For instance, legally binding common rules on transparency and common requirements for fundamental rights impact assessments should be enacted in order to answer if stakeholders are obliged to ensure transparency by design, if they can differentiate the levels of transparency required depending on the automatization of each AI system and to what extend their intellectual property rights or trade secrets will set a limit on requirements of transparency and accountability.

Concerning the requirement of explainability, namely the availability of explanations that go beyond the function of an AI system itself, it is not always possible to make explanations available concerning an algorithmic decision because of the "black box effect" that is already described in the introduction of the present document.

For that reason, European Parliament recommends the creation of a regulatory body for algorithmic decision-making that will define the criteria that can be used in order to separate the algorithmic systems that are acceptable and those that should be prohibited, for instance if transparency, explainability or accountability cannot be achieved. Also, that body will determine which would be the obligations of a provider of an algorithmic decision-making system.

More issues such as the obligation for informing the persons affected by AI systems and specific liability regimes should also be addressed. Also, a prior algorithmic impact assessment before the use of an AI system it should deployed. Therefore, in the future, a new European legislation that concerns specifically the algorithmic decision systems may be enacted in order to respond to all those new challenges[12].

Concerning the existing legal framework of European Union, some

[11] THOMAS METZINGER, *EU guidelines Ethics washing made in Europe*, DER TAGESSPIEGEL, 08.04.2019 (English version).

[12] *Understanding algorithmic decision-making: Opportunities and challenges*, Study, Panel for the Future of Science and Technology, European Parliamentary Research Service, Scientific Foresight Unit (STOA), European Parliament, March 2019.

argues that GDPR does not provide a right to explanation that enhances the transparency and accountability of AI systems. Merely it grants to the data subject a right to be informed and further it does not protect data subject from discrimination[13].

As GDPR has recently applied within the member-states[14], it is necessary to monitor its application in the artificial intelligence's context, in order to conclude if it is suitable or not for this context, and also to observe the interpretation of its relevant articles from the Courts.

Having as an aim to find a balance between protection and innovation and not stifle the latter, further legal research should be accomplished in order to assess in which sectors a European regulatory intervention is needed and particularly in which way. Namely, European Union has to answer if there is a need of rules as adjustments to the existing legal framework or it is necessary to create a new European legislation more suitable for artificial intelligence. Also, it has to decide if those rules would be general or sectorial and in case of new legislation, if the latter would be enacted through hard-law or soft-law approach and as state regulation, self-regulation or co-regulation.

5. Conclusion

Artificial intelligence can take life-changing decisions, especially when AI systems are used in sensitive sectors such as this one of justice. Admitted that it evolves as swiftly as we don't have yet all the answers not all the questions concerning its role, European Union should enact a legal framework in order to specify rules at least about what machines cannot do. Also, since a prerequisite for trustworthy artificial intelligence is to understand how decisions are made by AI systems, legislation ought to provide tools that allow humans to supervise deci-

[13] For instance, Sandra Wachter, Brent Mittelstadt and Luciano Floridi, *Why a Right to Explanation of Automated Decision-Making Does Not Exist in the General Data Protection Regulation*, Oxford Internet Institute, University of Oxford, International Data Privacy Law, 2017.

Also, Bryce W. Goodman, *A Step Towards Accountable Algorithms?: Algorithmic Discrimination and the European Union General Data Protection*, Oxford Internet Institute, University of Oxford, 29th Conference on Neural Information Processing Systems (NIPS 2016), Barcelona, Spain.

[14] The application of GDPR began from 25 May 2018, according to article 99, par. 2 of the GDPR.

sions taken by AI systems and to challenge those decisions through judicial proceedings.

Therefore, European Union has now the opportunity to enact the kind of future that it would like to have concerning the use of AI systems and by its actions can prove to itself that is capable to avoid the "dark ages" of artificial intelligence.

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FRANCESCO BILANCIA*

THE USE OF ALGORITHMS AS ONLINE DISPUTE RESOLUTIONS MECHANISM. COMMENTS AND REMARKS

Abstract The work is intended to discuss the outcomes and papers delivered by the Conflict Resolution with Equitative Algorithm Research Group. The contribution focuses on some parts of the whole project, namely the Reports on "EU Common Ground of available rights", as well as the Report on Regulatory Framework (D2.1), the Report on Civil sector chosen (D2.2), the Report on Data Analysis (D2.3) and the Report on EU Common Ground (D2.4). The essay highlights as worthy of being emphasized, for their relevance, in particular, the following aspects: the analysis of the implementation of Directives and Regulation on ADR, ODR and mediation in search of common ADR procedures in civil and commercial matters; the procedure adopted in order to select and choose sectors of civil law to focus for studying the application of the algorithm, like assignment of goods, well suitable for economic algorithms, the adoption and application of distinction between mandatory rules and available rights.

1. This work aims to shortly discuss and comment the outcomes and papers delivered by the *Conflict Resolution with Equitative Algorithm* Research Group. In a first version it was presented to give suggestions and critical comments, before the presentation of the final deliverables by the Research Group. Paragraph 1.3.5. WT5 of the *Annex* (Part A) to the *Agreement* with the EU Commission – *Critical implementation risks and mitigation actions* states that in order to avoid "*not suitable quality of Deliverablesthe Project Coordinator initially internally reviews all public deliverables and will then circulate to the External Advisory Board for further review prior to dissemination*" (p. 21). This contribution on reviewing the latest deliverables is not detailed enough to be taken as part of the project, it is just intended to give rise, when possible, to further discussion and deeper research activities, especially through experimental steps.

By creating and experimenting an algorithmic kit, in order to build up an Online Dispute Resolution (ODR) system, the project aims to provide elements for the implementation of "*new mechanisms of dis-*

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pute resolution as a helping tool in legal procedures for lawyers, mediators and judges with the objective to reach an agreement between the parties; in some situations it could be used directly by citizens". With "*the potential to deeply change national and cross-border civil proceedings*" also by "*removing differences due to national laws among all EU countries*". Through the implementation of specific algorithms within already existing and new ODR, the idea is also to "*develop a «European common ground» of available rights, different from standard legal principles, by developing and using algorithms that rapidly implement better settlements*".

From the point of view of the legal scholar, these few notes go more deeply through some of the Reports and Deliverables among the many. Just to be more precise, my analysis focuses on the meaningful Reports on "*EU Common Ground of available rights*". As well as the *Report on Regulatory Framework* (D2.1); the *Report on Civil sector chosen* (D2.2); the *Report on Data Analysis* (D2.3) and the *Report on EU Common Ground* (D2.4). Nonetheless, from a specific point of view, I found very interesting some of the arguments of the Reports and Deliverables from WP3 about *Analytical-Cognitive-Experimental tools*, on the empirical feedback collection.

From the point of view of the External Advisory Board, in order to give response to the commitments set forth by the official documents, we could quickly conclude evaluating "*the overall quality of the research and carried out assessment*" as very good; as well as we could confirm "*their compliance with privacy, ethical, regulatory and social acceptance requirements*". The same can be said about their compliance with European Union legislation (Directive 95/46/EC and Directive 2002/58/EC) on "*legal, ethical and security aspects*" of these materials. As well as personal data have been anonymized in the development and testing phase and participants as profiling activities have been conducted through anonymity. If we intended to limit our analysis and comments to the official statements framework, we could stop here with any remarks.

2. After a moredeep reading of some of the deliverables and assessments elaborated on the research topics analysed by some of the research units, more details could be now underlined, although in a very short and easy way.

The project has been assumed to deal with "*Cross-border civil proceedings*", assuring more "*efficiency of cross-border judicial processes through solutions that facilitate the cross-border case-handling*"; "*removing differences due to national laws among all EU countries…*" (through) "*the application of the proposed algorithms, independently*

from each legal system of the EU member states". It has been written that this approach "*would create an EU instrument, a legal procedure, the same for each state*" as well as "*the attempt to create a «European common ground» of available rights which would not be grounded in legal principles but instead in the properties of the algorithms*" (emphasis added).

The project went on, "*distinguishing available rights (droits disponibles) from national mandatory rules (loi de police) in force in the different EU Member States*"; "*to connect the planned software to the EU ODR platform (webgate.ec.europa.eu/odr) and to the E-Justice portal, in order to improve the dissemination and awareness raising activities*"; and working on "*Law harmonization at a litigation level, without impinging on different national substantive laws, involving the parties to reach an agreement*" (emphasis added).

This is the very methodological core of the work that has been conducted. So that I think this should have been better highlighted and emphasized. These aims are insofar remarkable, as there has been no intention to rewrite the existing regulations into algorithms. Notwithstanding this, one may ask the reason why only those specific countries and no others have been selected in order to deal with those questions. As any comparative research the analysis would benefit from declaring in advance its methodological foundations and the research reasons for any specific country selection. Somehow, clarifying which are the foundations of this choice would make the outcome more consistent.

As the cross-border dimension has been chosen as one of the core methodological issues, one could be wondering if, by number of cases, legal relations among these countries legal systems are quantitatively or statistically more significant than others. As well as it could be asked, if more differences or common features of legislation and praxis among some European countries than others have been found to be more relevant. To probably conclude instead, as it is I think the case, that what is really relevant here is not the comparison among different national legislations, but the core functioning of the tool the research group have been experimenting, the algorithm through the software being the very common feature among the many situations which have been confronted.

The suggestion, here, in order to prevent possible methodologically wrong interpretation by anyone, is to better clarify the meaning of the comparative perspective assumed. The research project is, indeed, conducted through the tools implemented and experimented more than worked through national legislations and practices analysis; the explanation, in order to justify the selection made among the Europe-

an legal systems, anyway, could help to better understand this assumption. Just because the use of expressions like: "*creation of a European common ground*" could be otherwise wrongly interpreted.

3. To give a stronger positive feedback on the core analysis, instead, it is useful to insist on the relevance of the results reached on these fields below as particularly significant:

a) Analysis of the implementation of Directives and Regulation on ADR, ODR and mediation in search of common ADR procedures in civil and commercial matters;

b) Procedure adopted in order to select and choose sectors of civil law to focus for studying the application of the algorithm, like assignment of goods, well suitable for economic algorithms;

c) Most important, the adoption and application of distinction between mandatory rules and available rights;

d) Speaking about what has been collected as "Data analysis" this has been conducted in a very deep and detailed legally reasoned framework, both about legislation and praxis, in the sectors of Inheritance, Divorce and Co-ownership, and Family Law.

As pointed out above, also the so-called "*Experimental Analysis*" conducted by WP3 through the improvement of the Game Theory tools has a very important legal dimension. We have to underline that WP3 has worked on issues which have also a very legal dimension, dealing with the fundamental question of the legitimizing process of the institutional framework and adjudication proceedings. In the research papers has been pointed out very well how the improvement of "*the strengthening of the sense of belonging to the Union*" is also at stake. The practice dealt with by the research group through the so-called experimental analysis, indeed, will help to better grasp the "*Authority building*" process within the European Union system. Where the concept of *authority*, here, has to be intended as it has been thought and developed in legal theory and philosophy, since David Hume to Joseph Raz. The making of a legitimized legal EU authority being the very challenge of the next future. We should agree on the point that this is important to mention.

This experimental game has been conducted in search of the perception, by the common people, of the fairness of the Judiciary in the European dimension, conducted through the analysis of the feedback of the specific ODR system proposed. I am not professionally fit to deal with the solutions comparison (the so-called egualitarian solution, with fair shares but no envy-free; or the competitive/Nash model solution, envy-free and more efficient); neither I feel confident to deal with behavioral and experimental economics. What I consider important to

underline, instead, is the appropriateness of the legitimating tools that have been used, in order to test the fairness of the system, which is for sure a fundamental legal feature. It fits both, with the acceptanceby the parties of the solution proposed**,** as the output of the case handling; and the acquiescence of the people to the decision as an outcome of a *legitimized legal authority*.

4. Considering, now, the ethical and regulatory requirements of the system, we just need to recall the assessments by the Council of Europe, specifically by the *European Commission for the Efficiency of Justice*(CEPEJ)**.**

After the adoption of the *European ethical Charter on the use of Artificial Intelligence in judicial systems and their environment*, (Strasbourg, 3-4 December 2018)[1], it now follows the *Project for the certification of artificial intelligence products in the light of the principles of the European Ethical Charter of the CEPEJ*. If we just watch at the information published on the website of the Commission, we find out that:

"*Following the adoption of the European Ethical Charter on the use of artificial intelligence in judicial systems and their environment in December 2018, the CEPEJ is currently exploring the feasibility of a certification mechanism for AI products used in judicial systems with regard to the Charter. This work will be aimed at public decision-makers, who will be able to use specific assessment criteria to evaluate AI tools and services, as well as the private sector, which is currently leading the development of AI tools and services, which would benefit from methodological and operational advice on how each principle of the Charter should be applied. This work will be launched during a CEPEJ expert meeting, which will take place in Athens on 23 September 2019*[2] *and in which the "Institute of Electrical and Electronic Engineers" and the European University Institute will also participate*".

During the plenary meeting of the CEPEJ, on December 5-6 2019, the Commission adopted a Document containing *Terms of reference* for a *Preliminary feasibility study on the possible establishment of a mechanism to certify tools and services of Artificial Intelligence*[3]. What

[1] https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c.

[2] See the Program at https://rm.coe.int/draft-agenda-23sept2019-certification-work-2/1680973af5. See also https://www.coe.int/en/web/human-rights-rule-of-law/-/project-for-the-certification-of-artificial-intelligence-products-in-the-light-of-the-principles-of-the-european-ethical-charter-of-the-cepej.

[3] https://rm.coe.int/cepej-2019-16-en-feasability-operationalisation-ethical-charter/16809939e1.

is probably most important, here, the Research Group should follow the updates of these processes, which are both useful and necessary in the fields of this project.

On the important issue of *Predictive justice and artificial intelligence (AI)*, e.g., during the plenary meeting in June 2019, the CEPEJ adopted, as a follow-up to the *Guidelines on how to drive change towards cyberjustice*, a Toolkit for the implementation of the Guidelines on Cyberjustice[4].

Looking at these rules and standards, we find out aims, which are enlisted, as, for instance:

a) Reviewing the legal framework before to change the organization of justice: it has to be clear, e.g., before to adopt any solution by algorithms, if it will be proposed after an agreement by the parties, as an instrument for an arbitration or a mediation attempt, whether compulsory or not;

b) Transparency,

c) Stakeholders Involvement,

d) Security and data Protection,

e) Adoption of specific principles of the software, and so on.

Many requirements have been already met, such as: a) the definition of the area of implementation of the system; b) the identification of an adjudication or a court; c) mostly important, the compliance with the fair trial principles and provisions established by art. 6 of the ECHR.

The suggestion here could be to deal with those *Guidelines* and their further developments, as well as to participate in the experimental and simulation activities conducted by the Commission and its bodies, to give the ethical and legal requirements of the tools elaborated and used by the research group further implementation in the final stage of the research and for the ongoing research group's activities.

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PART II

CREA PROJECT AND SOFTWARE

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CONFLICT RESOLUTION WITH EQUITATIVE ALGORITHMS A TOOL TO ESTABLISH A EUROPEAN COMMON GROUND OF AVAILABLE RIGHTS

Abstract The current study examines the application of algorithms in resolving civil conflicts within the EU with specific focus on divorce and inheritance concerning asset division. For that purpose, this paper initially argues the applicability and advantages of deploying algorithmic conflict resolution for civil disputes, in general terms. Then, the best practices established at the global level in the United States, Canada and Australia will be discussed followed by the European approach towards the use of algorithms in resolving disputes. Next, the authors will focus on arguing how the use of the algorithmic dispute resolution method can best fit within the European context of civil dispute resolution – considering the existing inconsistencies among civil and civil procedural rules of the Member States – leading us to establish for the first time a European Common Ground of Available Rights at the EU level. Finally, this study lays out the project on Conflict Resolution with Equitative Algorithms (CREA) and looks at the results achieved through the data collection process and analysis of such data contributing towards the two major practical achievements of this project, namely developing CREA Software, which assists disputants to resolve their property division related conflicts through this online tool, and the establishment of the EU Common Ground of Available Rights framework, with the principle aim of tackling the existing inconsistencies in civil and civil procedural rules on divorce and inheritance within the EU.

Introduction

Algorithmic driven Artificial Intelligence (AI) is already shaping various aspects of human life from education and finance to transportation, healthcare and significant national security applications. In a like manner, the legal domain has also been experiencing the emer-

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(§ § Introduction, III & Conclusion are attributed to both authors. §§ I & II are attributed to Marco Giacalone.)

gence of AI in the legal industry. However, unlike many other areas of human life, which have been remarkably open towards accepting AI into their field, even though the research field of AI and Law dates back to the early 1980s,[1] the legal industry is still very slow and to some extent resistant to adopting advanced technological innovations into the world of law.[2]

The economist Klaus Schwab in his striking, yet alarming, book of *'The Fourth Industrial Revolution'* indicates that lawyers are not alone among the professions that will be partly or completely automated, but he also rightly emphasizes that legal proceedings will turn into automated procedures rather than generic ones.[3] More deliberately, Richard Susskind explicitly notes that within the next two decades there will be drastic changes in the legal world compared to the last two centuries.[4]

Despite all the controversies and scepticism towards the influence of a union between AI and Law on justice,[5] there is already evidence that the advantages outweigh the risks involved in various aspects of the legal field. These benefits have been mentioned as time-savings, and providing more precise and accurate solutions to complex legal conflicts leading to the increased satisfaction of disputants from the service experience.[6]

[1] ASHLEY, K. (2017). Artificial intelligence and legal analytics: New tools for law practice in the digital age. Cambridge: Cambridge University Press, p. 3.

[2] Law in Order: The Rise of Artificial Intelligence in Law Infographic | The Fact Site. (2019). Retrieved 15 October 2019, from https://www.thefactsite.com/artificial-intelligence-in-law/

[3] SCHWAB, K. (2017). The fourth industrial revolution. UK: Portfolio Penguin, pp. 39, 156.

[4] SUSSKIND, R. (2017). Tomorrow's lawyers an introduction to your future (Second ed.). Oxford: Oxford University Press, p. 17

[5] The most indicated issues with algorithms include discrimination and unfairness, informational privacy, opacity and transparency. See Edwards, L., & Veale, M. (2017). Slave to the Algorithm? Why a 'right to an explanation' is probably not the remedy you are looking for. Duke Law & Technology Review, Duke Law & Technology Review, 16 (1) pp. 18-84. (2017), pp. 27-43. Also see Mackworth, A. K. (2011). Architectures and ethics for robots, constraint satisfaction as a unitary design framework. In M. Anderson & S. L. Anderson (Eds.), Machine ethics. Cambridge: Cambridge University Press.

[6] PARNHAM, R. (2019). How law firms are using AI-assisted LegalTech solutions: A conversation with Slaughter and May's Knowledge and Innovation team [Blog]. Retrieved 19 November 2019, from https://www.law.ox.ac.uk/unlocking-potential-artificial-intelligence-english-law/blog/2019/06/how-law-firms-are-using-legal

One of the most commonly cited areas that AI can bring into the field of law is the application of automated intelligence to increase the efficiency of justice in both civil and criminal matters. Although at present, the discussion on implementing automated intelligence driven criminal proceedings[7] is more robust compared to the civil procedure, the deployment of AI in civil proceedings has not been ignored.

Accordingly, AI has been implemented in various aspects of civil procedure from case data management and legal arguments[8] to decision-making processes.[9] With regard to the possibility of using automated decision-making in the context of civil matters, the main reason driving this is the existing deficiencies, such as extremely lengthy and costly proceedings, in addition to language obstacles,[10] in current cross-border civil proceedings, while increasing the effectiveness of civil justice.[11]

At the European level, delivering an efficient justice system is considered as one of the most significant pillars of the right to a fair trial as expressly mentioned within Article 6 of the European Convention on Human Rights. Building an efficient and fair judicial system essentially demands several elements to be present. The first and most significant

[7] For more information on the use of AI in criminal procedures look at Berman, Donald H., & Hafner, Carole D. (1989). The potential of artificial intelligence to help solve the crisis in our legal system. (Social Aspects of Computing special section). Communications of the ACM, 32(8), 928-938. Also Berk, R. (2019). Machine Learning Risk Assessments in Criminal Justice Settings. Cham: Springer International Publishing: Imprint: Springer. Also Chun-Soo Yang. (2017). Artificial Intelligence and the Change of Legal System −In case of criminal justice−. Korean Journal of Legal Philosophy, 20(2), 45-76. AlsoJimeno-Bulnes, M. (2017). The use of intelligence information in criminal procedure: A challenge to defence rights in the European and the Spanish panorama. New Journal of European Criminal Law, 8(2), 171-191.

[8] LEENES, R.E., & Faculty of Behavioural, Management Social Sciences. (2001). Burden of proof in dialogue games and Dutch civil procedure. The Eighth International Conference on Artificial Intelligence and Law: Proceedings, 109-118, p. 109.

[9] EDWARDS, L., & VEALE, M. (2017). Slave to the Algorithm? Why a 'right to an explanation' is probably not the remedy you are looking for. Duke Law & Technology Review, Duke Law & Technology Review, 16 (1) pp. 18-84. (2017), p. 19.

[10] STADLER, ASTRID, & ERASMUS SCHOOL OF LAW. (2013). Practical Obstacles in Cross-Border Litigation and Communication between (EU) Courts. Erasmus Law Review, 5(3), 151-168, p. 153.

[11] CORRALES, M., FENWICK, M., & FORGÓ, N. (2018). Robotics, AI and the Future of Law (Perspectives in Law, Business and Innovation). Singapore: Springer Singapore: Imprint: Springer, p. 11.

component to consider is to analyse the extent to which a judicial system deals with cases within a reasonable amount of time. Referring to the legal maxim of "*to delay justice is injustice*"[12] indicates the significance of this component in facilitating a just procedure in legal systems.

The next element refers to the cost of civil proceedings which is clearly recognized as a serious obstacle hindering effective access to justice for citizens. Linguistic diversity is another practical issue within the European context that restricts the right to have access to justice at the cross-border level.[13] Despite citizens' access to translation and interpretation services as a solution to language challenges, this imposes considerable costs on EU citizens.[14]

Furthermore, the current legal systems underestimate the potential and value of possibilities to reach an amicable agreement between disputants. Instead, courts merely rely on judicial solutions. This existing exaggerated focus of the European jurisdictions on resolving disputes through the ordinary judicial proceedings highly disregards the disputants' desires and needs in the process of conflict resolution.

Taking into account the long-pursued goal of the EU Commission to reinforce the European Digital Single Market (DSM) and increase consumers' contributions to this market, harmonization of civil procedural rules at the EU level seems essential to guarantee the proper functioning of the EU DSM.[15] Despite the current efforts of EU Member States in developing national legal systems of civil justice, the existing inconsistencies demonstrate that the solutions have not often been sufficiently coherent in tackling the very slow and inefficient access to justice, in particular at the supranational level.[16]

[12] BÓKA J. (2014) 'To Delay Justice Is Injustice': A Comparative Analysis of (Un)reasonable Delay. In: Badó A. (eds) Fair Trial and Judicial Independence. Ius Gentium: Comparative Perspectives on Law and Justice, vol 27. Springer, Cham

[13] MELLONE M. (2014) Legal Interoperability in Europe: An Assessment of the European Payment Order and the European Small Claims Procedure. In: Contini F., Lanzara G. (eds) The Circulation of Agency in E-Justice. Law, Governance and Technology Series, Springer Dordrech 13, 245-264, p. 257.

[14] ONTANU, E., & PANNEBAKKER, E. (2012). Tackling Language Obstacles in Cross-Border Litigation: The European Order for Payment and the European Small Claims Procedure Approach. Erasmus Law Review, 5(3), 169-186, p. 169.

[15] A strong and united Europe that reflects European values and thrives globally in an open economy - DIGITALEUROPE. (2019). Retrieved 16 October 2019, from https://www.digitaleurope.org/resources/a-strong-and-united-europe-that-reflects-european-values-and-thrives-globally-in-an-open-economy/

[16] SILVESTRI E. (2014) Goals of Civil Justice When Nothing Works: The Case of

In this article, the authors argue that the proposed model of Conflict Resolution with Equitative Algorithms (CREA)[17] has the potential to function as a pragmatic alternative solution for resolving cross-border (also, national) civil disputes to increase the efficiency of justice.

The specific focus of this study is divorce and inheritance conflicts. The main reason for selecting these two subject matters refers, on the one hand, to their direct link with the element of distribution of property among two or more individuals. On the other hand, they were chosen due to the immense significance of reaching a proportional and envy-free property division in the process of divorce and inheritance to provide satisfaction for every participant involved by receiving the largest possible portion of goods divided. Therefore, CREA was established on the basis of the point-allocation procedure, estate and divorce property distribution being ideal candidates for the purpose of this study.

The main contribution of the current paper is to introduce the CREA project – that eventually resulted in developing the CREA software in addition to establishing for the first time the EU Common Ground of Available Rights in the EU – as a new establishment of access to justice providing new insights into a privatized and non-judicial model of dispute resolution. This proposed method can be used as a helpful tool for people who are involved in the judiciary, including judges and lawyers and also non-judicial experts such as negotiators and mediators. More significantly, this tool can also be used directly by disputants independently in order to reach an agreement among themselves, taking control over the process of resolving their conflict, without the necessity of referring to the court.[18]

Hence, in the current study, the research question is:

'How does CREA – as an algorithmic-driven model of dispute resolution – contribute towards tackling the problem of legal inconsistencies among the EU jurisdictions on civil matters through establishing the Eu-

Italy. In: Uzelac A. (eds) Goals of Civil Justice and Civil Procedure in Contemporary Judicial Systems. Ius Gentium: Comparative Perspectives on Law and Justice, vol 34. Springer, Cham, pp. 79-80.

[17] CREA project, funded by the EU Commission, began in 2017 for a period of two years focusing on investigating into establishing an effective decision support system in resolving disputes through implementing the equitative algorithms. CREA tool functions as a service for the disputants assisting them to reach to an amicable settlement.

[18] http://www.crea-project.eu. Retrieved 19 November 2019.

ropean Common Ground of Available Rights? Furthermore, to what extent does this establishment assist the parties to gain access to efficient justice for their cross-border civil disputes?'

In order to answer the above research questions, this study first argues for the algorithm's compatibility for being used in the context of resolving civil disputes. To provide a more in-depth insight into this matter, the practice of algorithmic civil dispute resolution and the leading existing examples of the use of AI for division of assets in the United States, Canada and Australia will be briefly discussed. Then, the implementation of algorithmic dispute resolution in the EU will be analysed accordingly. The study therefore reviews the CREA project followed by highlighting the creation of CREA software and also the significance of establishing the EU Common Ground of Available Rights as the two major achievements of this project. Drawing on the previous section, the results of the investigation into several selected EU Member States' legislations concerning divorce and inheritance will be presented.

I. *Literature Review*

1. *Definition of Terms*

In understanding the meaning of the technical terms used in the course of analysing the applicability of AI, algorithms and automated decision systems (ADS), the vital first step is to provide a precise definition of these terms for readers. Hence, this section of the article clarifies exactly what is meant by these concepts.

a) Artificial Intelligence (AI)

No clear consensus exists over a precise and universal definition of Artificial Intelligence (AI) among scholars.[19] Despite the lack of an explic-

[19] For more information see Machines Who Think. (1991). Science, 254(5036), 1291. Also Simon, Herbert A., &Munakata, Toshinori. (1997). AI lessons. (artificial intelligence; IBM's Deep Blue chess computer). Communications of the ACM, 40(8), 23. Also Boden, M. (1996). Artificial intelligence (Handbook of perception and cognition (2nd ed.)). San Diego: Academic Press. Also Rich, E. (1983). Artificial intelligence (McGraw-Hill series in artificial intelligence). New York: McGraw-Hill. Also Nilsson, N., & SRI International. Computer Science Technology Division. (1974). Artificial intelligence (Technical note (SRI) ; 89). Menlo Park, Calif.: Artificial Intelligence Center, SRI International. Also Graham, N. (1979). Artificial intelligence. Blue Ridge Summit, Pa.: Tab Books. Also Lawrence, D., Palacios-Gonzãlez, C., & Harris, J.

it clarification about the term AI, this field has grown tremendously and enhanced in various aspects. Nonetheless, it appears that the most highly favoured definition is provided by Nils J. Nilsson who defines AI as:

"the activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment".[20]

According to the definition provided by Nilsson, AI is defined as a credit incorporated into a software and hardware system to make its functionality appropriate while having considerable foresight depending on the environment of its applicability,[21] which in this article is the legal context.

b) Algorithmic Decision-making System (ADS)

From the technical perspective, an algorithm is defined as any procedure with the potential to be carried out automatically.[22] This definition is too broad[23] to provide us with an elaborate definition of an algorithm. Although currently there is no generally acknowledged formal definition of an algorithm among scholars, nevertheless the European Ethical Charter on the use of artificial intelligence (AI) in judicial systems defines it as:

"Finite sequence of formal rules (logical operations and instructions) making it possible to obtain a result from the initial input of information. This sequence may be part of an automated execution process and draw on models designed through machine learning."[24]

Despite differences of opinion on the definition of an algorithm, there appears to be some agreement that an algorithm refers to a list of rules that are automatically followed in a phased sequence in order to resolve a problem.[25]

(2016). Artificial Intelligence. Cambridge Quarterly of Healthcare Ethics, 25(2), 250-261. Also Winston, P. (1977). Artificial intelligence (Addison-Wesley series in computer science). Reading, Mass.: Addison-Wesley Pub. AlsoEnnals, J. (1987). Artificial intelligence (State of the art report; 15:3). Maidenhead: Pergamon Infotech.

[20] NILSSON, N. (2010). The quest for artificial intelligence (1st ed.). Cambridge: Cambridge University Press.

[21] STONE, P.et al. (2016). Artificial Intelligence and Life in 2030: One Hundred Year Study on Artificial Intelligence. Stanford University.

[22] CHABERT, J., & BARBIN, E. (1999). A history of algorithms. Berlin: Springer, p. 2.

[23] Supra note 9, p 24.

[24] The European Ethical Charter on the use of artificial intelligence (AI) in judicial systems and their environment, adopted at the 31st plenary meeting of the CEPEJ (Strasbourg, 3-4 December 2018), Council of Europe, February 2019, p. 69.

[25] DOMINGOS, P. (2015). The master algorithm (1st ed.). New York: Basic Books, p. 1.

During the course of this study, by referring to the algorithmic decision-making systems, the authors mean a model of dispute resolution that functions in the course of a procedure to make a decision by using algorithms without any human intervention in the entire decision-making process. The ADS has been widely used already in various areas from medicine and industry to finance and banking. In the legal context, the ADS is already being implemented within judicial enforcement and criminal justice in predictive and preventive capacities, such as delivering decisions to assist police in identifying whether a crime suspect is high-risk for being released.[26]

In terms of using ADS in civil law, Family_Winner by John Zeleznikow and Emilia Bellucci in Australia, SmartSettle in Canada and Adjusted-Winner in the United States are among the most prominent examples of using algorithms to resolve civil conflicts specifically to divide property under dispute.

Nevertheless, before going on to discuss the implementation of some algorithmic models of civil dispute resolution in non-European jurisdictions, it is necessary to explain the compatibility of using algorithms for resolving (cross-border) civil conflicts.

2. *The Algorithms' Compatibility in Resolving Civil Disputes*

Judicial decision making in civil law related matters not only requires the judge to have logical reasoning in the legal context, but also to be endowed with a synergetic collection of research, language, creative problem-solving and social skills capabilities in order to be able to deliver a competent judgment. Taking into account what Richard Posner stated in his notable book of '*How Judges think*', that even judges at the highest level of expertise, who are working in the appeal or supreme courts, are at the risk of their judgments being influenced by their experiences, temperament and personal characteristics instead of in-depth legal reasoning.[27]

Nevertheless, in responding to the above-mentioned limitations to human-delivered judgments, the algorithmic dispute resolution model can be used as a complementary tool to the work of judges (and also

[26] MARSH, S. (2019). UK police use of computer programs to predict crime sparks discrimination warning. Retrieved 20 October 2019, from https://www.theguardian.com/uk-news/2019/feb/03/police-risk-racial-profiling-by-using-data-to-predict-reoffenders-report-warns

[27] POSNER, R. (2008). How judges think. Cambridge, Mass.: Harvard University Press.

arbitrators, mediators, negotiators or even disputants *per se)* in order to assist them in overcoming human-based errors, sometimes occurring unintended, in the process of decision-making, providing the highest possible precision and correctness.[28]

In resolving civil conflicts, cases involving the element of the division of assets are ideal candidates to apply ADS. The most noticeable feature is the intelligence laid down in algorithms. This ability can provide solutions in an instant and much more comprehensive manner compared to the human decision-maker.[29] Moreover, ADSs retain the distinctive feature of storing a tremendous amount of laws and regulations and use them in the course of processing data to reach the most suitable and appropriate decision as an output. In the European context, considering the existing disparities among the national legal systems and lack of adequate harmonization in this aspect, specifically regarding asset division in cross-border civil disputes, the use of such an international and comprehensive model of dispute resolution is a considerable advantage to be implemented at the EU level.

Taken together, it is also significant to point out the possible risks of using algorithms in the process of legal decision-making. To be more specific, risks are associated with the issue of transparency, discrimination, bias, quality, security and the system remaining under the control of the user during the entire decision-making process[30], though discussing them is beyond the scope of this paper.[31]

II. *Using Algorithms for Resolving Civil Disputes – A Global Perspective*

1. *The United States*

The emergence of the fair division theory in the United State dates back to 1948, when the mathematician Hugo Steinhaus and his re-

[28] DANZIGER, S., LEVAV, J.,& AVNAIM-PESSO, L., (2011). Extraneous factors in judicial decisions. Proceedings of the National Academy of Sciences, 108(17), 6889-6892.

[29] Machine, Platform, Crowd: Harnessing Our Digital Future, by Andrew McAfee and Erik Brynjolfsson. (2017). Times Higher Education, p. Times Higher Education, Jul 27, 2017, Issue 2316.

[30] The European Ethical Charter on the use of artificial intelligence (AI) in judicial systems and their environment, 2019, p. 7.

[31] For more information see EPIA. (2019). Progress in Artificial Intelligence: 19th EPIA Conference on Artificial Intelligence, 3-6 September 2019, Vila Rea, Portugal.

search fellows raised the question of fair division in cases where there are more than two individuals involved. Since then, there have been several other studies focused on fair division issues, however, they all encountered some complexities, such as the limited application of this procedure to four agents as well as the difficulty of reaching an envy-free allocation of goods compared to proportional allocation.[32]

Unlike previous studies conducted on fair division techniques, the procedure developed by Steven Brams and Alan Taylor known as 'Adjusted Winner (AW)' in 1996 and 1999[33] brought significant attention to dividing assets in a more precise and fair manner. The AW entails various interesting features, including envy-freeness, efficiency and equitability to achieve a just division through the use of algorithms.[34] This algorithmic procedure is founded on the basis of game theory techniques and division theory.[35] The AW became the preferred procedure to be used for the allocation of several divisible assets between two individuals in a dispute.[36]

This rich theoretical and mathematical framework developed by Brams and Taylor was advocated as a pioneering procedure in resolving eligible disputes such as political issues, international border conflicts, water conflicts and some legal issues, explicitly in the division of assets within divorce and inheritance.[37]

Despite the efficiency of the fair division procedure's implementation in the judicial context, it has been under-used in this sector.

In line with efforts to indicate more implementations of algorithms in splitting assets, in 2001 Brams and Kilgour introduced the fallback bargaining concept.[38] According to fallback bargaining, the parties involved

[32] BRAMS, S., & TAYLOR, A. (1996). Fair Division: From Cake-Cutting to Dispute Resolution. Cambridge: Cambridge University Press, p. 30.

[33] BRAMS, S., & TAYLOR, A. (1999). The win--win solution. New York: W.W. Norton.

[34] MASSOUD, T. (2000). Fair Division, Adjusted Winner Procedure (AW), and the Israeli-Palestinian Conflict. Journal of Conflict Resolution, 44(3), 333-358, p. 333.

[35] BELLUCCI, E., LODDER, A., & ZELEZNIKOW, J. (2004). Integrating artificial intelligence, argumentation and game theory to develop an online dispute resolution environment. 16th IEEE International Conference on Tools with Artificial Intelligence, 749-754, p. 752.

[36] The Adjusted Winner Procedure is currently operated under the Fair Outcomes, Inc at https://www.fairoutcomes.com/fd.html. For deeper insight into the function of the AW Procedure visit http://www.nyu.edu/projects/adjustedwinner/ . Retrieved 19 November 2019.

[37] AZIZ, H., BRÂNZEI, S., FILOS-RATSIKAS, A., & FREDERIKSEN, S. (2015). The Adjusted Winner Procedure: Characterizations and Equilibria, pp. 1-2.

[38] BRAMS, S., & KILGOUR, J. (2001). Fallback Bargaining. Group Decision and Negotiation, 10(4), 287-316.

in division initiate the procedure by stating their order of preference for the existing alternatives. Subsequently, they fall back to the least preferred items beginning with their first choices and adding the second and so on, until all individuals reach an item which they all agree upon.

During recent decades, various legal applications of algorithmic fair division such as Cybersettle[39] and SquareTrade[40]were established in the United States. Although not all of these service providers are currently as active as in the past in procuring algorithmic dispute resolution services, some of them are still actively operating in this field.

One of the most remarkable automated dispute resolution service providers was Modria, founded in 2011 by Colin Rule, providing the initial online dispute resolution platform to PayPal and eBay with regard to automated dispute resolution with limited human intervention in the procedure. However, later, Modria offered comprehensive online dispute resolution services to public agencies such as courts and tax-related corporations. Following the successful operation of Modria, this platform was finally acquired by TylerTech Corporation in 2017 aiming at developing justice solution services.[41]

2. Canada

Similarly, in Canada the Ministry of Justice of British Columbia thoroughly investigated the use of algorithms in dispute resolution, leading to the establishment of the Civil Resolution Tribunal (hereinafter, CRT)[42], in 2011. The CRT was offered as an alternative tool to the ordinary court proceedings by British Columbia Consumer Protection Centre using a Modria-based online dispute resolution system for settling disputes between consumers and businesses in British Columbia (BC).[43]

[39] Cybersettle. (2019). Retrieved 4 September 2019, from http://www.cybersettle.com/.

[40] SquareTrade Protection Plans - Extended Warranties - About Us. (2019). Retrieved 4 September 2019, from https://www.squaretrade.com/about-us.

[41] Relations, I. (2019). Tyler Technologies Acquires Modria. Retrieved 5 September 2019, from https://tylertech.irpass.com/Tyler_acquires_Modria.

[42] For more information see Home - Civil Resolution Tribunal. (2019). Retrieved 12 November 2019, from https://civilresolutionbc.ca/.

[43] RAYMOND, ANJANETTE H., & SHACKELFORD, SCOTT J. (2014). Technology, ethics, and access to justice: Should an algorithm be deciding your case? Michigan Journal of International Law, 35(3), 485-524, p. 505.

Nevertheless, the successful implementation of such systems led the BC government to pass the Civil Resolution Tribunal Act (CRTA), in 2012, aiming at the mandatory application of algorithms and alternative dispute resolutions to improve access to justice for provincial residents regarding their small claims and residential property disputes through an expedited, economical, informal and flexible communication mechanism. In 2015, the CRTA was amended, aiming at extending its jurisdiction to the majority of small claims up to 5,000 CAD as well as Strata disputes of any value, traffic incidents and injury claims up to 50,000 CAD. In addition, disputes arising from societies and cooperative associations of any value are eligible to use this ODR service within the BC province.[44]

Another prominent example of a dispute resolution service provider is SmartSettle[45] founded by Ernest M. Thiessen, the president of iCan Systems Incorporations.[46] SmartSettle assists conflicting parties to resolve existing negotiating challenges between them, through using a set of algorithmic tools. This procedure enables the parties to take control over the process of resolving their conflicts through identifying their interests and arrangements. This tool is precisely focused on recognizing each party's satisfaction and enabling them to reach their most favourable solutions as a win-win outcome.[47]

3. *Australia*

In like manner, over the last two decades, the use of algorithms in resolving disputes has gained the attention of legal experts in Australia. In 1995, John Zeleznikow and Stranieri explored and discussed the distribution of properties through using data mining within the legal domain under Australian laws.[48] This research was conducted in the

[44] SHANNON, S. (2017). Online Dispute Resolution and Justice System Integration: British Columbia's Civil Resolution Tribunal. Windsor Yearbook of Access to Justice, 34(1), 112-129, pp. 117-120.

[45] Smartsettle complies with Canadian anti-spam laws – iCan Systems Inc. (2019). Retrieved 10 November 2019, from https://smartsettle.com/2014/06/13/consent/

[46] https://smartsettle.com/about-us/ernest-m-thiessen-peng-phd/Retrieved 19 November 2019.

[47] Supra note 35, pp. 752-753.

[48] ZELEZNIKOW, J., STRANIERI, A., & GAWLER, M. (1995). Project report: Split-Up? A Legal Expert System which determines property division upon divorce. Artificial Intelligence and Law, 3(4), 267-275. Also see Stranieri, A., &Zeleznikow, J.

context of a project called 'Split-UP', in which they used data collected from cases in the Australian Family Court that dealt with the division of assets following divorce between couples. The main objective of this project was to predict the percentage each conflicting party receives as his/her allocation in property distribution based on a judge's decision in the Family Court.[49]

Another significant model for using algorithms in dispute resolution is the programme developed by Zeleznikow and Bellucci known as 'Family_Winner'.[50] This system functions by using a range of artificial intelligence and game-theory techniques to provide advice to disputants about possible compensation strategies.[51]Family_Winner does not utilize any decision analysis, instead it only provides the parties with advice in the area of Australian Family Law, explicitly in assisting divorcing couples in defining their interests in negotiation.[52]

Interestingly, Zeleznikow defines the role of these intelligent systems in the context of assisting self-represented litigants in courts regarding the property division process.[53] Nonetheless, the necessary point to consider is that, even though applying algorithms to resolve disputes has existed for more than two decades in Australia, these systems have had limited judicial or commercial use. Whereas, algorithmic dispute resolution systems such as Family-Winner or Split-Up

(2005). Knowledge Discovery from Legal Databases (Vol. 69, Law and Philosophy Library). Dordrecht: Springer Netherlands.

[49] ZELEZNIKOW, J. (2004). The Split-up project: Induction, context and knowledge discovery in law. Law, Probability and Risk, 3(2), 147-168, p. 147.

[50] It is necessary to point out that after the introduction of Family_Winner software, this tool received considerable attention from the investors to commercialise it. See Lodder, A., &Zeleznikow, J. (2010). Enhanced dispute resolution through the use of information technology. Cambridge: Cambridge University Press, p. 116.

[51] ZELEZNIKOW, J. AND BELLUCCI, E. (2003) *Family_Winner: Integrating Game Theory and Heuristics to Provide Negotiation Support.* In: Legal knowledge and information systems: JURIX 2003: the sixteenth annual conference. Bourcier, Danièle, ed. Frontiers in artificial intelligence and applications. IOS Press, Amsterdam, 21-30, pp. 21-22.

[52] BELLUCCI, E. &ZELEZNIKOW, J. (2005). Developing Negotiation Decision Support Systems that Support Mediators: A Case Study of the Family_Winner System. (Author abstract). Artificial Intelligence and Law, 13(2), 233-271, pp. 233 and 266-267.

[53] ZELEZNIKOW, J. (2017). Can Artificial Intelligence and Online Dispute Resolution enhance efficiency and effectiveness in Courts. International Journal for Court Administration, 8(2), 30-45, p. 42.

have considerable potential for assisting courts in dealing with sophisticated matrimonial property division cases.[54]

III. *Algorithmic Dispute Resolution in the EU*

1. *Current issues: the necessity for improving access to efficient justice*

Currently, to resolve a civil dispute, a citizen must spend a considerable amount of money to be able to seek justice for his/her claim. Moreover, the time for trial proceedings is too long in the majority of EU Member States. As an example, in Italy the length of civil proceedings is so long that in many cases it may take several years to get a judgment from the court of first instance and appeal tribunals. Next comes Greece and Malta with lengthy proceedings for resolving civil disputes within their jurisdictions.[55]

This scenario is even worse in the case of cross-border civil disputes. In addition to huge trial costs and long trials, the considerable disparities between the laws of Member States and language barriers play a significant role in hindering efficient justice for EU citizens at the Community level. These hurdles are in obvious contradiction to the EU's emphasis on the further transnational economy boost of the EU Internal Market, since such obstacles have had a negative influence on the trust of consumers to actively contribute to the Market.[56]

Furthermore, one of the major complexities many citizens confront in striving to seek justice in their cross-border civil disputes, is to find the competent forum that has jurisdiction over the case. Assuming the citizen is a lay person with zero to very limited legal knowledge, it is extremely difficult to overcome these complications with no expert help. As a result, the citizen must seek legal assistance through hiring a lawyer which costs him/her a remarkable amount of money, aside from the trial and translation fees for the proceedings.[57]

[54] BURSTYNER, N., SOURDIN, T., LIYANAGE, C., OFOGHI, B., &ZELEZNIKOW, J. (2018). Using Technology To Discover More About The Justice System. Rutgers Computer & Technology Law Journal, 44(1), 1, p. 13.

[55] European Commission (2018). The 2018 EU Justice Scoreboard. COM (2018) 364 final. Brussels :European Commission, pp. 10-12.

[56] CORTÉS, PABLO, & CORTÉS, P. (2016). The New Regulatory Framework for Consumer Dispute Resolution. Oxford University Press, pp. 450-451.

[57] STORSKRUBB, EVA, & STORSKRUBB, E. (2008). Civil Procedure and EU Law: A

The enforcement of the judgment in a foreign country with a different language and alien rules is also very tricky and complicated for a lay citizen.

Given these points, the existing legal systems do not adequately appreciate the possibility of reaching an amicable agreement between disputants. In contrast, they constantly try to resolve civil disputes through resorting to usually burdensome, costly and long-lasting court trials.

In a Report adopted by the CEPEJ at its 8th preliminary meeting in Strasbourg in December 2006[58], the following factors were identified as the main causes of delayed justice in courts; they can be divided into two categories of pre-trial and trial-stage obstacles.

With respect to pre-trial complexities, various major reasons are taken into account by the Report, such as the territorial distribution of court jurisdiction, transfer of judges, inadequate number of judges, systematic use of multi-member tribunals, backlog of cases, complete inactivity by judicial authorities and systematic shortcomings in procedural rules, all causing lengthy court proceedings in EU national jurisdictions.[59]

The other category considers the causes of lengthy trials from initiation to the end of the court procedure. Among these grounds, failure to summon parties or witnesses, unlawful summons, late entry into force of legislation, controversies about jurisdiction and competency between administrative and judicial authorities and delays in transmitting the case file to the court of appeal can be mentioned as major obstacles in dealing with court claims in a more expedited manner.[60]

One should note that the consequences of long trials can simply be conveyed by the expression "justice delayed is justice denied" for EU citizens. These existing hurdles to seeking justice is in contradiction with the right to have access to an effective remedy as stipulated in Article 47 in the Charter of Fundamental Rights of the European Union.[61]

As discussed earlier, the present extreme disparities among EU

Policy Area Uncovered. Oxford University Press, p. 183. Also see Storskrubb, E. (2016). Alternative dispute resolution in the EU: Regulatory challenges. European Review of Private Law, 24(1), 7.

[58] European Commission for The Efficiency of Justice (CEPEJ), Length of court proceedings in the member states of the Council of Europe based on the case law of the European Court of Human Rights by Ms Françoise Calvez. This report has been adopted by the CEPEJ at its 8th plenary meeting in Strasbourg, 6-8 December 2006.

[59] Ibid, p. 5.

[60] Ibid.

[61] Charter of Fundamental Rights of the European Union, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:12012P/TXT, Retrieved 19 November 2019.

Member States in civil and civil procedural laws, along with different languages, have acted as a serious obstacle for citizens to resolve their cross-border civil disputes in foreign courts.

Given the above-mentioned facts, there is a strong need, at the EU Community level, for establishing efficient methods of cross-border civil dispute resolution. Such methods not only protect citizens against issues such as long trials, language barriers and extreme costs, but also provide them with the most effective justice through out of court agreements. There can be a double emphasis on settling civil disputes through alternative non-judiciary means of conflict resolution considering the concept of 'de-judicialization'[62] of disputes.

To this end, the use of technology in resolving conflicts with the aim of promoting the efficiency of justice has received more attention from researchers during the last decade. Furthermore, the ever-fast-growing digital transformations in Europe have also worked as a trigger to push the EU Member States towards initiating digital justice plans to provide their citizens with more convenient access to justice.

The European Commission for the Efficiency of Justice (CEPEJ), within study No. 26 on analysing the current state of developments concerning the use of Information Technology (IT) in justice at the EU level, has identified artificial intelligence as not only capable of rethinking justice, but also of delivering much efficient justice through private providers, instead of States. Additionally, this study suggests that this model of dispute resolution benefits citizens by generating competition among private operators of justice providers which could result in producing more effective justice without unnecessary demands on the public services of the courts.[63]

Several Member States have already developed advanced e-justice programmes using technology to provide legal support.[64] For instance, in 2017, the Courts of Appeal in the region of Douai and Rennes in France tested a software programme called 'Predictive Justice' by judges in civil and criminal matters while evaluating its compatibility with the needs of

[62] LOURENCO, R.P., FERNANDO, P. AND GOMES, C. (2016). From eJustice to Open Judiciary: An Analysis of Portuguese Experience. In Achieving Open Justice through Citizen Participation and Transparency (pp. 111-136). Hershey, PA, USA: IGI Global, pp. 125-126.

[63] Systèmes judiciaires européens –Efficacité et qualité de la justice, ed. 2018 (données 2016) Etudes de la CEPEJ N° 26 . p. 219.

[64] KRAMER, X. E. (2016). Access to Justice and Technology: Transforming the Face of Cross-Border Civil Litigation and Adjudication in the EU (January 1, 2016). in: Karim Benyekhlef, Jane Bailey, Jacquelyn Burkell and Fabien Gelinas (Ed), eAccess to Justice (University of Ottawa Press 2016), p. 351-375, p. 352.

citizens in resolving disputes.[65] Similarly, the Austrian justice system has applied AI with the aim of automating the anonymization and recognition of metadata in court judgments and preparing such decisions to be published in the Judiciary Legal Information System. To this end, the AI tool analyses the decision documents and extracts the metadata, recognizes natural and legal entities with their details, also anonymizes the personal data of parties while preserving the comprehensibility of the case. It has been claimed that integrating AI into the Austrian judiciary system will potentially establish strong links between the courts' decisions and create judicial coherency in terms of decision-making.[66]

Despite all these efforts, such initiatives have been limited to local tests at the national level and research conducted by various academic institutions, however, none of these establishments have implemented them broadly at the EU level, at least not yet.[67]

However, it is important to point out that all these efforts to provide citizens with convenient access to justice through the application of algorithms in dispute resolution are primarily established on the basis of the existing need at the cross-border level. Investigating reasons for using AI in dispute resolution points us to the existing inefficiencies, which were discussed earlier, in judicial dispute resolutions that are burdensome for EU citizens seeking justice.

Returning to the concept of the de-judicialization of cross-border civil disputes at the EU level, this can be simply achieved through using algorithms for resolving such claims instead of going to the judiciary. As noted previously, the successful experiences of countries such as the United States, Canada and Australia in using algorithms for resolving civil disputes prove the happy union between technology and law has the potential to bear fruit in efficient access to justice.

In the case of the EU, considering the 28 Member States with independent and sometimes extremely different rules, there is a high necessity for establishing a uniform set of rules to protect EU citizens and grant

[65] Commission européenne pour l'efficacité de la justice (CEPEJ) – Charte éthique européenne d'utilisation de l'intelligence artificielle dans les systèmes judiciaires et leur environnement, 2019, p. 14.

[66] STAWA, GEORG (2018). How is Austria approaching AI integration into judicial policies?, A presentation from the president of CEPEJ and the head of Department for Strategy, Organisational Consulting and Information Management, in Federal Ministry for Constitution, Reforms, Deregulation and Justice in Austria. Available at: https://rm.coe.int/how-is-austria-approaching-ai-integration-into-judicial-poli-cies-/16808e4d81. Retrieved 19 November 2019.

[67] Supra note 65.

them the most convenient and efficient access to justice regarding their transnational civil disputes. The use of algorithms in resolving conflicts can constitute a very compatible solution to this challenge.

However, to date, there has been a serious lack of implementation of an algorithmic dispute resolution model to assist EU citizens in settling their civil conflicts through a fair, expedited and cost-efficient option using algorithms.[68]

2. *CREA – Using Algorithms to Resolve (cross-border) Civil Disputes in the EU*

The CREA project[69] aims to introduce a new mechanism for settling disputes as an assisting tool in legal procedures for lawyers, mediators and judges with the objective to reach an agreement between the parties. Moreover, this mechanism could be used directly by citizens. This new procedure has the potential to streamline national and cross-border civil proceedings. The ultimate goal of CREA is to remove the existing differences among all EU countries caused by various national laws.

To be more precise, the CREA project achieves its objectives through several stages. The first and most remarkable step is to apply algorithms in resolving certain national and cross-border civil mattersin the allocation of goods or the resolution of issues leading the parties to reach an amicable solution before or during the trial stages. For that purpose, the project has primarily focused on demonstrating the efficacy of using an algorithmic approach to resolve civil disputes. To denote such efficiency, new areas in which specifically the concept of 'Adjusted Winner' or other algorithms weretried out, beginning with negotiations involving easily specific dissues or well-defined good sin common property. For instance, disputes in which parties contest the inheritance of common property or the division of marital assets in a divorce settlement are among the most compatible candidates to be settled through algorithmic dispute resolution programmes.[70]

The next measure is to develop new algorithms with the aim of dis-

[68] CORTES, P. (2011). Online dispute resolution for consumers in the European Union (Routledge research in IT and E-commerce law). London; New York, N.Y.: Routledge.

[69] For more information see CREA Project. (2019). Retrieved 5 September 2019, from http://www.crea-project.eu/about/overview/.

[70] BARNETT, J., & TRELEAVEN, P. (2018). Algorithmic Dispute Resolution—The Automation of Professional Dispute Resolution Using AI and Blockchain Technologies. The Computer Journal, 61(3), 399-408, p. 400.

tinguishing available rights (*droits disponibles*) from national mandatory rules (*loi de police*) in force, in the different EU Member States.[71]

Another initiation by the CREA project which should be considered as a pioneering model in the EU, up to the present time, is to establish a "European Common Ground of Available Rights (ECGARs)", different from standard legal principles, by developing and using algorithms that rapidly implement better settlements. To this end, the principal focus of the CREA project's Consortium lies within the available rights in divorce and inheritance in several selected Member States.[72]

The last and very practical stage of the CREA project refers to advancing software in which the selected harmonized procedures, applicable in all the EU States, will not infringe upon or conflict with national regulations. This software has the potential to be integrated into the European e-Justice portal[73] and the EU-ODR platform.[74]

The CREA project deploys an entirely bottom-up approach, thus the parties determine the model of dispute settlement which is compatible with their interests in order to reach a final solution for the division of common property. To achieve this goal, the project endorses the theoretical premises of decision theory studies in this regard.

At the final stage of the project, CREA software assists judges and lawyers to establish the legal procedure not as a confrontation between the parties' positions, but as a process which is aimed at helping disputants to reach an amicable consensual agreement over their conflicts. In the CREA approach, judges and lawyers do not play the role of rule enforcers or even solution makers. They act more in the capacity of mere assistants to disputants in aiding them with reaching their own solutions about the conflict; a solution which is fair, envy-free and satisfactory for all parties. This new approach is a remarkable innovation introduced and developed by the CREA project for the first time in the EU.

It can therefore be observed that the ultimate beneficiaries of this approach are the EU citizens who can use this process to foster their effective access to justice without having to seek it by resorting to cost-

[71] GIACALONE, M. (2016). Dispute Resolution and New IT Realities (Ph.D.). University of Naples Federico II/Vrije Universiteit Brussel, p. 195.

[72] These EU countries include: Belgium, Croatia, France, Greece, Italy, Lithuania and Slovenia.

[73] European E-Justice. (2019). Retrieved 4 September 2019, from https://e-justice.europa.eu/home.do.

[74] Online Dispute Resolution | European Commission. (2019). Retrieved 4 September 2019, from https://ec.europa.eu/consumers/odr/main/index.cfm?event=main.home2.show&lng=EN.

ly and lengthy judicial remedies. The outcome of citizens' satisfaction indeed strengthens the sense of belonging to the Union and not just being a citizen of one Member State. Such a perception can be encouraged even further by establishing an alternative channel to resolve conflicts throughout the Union. In this way, every citizen feels more protected and involved in affairs at the European cross-border level.

3. *The European Common Ground of Available Rights (ECGARs)*

As discussed earlier, the application of the algorithmic model of civil dispute resolution in the United States, Canada and Australia has attracted more attention compared to in Europe. Moreover, there is a significant distinction between the current attitude in the EU and in the other mentioned jurisdictions towards privatization – in contrast to the adversarial approach – of justice services in civil dispute resolutions, which is mainly embedded in the context of the 'rule of law'[75] as a principle. In this regard, whereas the EU position towards the rule of law still tends strongly to advocate the adversarial approach,[76] the United States,[77] Canada[78] and Australia[79] have already initiated strong support for the privatization of civil justice.

At the EU level, retaining an adversarial approach has caused abundant complexities in resolving cross-border civil disputes.[80] It has been understood that the existing wide disparities among the national laws of the EU Member States – specifically in civil procedural rules – are the major cause for the inefficiency of justice for European citizens. Such ineffectual justice has caused citizens' mistrust in supranational civil proceedings conducted by courts as part of public service. Over-

[75] SHARP, G. (2016). The Right of Access to Justice Under the Rule of Law: Guaranteeing an Effective Remedy. Canadian Institute of The Administration Of Justice. Retrieved 19 November 2019. from https://ciaj-icaj.ca/wp-content/uploads/page/2016/05/the-rule-of-law-and-the-right-to-effective-access.pdf

[76] HAZEL GENN, D. (2012). Why the Privatisation Of Civil Justice Isa Rule Of Law Issue. Lecture, University College London, UK.

[77] JEAN R. STERNLIGHT, Is Alternative Dispute Resolution Consistent with the Rule of Law?: Lessons from Abroad, 56DePaul L. Rev.569 (2007). Available at: https://via.library.depaul.edu/law-review/vol56/iss2/1

[78] Farrow, T. (2014). Civil justice, privatization, and democracy. University of Toronto Press.

[79] GRUIN, J. (2008). The Rule of Law, Adjudication and Hard Cases: The effect of alternative dispute resolution on the doctrine of precedent. Australats Dispute Resolution Journal, 19(206).

[80] See Chapter III. 1. at p. 10.

coming the existing hurdles in this regard in order to advance the effectiveness of justice in civil matters, thereby demands reconceptualizing the approach towards resolving civil disputes. Thus, it is necessary to shift from the exclusively adversarial systems in the EU – rendered by public justice services i.e. national courts – to the wider application of private justice by providing citizens with more elaborated access to private models of civil dispute resolution.[81]

Nevertheless, privatization of justice by using Alternative Dispute Resolutions (ADRs), Online Dispute Resolutions (ODRs) or Automated Decision-making Systems (ADSs) to resolve civil disputes has sparked some critics to attack the informalization of dispute resolution, arguing that it is against the principle of the rule of law. In this vein, a major criticism was raised by Owen M. Fiss arguing that a preference for non-judiciary models of dispute resolution over adjudication would lead to the sacrifice of justice for the sake of peace. In his arguments, Fiss has precisely clarified the advantages of using litigation over ADRs particularly in negotiation. He also seriously doubts the effectiveness of private dispute resolution models in safeguarding and promoting individual rights – due to causing a lack of elaboration of law – compared to public litigation systems.[82] Similarly, Jean R. Sternlight in her analytical article on mandatory arbitration argued that the privatization of dispute resolution does not necessarily safeguard citizens' interests in providing them with a significant and essential educational function compared to the judiciary systems – in terms of holding public hearings and publishing judgments issued by judges residing at civil courts.[83] Moreover, other critics have highlighted the informalization of dispute resolution causing prejudice in the course of decision-making. Richard Delgado is among those scholars that have clearly expressed concerns over the prevailing influence of emotional and behavioural elements in decision-making within a privatized dispute resolution context. His main emphasis is upon the competency of formal litigation procedures in having control over the two significant components of justice through ensuring fairness and equality between the disputants.[84]

[81] STERNLIGHT (2007), p. 580.

[82] FISS, OWEN M. (2009). The History of an Idea, *Symposium*: *Against Settlement*: *Twenty-Five Years Later*. 78 Fordham L. Rev. Available at: http://fordhamlawreview.org/wpcontent/uploads/assets/pdfs/Vol_78/Fiss_December_2009.pdf, Retrieved 17 November 2019.

[83] STERNLIGHT, JEAN R., "Creeping Mandatory Arbitration: Is It Just?" (2005). Scholarly Works, paper no. 280, p. 1631.

[84] DELGADO, RICHARD (1997). Alternative Dispute Resolution--Conflict as Pathology: An Essay for Trina Grillo. *Minnesota Law Review*.

As previously noted, most of these critics have expressed their concerns over jeopardizing the rule of law by the informalization of dispute resolution in civil matters. However, as the authors of this study believe that the model of private conflict resolution introduced here (the CREA) is not in contradiction with the rule of law, the authors present the following arguments to support their view.

First, to assess the compatibility of private justice with the rule of law, it is necessary to understand how privatization can reasonably fit within the fundamental components of the rule of law. Referring to the various principles of the rule of law[85] clarifies that among all these ideas, '*the observance of natural justice*' is most compatible with the concept of private justice. It should be demonstrated that 'natural justice' will be born as an outcome of resolving a conflict in an open, fair and non-biased process.[86] Considering the nature of the private models of dispute resolution, in private justice settings, parties to the claim have the opportunity to be heard fully on the dispute by an impartial entity who is independent of the disputants and not influenced by bias. Therefore, it can be demonstrated that the informalization of dispute resolution in civil matters is consistent with the rule of law and the Member States should facilitate private arrangements between individuals to enable them to pursue their choices of civil dispute resolution methods, based on the parties' mutual agreement.[87] It is necessary here to clarify that the term facilitation of private arrangements for disputants is rooted in the concept of freedom of contract. This connection clearly highlights that the Member State should seriously consider the wills of the parties to decide their own methods of dispute resolution in civil matters based on free choice and without state intervention.[88]

[85] Joseph Raz has mentioned the most significant constituting principles of the rule of law as, "All laws should be prospective, open and clear"; "Laws should be relatively stable"; "The independence of the judiciary must be guaranteed"; "The principles of natural justice must be observed"; "The courts should have review powers over the implementation of the other principles", etc. See Raz, J. (1979). The authority of law: Essays on law and morality. Oxford: Clarendon, pp. 214-218.

[86] For more information on 'natural justice' see Snider, Judith A., & Yates, C. Kemm. (1995). Alternative dispute resolution: Use and abuse of information and specialized knowledge. (Canada). Alberta Law Review, 33(2), 301-341.

[87] RAZ, J. (1979). The authority of law: Essays on law and morality. Oxford: Clarendon, p. 170.

[88] It should be noted that the general right to contract can be restricted on the grounds of public concerns. See Weber, David P. (2013). Restricting the freedom of

Another significant point to consider regarding these critiques on the inconsistency between private justice and the rule of law is that the critics make no serious attempt to distinguish between the domestic and international application of private dispute resolution.[89] At the domestic level, the Member States' hesitation towards informalization of private justice may seem justifiable by referring to the power of the state in preventing the abuse of power bestowed on private actors to deliver justice.[90] On the other hand, dealing with cross-border civil disputes against the backdrop of the existing plurality of EU Member States' legal systems – with the diverse range of civil and civil procedural laws failing to deliver efficient justice for citizens – demands a reconsideration of adhering solely to the adversarial approach.

Finally, regarding the link between the privatization of civil dispute resolution and the rule of law, Sternlight draws our attention to rethinking the relationship between these two concepts. She then points out that instead of having a sole reliance on private justice or adversarial proceedings, it is far more rational to adopt a binary approach from which, as a result, citizens can benefit from the significant roles of both social norms and the law, functioning closely together to deliver efficient civil justice.[91]

In view of all that has been mentioned so far, the primary focus of the CREA project Consortium has been to establish a private model of dispute resolution that functions on the basis of the laws through establishing the European Common Ground of Available Rights (ECGARs). Such constitution – with its binary approach – advances the efficiency of justice in resolving cross-border civil conflicts through laying emphasis on extracting similarities among the laws of the Member States and incorporating them into the CREA software.

It is worth noting that CREA is the first comprehensive effort, in its own category, in collecting all the mandatory rules of each Member State to create a common ground out of them and establish the ECGARs framework for the entire European Union.

This common ground is essentially based on the data acquired from seven selected EU jurisdictions including Belgium, Croatia, France, Greece, Italy, Lithuania and Slovenia. The derived data was

contract: A fundamental prohibition. (p. 51-76). Yale Human Rights and Development Law Journal, 16, 51.

[89] Supra note 78, p. 580.

[90] Although such critical reflection per se can be also questioned, however the discussion about it falls beyond the scope of this paper.

[91] Supra note 78, pp. 581-589.

specifically collected in two areas of civil law, namely divorce and inheritance, from each of these European Jurisdictions.

As previously discussed, the major reason for opting for these two areas of civil law lies in the fact that the nature of most disputes arising out of divorce settlement or inheritance are rooted in asset division. Thus, conflicts over dividing marital property or the disposition of an estate among heirs are the most compatible disputes to be resolved through algorithms.

The data collected were used to represent the mandatory rules on divorce and inheritance with explicit focus on the division of assets to constitute the ECGARs framework which would not be grounded in legal principles, but instead in the properties of the algorithms. Creating such common ground will facilitate efficient access to justice through a more expedited and less expensive means of dispute resolutions. For that purpose, the authors as part of the CREA team provide a concise and comprehensive overview of such mandatory rules within the selected national jurisdictions pursuing a comparative approach in analysing the collected data.

Having discussed the ECGARs, the following section of this paper addresses the methodology applied in collecting and analysing the necessary data on divorce and inheritance from the jurisdictions studied to constitute the common ground.

4. *Methodology*

The methodology adopted by the authors was mainly based on qualitative research. However, the acquired data were visualized in tables and graphical figures to provide a more developed and precise understanding of the research for readers regardless of their legal or non-legal background.

The samples for collecting data consisted of seven EU Member States including Belgium, Croatia, France, Greece, Italy, Lithuania and Slovenia. The only driving factor for choosing these seven States out of a total of 28 EU Member States solely refers to the nationalities of the project partners. Following the selection of samples, a set of questions were designed by the authors to insert the answers into a predetermined framework and increase the quality of comparative study at later stages of the research.

The questions were sent to each project partner residing in the target countries. They were asked to provide the most compatible answer, according to the national legislations on divorce and inheritance, to the questions in particular where division of property is explicitly

involved. Once the reports on the investigated jurisdictions were received by the authors, it was first necessary to extract the fractions and numerical data on the division of assets to establish the framework of the ECGARs. Following the legal analysis of the collected rules, conducted by the authors, the extracted fractions and numeric data were sent to the Information Technology Unit of the CREA project to be used as an input into the system for the purpose of designing the algorithmic dispute resolution model in CREA software.

5. Results and Findings

a) Divorce – Matrimonial property regimes

The first set of questions aimed at identifying the 'recognized matrimonial property regimes' under the studied national legislations. The purpose of this investigation was to find out the existing similarities and differences among the rules on asset division.

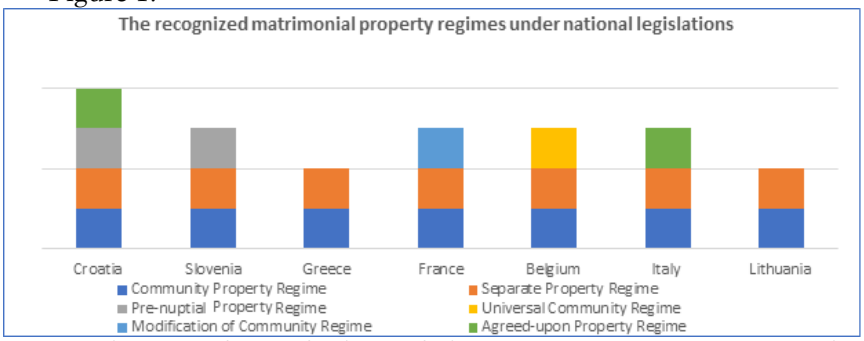
To distinguish various types of matrimonial property regimes recognized by the selected jurisdictions, Figure 1 presents a comparative overview of these regimes.

The most striking observation to emerge from the data comparison is the acceptance of the Community Property Regime and Separate Matrimonial Property Regime by all these Member States.

It is necessary here to clarify exactly what is meant by these two property regimes. The term Community Property (or Co-ownership) has been generally used to refer to situations in which the spouses jointly co-own the assets in the context of their marriage. In contrast, the concept of Separate Matrimonial Property Regime by default assumes the assets fall under the independent ownership of each spouse.

Interestingly, there are also other types of matrimonial property regimes recognized by some of the Member States. This can be seen in the case of Croatia in which the other two property regimes have been identified by the Croatian legislator under the Pre-nuptial and Agreed-upon Property Regimes. Thus, couples in this country have more options available to them to choose their favoured governing system from any of these four property regimes. In similar cases, national legislators in Slovenia (Pre-nuptial), Belgium (Universal Community), Italy (Agreed-upon) and France (Modification of Community) also recognize an additional type of matrimonial property regime compared to Greece and Lithuania that have merely recognized the Community and Separate Matrimonial Property regimes to govern the division of assets between the spouses.

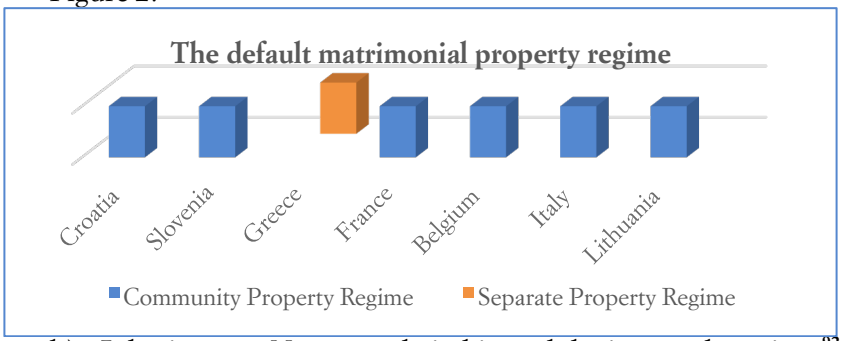
Figure 1.



Another significant finding of the current investigation into the matrimonial property regimes of the selected Member States was to identify the default regime applicable to property division between spouses. In this literature, the term 'default regime' tends to be used to refer to situations where the spouses have not opted to choose their favoured matrimonial property regime. Consequently, upon separation/divorce the default matrimonial property regime is automatically applicable to asset division and financial matters between the couple. However, the spouses have the option to choose their preferred matrimonial property regime to govern ownership of the assets.

As shown in Figure 2, except for Greece, all the countries follow a similar approach in accepting the co-ownership property regime as a default regime to govern splitting assets between the spouses. To further clarify, Greece has accepted the separation of property as the default matrimonial property regime.

Figure 2.



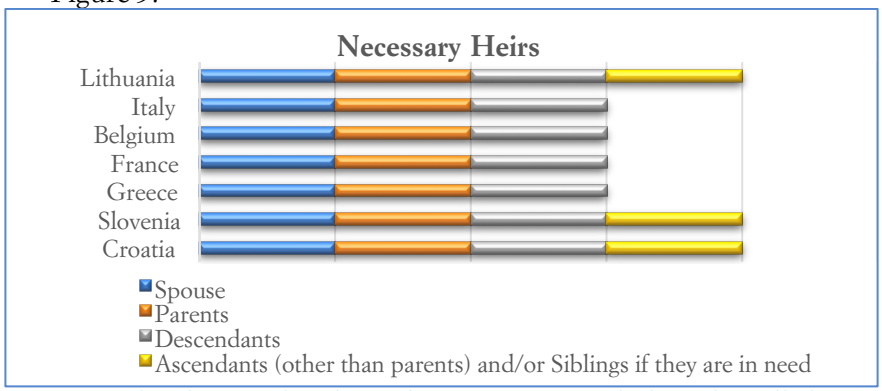
b) Inheritance – Necessary heirship and the imposed portions[92]

[92]The meaning of the 'necessary heirship' and their portions is established by the

In the process of conducting the CREA research study, with the purpose of establishing the ECGARs, the remaining questions were specifically focused on investigating the inheritance laws of the selected jurisdictions.

The primary inclusion criteria for extracting the relevant data among the vast array of inheritance laws related to identifying the necessary heirs and their portions to provide fractions of their shares in the estate. The Figure below illustrates the necessary heirs recognized under each jurisdiction.

Figure 3.



From the data in the above figure, it is crystal clear that all these legal systems primarily accept the principle of 'necessary heirship'. Nevertheless, the most significant outcome is that these jurisdictions have unanimously taken a similar approach in identifying spouse, parents and descendants (including children and their offspring) as necessary heirs to the deceased.

However, except for descendants that are generally considered as protected heirs, spouse and parents have some special status in some jurisdictions. Concerning parents, their status as necessary heirs is not absolute, since this right is conditioned to circumstances where they are in need. For instance, in France, parents are regarded as necessary heirs provided that there are no children causing the inheritance to be shared between the surviving spouse and parents of the deceased. Likewise, in the absence of a surviving spouse, the parents are considered as necessary heirs along with the children to the demised. Slovenian laws on inheritance recognize the parents to the deceased strictly

legislators to provide a protective legal shield against the unjust deprivation of the necessary heirs who are generally among the close family members to the demised.

as necessary heirs. In Belgium, parents are primarily considered as necessary heirs, however this entitlement is solely limited to receiving a life maintenance. Also, in Italy and Greece, parents are necessary heirs provided that there are no children as heirs.

In comparison, in Lithuania, parents are necessary heirs contingent upon being in need. Under Croatian laws, parents must comply with two preconditions to be regarded as necessary heirs that is being recognized as incapable of working and being unable to support themselves.

Furthermore, it is apparent from Figure 3 that the ancestors and/or siblings of the deceased are only conditionally recognized as necessary heirs in Croatia, Slovenia and Lithuania. These circumstances are mostly need-based for this category of heirs.

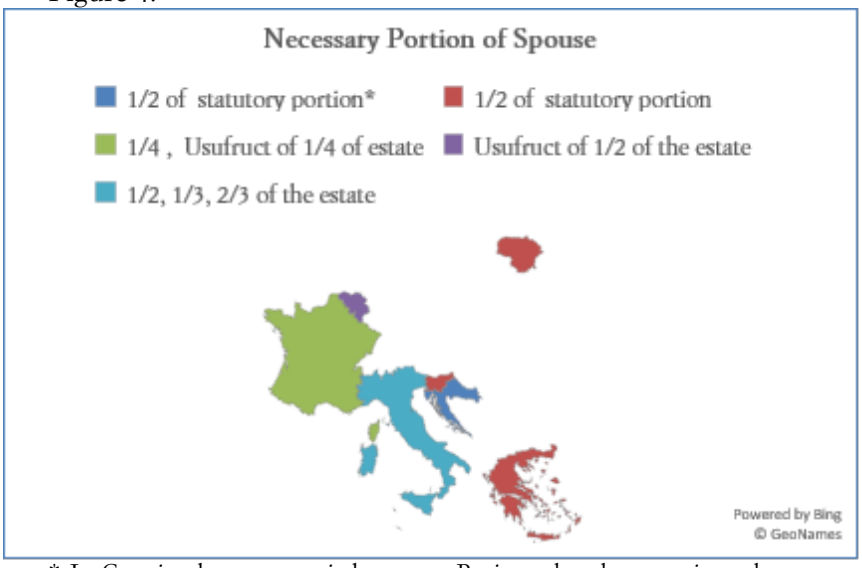
The Figures below indicate the portion of necessary heirs limiting the freedom of the testator to dispose of his/her assets against the protected heirs. As is apparent, the presented portions are different in the various Member States, either based on the statutory portion of necessary heirs or in relation to the entire estate.

One significant finding at this stage of the analysis was identifying the two different approaches taken by these jurisdictions concerning the shares of protected heirs. While some of these legal systems define the compulsory portion on the basis of statutory share, the others apply the principle of the whole estate to calculate the necessary portion.

Thus, the necessary share of the surviving spouse in the Member States studied is presented in Figure 4. Accordingly, the obligatory portion for a spouse in Slovenia, Croatia, Greece and Lithuania[93] is half of the statutory portion the surviving spouse would have been entitled to. Whereas, in France and Italy this portion depends on the number of children. As an example, in Italy in the case that the spouse is the only heir, s/he receives half of the estate. In the case that there is one child, the spouse's necessary portion is one-third and if there are two or more children, the surviving spouse's compulsory share is one-quarter of the entire estate.

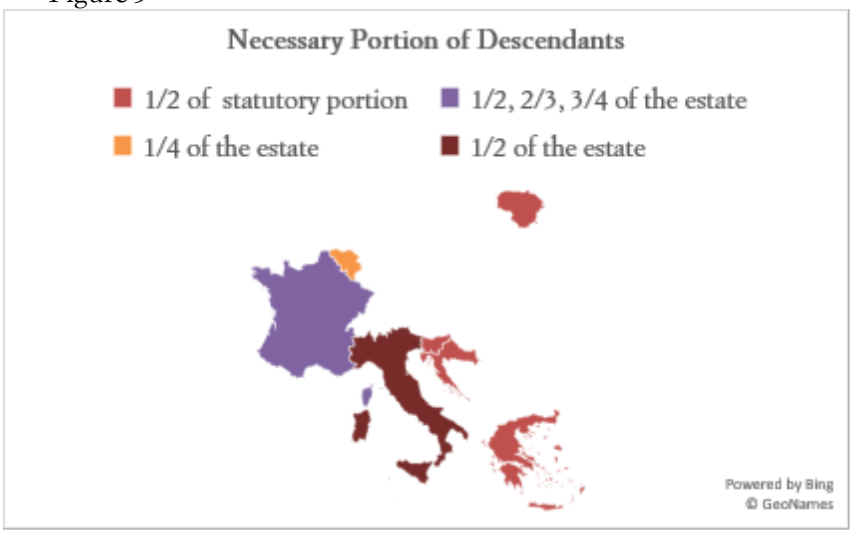
[93] If there are no more than three heirs of the first line, the spouse inherits ¼ of the inheritance. If there are more than three heirs of the first line, the spouse inherits an equal share with the heirs of the first line. If there are no heirs of the first line and the spouse inherits together with the heirs of the second line, the spouse inherits half of the inheritance. If there are no heir of the first and the second lines, the spouse inherits all inheritance.

Figure 4.



* In Croatia, the extra-marital partner. Registered and non-registered same-sex partners inherit the same portion as the spouse.

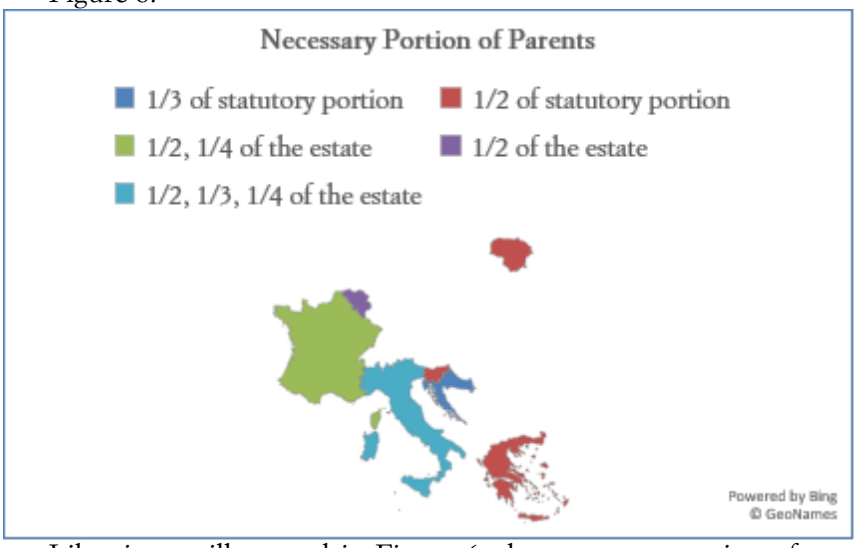
Figure 5



The Figure above shows the necessary share of descendants (including children and their offspring). For example, in France the number of descendants is taken into account to determine their obligatory shares. Hence, half of the estate is the necessary share of one

child, two-thirds of the whole estate for two children and three-quarters is the protected portion for three and more children.

Figure 6.



Likewise, as illustrated in Figure 6, the necessary portion of parents in the estate of the deceased is distinctly different in these countries. For instance, under the Italian and Greek Civil Code, parents' necessary portion is based on various circumstances. In fact, in the case that parents are the only heir, their obligatory portion is one-third of the estate, while if there is a surviving spouse, the necessary share of parents is then restricted to one-quarter of the entire inheritance. In addition, under Lithuanian law, if it is proved that parents are in need, they are entitled to half of their statutory portion. Similarly, in Croatia, parents are entitled to receive one-third of their statutory share if there is evidence that they are in need and incapable of working.

6. *Research Limitations*

During the course of conducting this study, there were a number of limitations. Firstly, it is unfortunate that the study did not include all the existing jurisdictions within the EU. Thus, being limited to investigating merely seven European Jurisdictions, compared to the total of 28 Member States, the size of this study was rather small. Secondly, despite the completion of CREA software by the Mathematics and Information Technology Units of the project, this tool is still undergoing

its testing phase. Therefore, the authors were unable to conduct an in-depth investigation into the results of the CREA software due to the lack of sufficient users' feedback. This limitation was caused more by the lack of adequate knowledge on the applicability of algorithms in terms of civil dispute resolution (particularly, where asset division is involved) among academia, legal practitioners and other categories of citizens.

Furthermore, despite the success of this research in establishing the European Common Ground of Available Rights, nonetheless there are still a considerable number of disparities among the existing legal systems of the EU Member States on civil and civil procedural rules. Such deep disharmonies not only restricted, but also complicated the investigation into the national laws pertinent to divorce and inheritance with the aim to extend the ECGARs at the EU cross-border level.

Conclusions and Future Research

The purpose of the present research was to examine the applicability of Conflict Resolution with Equitative Algorithms (CREA) in resolving civil disputes with a specific focus on the distribution of assets in divorce and inheritance matters – on the basis of the fair solution theory.

The second and major aim of this study was to reveal and discuss the establishment of the European Common Ground of Available Rights (ECGARs) as a result of implementing the CREA project. In this regard, the divorce and inheritance rules – affecting asset division – of several EU Member States were investigated using a qualitative research methodology.

The findings of this research have shown that the CREA software is applicable as an alternative tool to assist disputants in resolving their conflicts concerning the division of assets in divorce and inheritance in a non-adversarial context, at both national and cross-border level. The interpretation of the collected data confirmed that application of the CREA online tool by either public or private actors can greatly benefit disputants providing effective access to justice to resolve their conflicts.

Moreover, another significant practical achievement of this study can be seen in the establishment of the ECGARs for the first time in the EU, which contributes towards tackling the existing disparities among the laws of Member States on cross-border asset division in divorce and inheritance disputes.

Although the current study is based on a small sample of investigated EU legal systems (only seven out of a total of 28 Member States), the findings suggest that the CREA pilot project functioned well in the capacity of resolving asset division conflicts in its testing phase. However, this research has thrown up some questions in need of future investigation. Therefore, further research is required to closely examine the results and users' feedback on the applicability and efficiency of the CREA algorithmic model of dispute resolution in the European context. Hence, another study should be carried out to explore all the EU Member States' legal systems and their relevant laws on divorce and inheritance regarding the distribution of property. Further investigation will furnish the already established ECGARs framework with new rules transforming it into a more coherent and developed source to be added to the CREA software for future application at much broader scale.

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EVENTUAL RESTRICTIONS AND EFFECTIVE USE OF ALGORITHMS IN CIVIL LAW MATTERS**

Abstract The following paper aims to point out the – rather underestimated – methodological restrictions on the use of algorithms deriving from the structure of provisions that regulate civil law matters. Civil law rules often suggest that the settlement of a dispute between individuals be depended upon the personal point of view of a judge or a mediator, who is thus expected to form his/her decision based rather on equity than on fest *criteria.* Moreover, quite a few civil law rules contain indeterminate legal concepts, whose meaning is not totally preconceived, but is partly defined *in concreto,* according to the circumstances of each case (e.g. "good faith" or "principles of morality"). Therefore, the efficient interpretation and application of the law require "creative initiatives" who can be undertaken only by humans, naturally gifted with flexibility and adaptability. On the other hand the much-discussed mandatory rules consist no real obstacle for the implementation of algorithms in the justice system. Since they embody the most significant principles that govern a certain legal system, they are usually formed by the legislator with clarity and precision, characteristics which enable their digital transcription, i.e. their transformation in accurate commands, easily executable by smart programs.

I. *Introductory remarks*

This study aims to point out the – rather underestimated – methodological restrictions on the use of algorithms emerging from the particular structure of provisions regulating civil law matters. Conversely, the much-discussed mandatory rules constitute no significant obstacle for the implementation of algorithms in the justice system.

It should be underlined that the following analysis regards algorithms (weak artificial intelligence), in other words software elaborating its decisions exclusively on the basis of specific commands, already determined in advance by the developer. Undoubtedly the technically further evolved "autonomous agents", as they are called, can be effec-

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tively used in a larger range of disputes and achieve more fascinating and varying results, since they are designed to act creatively and independently. However, it is admitted that neither the process nor the outcome of their decision making can be fully predicted, a fact that will probably lead to greater legal uncertainty and enhance the existing mistrust against justice.

II. *Restrictions regarding the use of algorithms*

Two main sorts of restrictions set the frame for the application of algorithms: First, various methodological restrictions, and, secondly, restrictions stemming from the existing mandatory rules, principally those governing the relationship between the (ex-) spouses or the co-heirs.

1. *Methodological restrictions*

Not all civil law disputes are befitting to an automated arrangement. First and foremost, matters concerning the personal regime of a married couple or the exercise of parental custody are to be excluded from algorithmic procedures, inasmuch as they refer to aspects of the personality right or affect the interests of children. Therefore, their regulation should be reserved to the private autonomy of the parties involved; the latter must be allowed to decide exclusively according to their personal conditions and wishes[1].

Furthermore, a computer program cannot undertake the interpretation of contracts. Finding out of the meaning of an agreement is an open process, not subject to formalization, whose outcome depends largely on the special features of the contracting parties as well as the circumstances accompanying the contract. Therefore, crystallizing rigorous interpretation parameters –compatible to automated and massive use by a smart program– is not possible. The aforementioned inability of setting concrete criteria applies *a fortiori* in case of interpreting wills, a domain where the aim of giving effect to the intentions of a particular testator prevails completely, thus overriding any kind of general rules or indications[2].

[1] For example, the name and surname of the children must be chosen by their parents and not selected by a computer.

[2] For this reason, in case of wills the principles of the so-called "subjective interpretation" are to be adopted. See *Papanikolaou*, Methodology of private law and in-

In addition, artificial intelligence cannot handle the task of specifying indeterminate legal concepts. It is a common practice that in drafting legal provisions legislators tend to use legal terms whose meaning is not totally preconceived (e.g. the concepts "good faith" or "principles of morality"), but is defined partly *in concreto,* in other words in accordance to the circumstances of the case under consideration, so as to ensure fairness and equity when the law is applied. It is needless to mention that algorithms would face insuperable difficulties if called to apply such "agile", beyond any standardization, rules, which nevertheless facilitate the reconciliation of conflicting interests by the judge. To the extent, subsequently, that the effective interpretation and application of the law require "creative interventions", algorithms cannot offer useful services. Such a subtle and complicated task can only be performed by human beings, who are naturally gifted with flexibility and adaptability.

2. *Consist mandatory rules a real obstacle for the use of algorithms?*

Taking into account all the abovementioned methodological limitations, one can draw the conclusion that algorithms are suited for resolving legal problems only in cases in which there is no need for an axiological decision. In particular for the purpose of dividing goods, specially designed distributive platforms are likely to be proven as precious assistants, due to their unique capability of operating complicated calculations with accuracy.

On the contrary, mandatory rules do not block or discourage the integration of algorithms in the justice system. Since they embody the most fundamental principles that govern a certain legal system, they are usually formed by the legislator with clarity and precision, attributes which enable their potential digital transcription, i.e. their transformation in accurate commands, easily executable by smart programs. Besides, the hardest phase regarding *ius cogens* is undoubtedly its characterization as such, in other words the estimation whether a provision expresses a primary evaluation of a legal order not to be put aside by private agreements. But this is a process prior and irrelevant to the use of algorithms. Moreover, one must bear in mind the fact that mandatory rules are to be respected in any litigation. In this sense, they inevitably limit the discretion of every "judge", mechanized or not.

terpretation of legal acts, Athens 2000, No 474, 524; *Stathopoulos*, in Georgiades/Stathopoulos (eds), Commentary of Greek Civil Code, 2nd ed. 2016, combined articles 173 and 200 GCC (= Greek Civil Code), No 131 ff.

III. *Examples of effective use of algorithms for the purpose of settling arguments between individuals (with emphasis on distribution of assets)*

1. *Solving preliminary problems*

One should not underestimate the difficulties confronted by judges, mediators or arbitrators when called to ascertain whether the disputed right has actually been infringed or the disputed claim is substantiated, so as to decide subsequently on the remedy indicated. This applies in particular for rights consisting in a share of another person's estate. Confirming whether the assets already allocated by the obligor to the entitled person equalize its legal portion (e.g. its portion of the deceased's property) demands a complex sequence of calculations and comparisons. The latter can be effective and reliably performed rather by algorithms than human minds. Here are some typical examples:

a) Is one's claim to a compulsory portion been infringed?

Wills often contain various complicated distributive provisions, especially when the inherited estate is of significant value and there are quite a few heirs designated by the testator. In such cases, moreover, the deceased previously, namely during his/her lifetime, usually disposes gratuitously some of his/her assets to the compulsory heirs, principally to his/her descendants. The abovementioned donations and gifts are also to be included fictively in the inheritance, so that the calculation basis for the reserved portions is broadened in favor of the obligatory heirs. As a result, when a will is combined with donations *inter vivos*, one faces serious difficulties in determining whether the goods already obtained by compulsory heirs are equivalent to or fall short of their claimable compulsory share. A smart computer program, specially designed for this scope, can accomplish efficiently and rapidly all the evaluations required, provided that it is equipped with a wide range of data needed for the precise assessment of values (e.g. prices per square meter regarding immovable property). If it turns out that the goods inherited or gifted are inadequate compared to his/her legal quota, then the beneficiary is entitled to overturn some or all donations that took place prior to the devolution of the inheritance. Otherwise his/her claims will be considered satisfied and no further action will be taken.

b) Can an equalization claim to accrued marital gains be established?

Defining the extent of the justified participation of a former

spouse to the accrued marital gains of the other can be proven even harder than estimating the amount corresponding to compulsory shares, in particular when both the compared properties of the spouses have increased during the marriage. We should bear in mind that in such an eventuality, according to the view prevailing in Greek legal literature and jurisprudence, each spouse is entitled to a separate equalization share; the reciprocal claims of the spouses are subsequently set-off to the extent that they overlap each other[3].

Apart from the highly challenging duty of evaluating two separate estates at two different dates, namely both at the time a marriage is concluded as well as at its ending, judges are often called to estimate the value of immaterial services offered by the claimant, such as keeping the household or upbringing children, which facilitate the undistracted exercise of professional activity on behalf of the other party and thus contribute to the increase of his/her income. One must also take into account that the statutory presumed amount of contribution to accrued marital gains can be contested by the claimant; the latter enjoys the right to prove that his/her involvement in the increase of the ex-spouse's property is wider[4]. All the above-described factors considered, it is no wonder that trials concerning accrued marital gains usually last for a long period of time. The intervention of an algorithm capable of operating accurate evaluations, deductions and setting-offs would considerably reduce the complexity and duration of such litigations.

2. *Algorithmic termination of disputes*

As it has been repeatedly emphasized in this paper, algorithms are mostly suited for resolving disputes demanding complicated calculations and correlations, especially disputes related to partitioning of goods or defining the amount of periodical payments. From the wide range of civil law matters relevant to distribution of assets or judicial definition of payable amounts we will focus on: a) the dissolution of the formed partnership between co-heirs by division of inherited assets and b) the specification of the maintenance amount due to the children by each of his divorced parents.

[3] See, inter alios, *Apostolos Georgiades*, Family Law, § 12 No. 30; *Lekkas*, in: Synoptic Commentary of Greek Civil Code (editor: *Ap. Georgiades*), article 1400 No 8.

[4] According to article 1400 of Greek Civil Code (henceforth citated as: GCC), the statutory presumed contribution amounts to one third of the property growth that took place during the marriage.

a) Distribution of the inheritance among the co-heirs

In the event of absence of a (valid) will, provided additionally that the deceased during his/her lifetime did not stipulate an asset distribution with his/her descendants[5], the inheritance passes under the rules of intestate succession. The inheritance may include material and immaterial assets, as well as enforceable claims against third parties. If more rightful heirs exist, the inherited assets become a joint acquisition of the co-heirs, who form a community. Every co-heir is entitled individually to request at any time the partitioning of the joint estate, thus dissolving the existing community. This is a common process because the management or disposal of jointly owned assets is subjected to significant limitations and conditions; the existing interdependence often leads to hostility between the co-heirs, though. For this reason, co-heirs try to make themselves exclusive owners of certain inherited goods through a consensual or judicial partition. The latter is ruled by the provisions concerning co-ownership, as well as those regulating the procedure of judicial distribution (articles 478-494 of Greek Code of Civil Procedure).

Under the circumstances described above the aid offered by an "automated distributor", skilled at achieving rational and impartial compromises, is decisive, especially since it is extremely common that the co-heirs' selections coincide; in other words they ask to obtain the very same goods, primarily the most valuable ones.

The division carried out by platforms should be based on both objective and subjective parameters. Obviously, all crucial mandatory rules regarding intestate succession are to be inserted in the program (for example, the provisions governing the degrees of intestate succession, their ranking, the shares corresponding to each degree, the right to a compulsory portion, the right to disclaim the inheritance and, naturally, the rules concerning initial joint acquisition of inherited goods by the co-heirs)[6]. In addition, the developer must enter a wide range of measuring information, which guarantee the accurate determination of the inherited estate's value.

On the other hand, personal wishes and features of the parties par-

[5] So an allocative agreement, effected *post mortem*, is valid solely when concluded with one's descendants (articles 1891 ff. GCC). All other types of inheritance contracts are prohibited and thus void (see article 368 GCC).

[6] It must be pointed out that admissible ways of judicial distribution are usually stipulated exhaustively by the law (see articles 480 ff. of Greek Code of Civil Procedure). In that sense, the partitioning process is not carried out freely, according to the interests and wishes of the parties, but is also subdued to compulsory provisions, which therefore must be applied by the algorithm in charge of the division.

ticipating in the division should also be taken into consideration. For this purpose the co-heirs should prior to the division be asked to declare which objects of the inheritance they would preferably receive. Further particularities must also be weighed (if, for example, one of the co-heirs already possesses land adjacent to the deceased's property, it is only fair that a priority right on this specific asset is acknowledged in his/her favor).

The application of objective and subjective criteria, combined with the digital character of the algorithm's judgement (which is therefore unsusceptible to any kind of pressure), secure that an equitable and unprejudiced settlement of the dispute is easily reached, without offering grounds for justified objections on the part of the heirs.

Finally, assets whose allocation fall into the scope of the court's equitable discretion[7] should rather be excluded from an algorithmic elaborated partition and remain reserved to weightings made *in concreto* by a human judge, arbitrator or mediator, capable of delicate adjustments.

b) Distribution of the accrued marital gains

The abovementioned remarks regarding the division of the inheritance also apply, *mutatis mutandis*, in case of assigning goods to the spouse entitled to participate in the increase of the other spouse's estate[8]. A potential distributive platform must comply with the relevant mandatory rules, contain evaluative data and take into consideration, to the extent possible, the personal preferences of the former spouses.

c) Specification of the children's maintenance

Separation of belongings is not the only issue entailing perplexed calculations and thus likely to arise serious disagreements between the interested parties. Equally disturbing is the determination of periodical payments, when the sum due is not predetermined by the law but varies in accordance to the special conditions concerning the obligor and the obligee. Defining the maintenance amount owned to minor children on part of their divorced parents is a typical example thereof. For the needs of an algorithm destined to estimate an equitable mainte-

[7] For example, article 1889 GCC provides that the court may assign the use of the matrimonial home exclusively to the surviving spouse of the deceased, taking account of his/her best interests.

[8] According to Greek civil law, the obligation of the enriched spouse to render part of his accrued benefits to his ex-wife/her ex-husband consists a pecuniary obligation, without prejudice of the parties' right to decide otherwise (agree, e.g., on a satisfaction of the claim *in natura*).

nance, the relevant – rather rigid – legal framework must be firstly digitized accurately.

As the legislator's main concern is to secure a decent living for the children, without risking however the maintenance of the parents, a detailed compulsory regulation, limiting considerably private autonomy, is introduced[9]. More precisely, both parents are obliged to provide maintenance for the children, as long as their remaining income is considered sufficient to cover their personal needs. If both parents fulfill this condition, their share is subsequently determined on a *pro rata* basis, taking into account their financial status (current earnings as well as property). Only if the child is considered self-sufficient (because, for example, he/she rents property inherited from the grandparents) are the antecedents released from the obligation to pay any allowance[10]. The maintenance, which must correspond to the child's current standard of living, comprehends all the necessities of life (alimentation, clothing, housing, etc), including the costs for education. The amount due is paid every month in advance, while summing up periodic payments is forbidden.

All the aforenamed conditions are often being contested by parents, mainly their ability or inability to offer maintenance, the current needs of the child in question, and the extent of their obligation to contribute to the child's expenses. Confirming the parents' ability to support the child (and its limits), consists a real challenge for every mediator involved in a reconciliation effort; the latter should practically engage himself/herself in an endless series of evaluations, risking meanwhile the child's prosperity. Conversely, by replacing a human by a computer program precious time is saved and possible miscalculations are avoided. The structure of such an estimative platform would be similar to the one designed to divide assets. In other words, it should contain, apart from the crucial mandatory provisions, data necessary for the appreciation of the current economic status of the divorced couple, on the one side, and the needs of the children, on the other side. At the same time both parents must state the minimum and maximum amount they are willing to spend for the sake of their children.

IV. *Conclusion*

The list of disputes cited above is purely suggestive. One may add

[9] In general, and notably in Greek legislation.

[10] It should be underlined that minor children are not obliged to liquidate their personal assets in order to preserve themselves, unless their parents are judged indigent based on the criteria set by the law.

other occurrences necessitating either division of goods or quantitative specification of claims[11], such as the partition of the jointly used mobile goods in the event of divorce or separation of a couple, the termination of common property regimes or even the administration of an inheritance in favor of the existing creditors. In any case, from the few examples mentioned in this short study one concludes beyond doubt that an algorithm's capacities for legal aiding are multiple and must be exploited appropriately. Mandatory provisions do not in any way hinder the automated elaboration of legal solutions, as long as they are carefully detected and subsequently coded in an executable and accurate way. Under this perspective, in the current phase of development and pilot implementation of algorithms one should rather focus on the nature of the disputes submitted to mechanized settlement, selecting those governed by rigidly formed provisions, namely provisions not containing indeterminate legal concepts or other "mobile" elements[12]. Flexible rules of this type are not destined by the legislator for immediate, general application, but require prior axiological estimations and adjustments, skills inherent mainly to human intellect. Algorithmic exercised discretion is, however, not to be excluded, provided that it takes place on the basis of measurable criteria, perceivable by artificial intelligence. Allocating assets consists, therefore, the most suitable field for the use of algorithms for the purpose of judicial or voluntary arrangement of private affairs.

One last conclusive thought must be added at the closing of this brief analysis. One must not underestimate the widespread mistrust towards judges, arbitrators and generally individuals mandated to resolve private disputes. Introducing in the judicial system electronic tools, not reacting to bribery or other means of persuasion, illustrates a perfect opportunity for reestablishing justice's lost prestige. Inevitably, of course, other complains, concerning this time massive and thus inequitable reconciliation of opposing interests, will arise. In the final analysis, the permanent disapproval of a third party's intervention (mechanized or not) in private affairs must be contemplated as an instinct reaction to the prohibition of self-redress mechanisms, which therefore is not likely to be eliminated in the future.

[11]Provided, of course, that the right or obligation in question fall into the dispositive power of the parties.

[12]For the concept and the function of the so-called "mobile system of legal elements" ("bewegliches System von Elementen") see *WalterWilburg*, Entwicklungeinesbeweglichen Systems imbürgerlichen Recht, Graz 1950.

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PART III

NATIONAL APPLICATION

TATJANA JOSIPOVIĆ* – IVANA KANCELJAK**

APPLICATION OF ALGORITHMIC PROCEDURE FOR DIVISION OF ASSETS - CHALLANGES FOR DIGITAL TRANSFORMATION OF CROATIAN PRIVATE LAW -

Abstract In this article, the authors discuss the scope of application of algorithms in the procedures for the division of assets, taking into account all the peculiarities of co-ownership and joint ownership that exist in Croatian private law. The paper firstly explains the existence of alternative methods of dispute resolution in the framework of which algorithms can potentially be of use. The latest amendments to the Civil Procedure Code also pave the way for such a way of resolving disputes. However, in addition to procedural norms, it is necessary to take into account the norms of substantive law. The paper focuses on different mandatory provisions which may have a restrictive effect on the application of the algorithms in the dissolution procedure. Nevertheless, the paper emphasizes the advantages of using algorithms in these procedures as well as the assumptions that must be met in order for the algorithm to actually be applied. The creation and as well the concept and nature of the algorithm depends on the idea of fairness understood by the code writer.

1. *Introduction*

Croatian private law provisions on division of assets in co-ownership or joint ownership are very traditionally regulated. The Act on Ownership and Other Real Property Rights (Property Act/PA)[1] lays down that a division of assets is decided based on the agreement of all co-owners or a court decision in extra-judicial proceedings (Art. 47-56. PA). There is also a series of mandatory provisions in the Property Act and in many separate acts[2] limiting the rights of co-

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[1] The Act on Ownership and Other Real Property Rights, Official Gazette (hereinafter: OG), Nos91/1996, 68/1998, 137/1999, 22/2000, 73/2000, 114/2001, 79/2006, 141/2006, 146/2008, 38/2009, 153/2009, 90/2010, 143/2012, 152/2014.

[2] See, for example, the restrictions on co-owners to determine the method of division imposed by special legislation such as The Physical Planning Act (OG, Nos 153/13, 65/17, 114/18, 39/19, 98/19), The Act on the Protection and Preservation of

owners to agree on the method of division of assets. On the one hand, these mandatory provisions in the PA and in other special legislation provide the framework within which co-owners may freely decide on the method of division of assets. On the other hand, the court, when deciding on the division of assets, must also take into account the mandatory provisions limiting the co-owners' rights to a division. The existing mandatory provisions can also constitute possible limitations on the introduction of algorithmic procedures for division of assets.

Indeed, a consideration of the possibilities of automatisation of making decisions in court proceedings by the application of artificial intelligence or algorithms[3] does not skirt the Croatian legal order. Strategic plans by the Ministry of Justice of the Republic of Croatia aimed at enhancing and modernising the justice system, also anticipate automatisation of business processes and support for the decision-making process by implementing the solutions based on complex algorithms and artificial intelligence. There is a plan to increase Internet services in the form of e-files and to connect and expand e-services within the justice system. The establishment of e-business and e-communication services is also included in the future plans. At the same time, a project of modernisation also envisages the inclusion of both practicing lawyers and notaries public. All these activities are aimed at decreasing the workload of judicial bodies and increasing the quality and efficiency of the process of resolving court cases and ultimately also reducing the existing backlog of unresolved cases.[4]

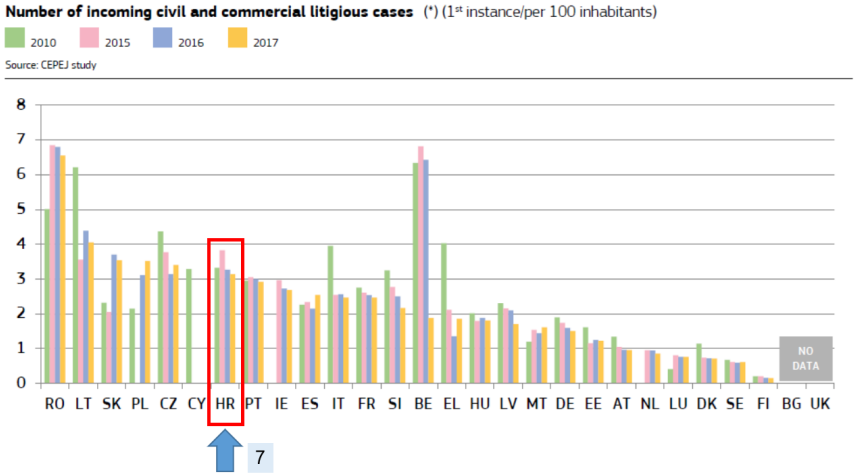
Cultural Property (OG, Nos 69/99, 151/03, 157/03, 100/04, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 98/15, 44/17, 90/18, 32/20, 62/20) etc. Restrictions are prescribed with regard to a division into building plots, sale and division of cultural property, collection of movable cultural goods *et al*. See, for example, Arts 160-162 of the Physical Planning Act, Arts 20, 37-40 *et al* of the Act on theProtection and Preservation of Cultural Property.

[3] For more see: Council of Europe: "Algorithms and Human Rights - study on the human rights dimension of automated data processing techniques and possible regulatory implications", DGI(2017)12, 2018; available at: https://rm.coe.int/algorithms-and-human-rights-en-rev/16807956b5 (last visited: 16.11.2019).

[4] See The Strategic Plan of the Ministry of Justice 2019-2021 (*Strateški plan Ministarstva pravosuđa za razdoblje* 2019-2021), pp. 7,8, availableat: https://pravosudje.gov.hr/UserDocsImages/dokumenti/Strategije,%20planovi,%20izvje%C5%A1%C4%87a/Planovi/Strate%C5%A1ki%20plan%20Ministarstva%20pravosu%C4%91a%20za%20razdoblje%202019%20do%202021..pdf(last visited: 18.11.2019).

See the Strategic Plan of the Ministry of Justice 2020-2022, pp. 8, 9, available at:https://pravosudje.gov.hr/UserDocsImages/dokumenti/Strategije,%20planovi,%20

Automatisation of business processes could be of particular significance for Croatian courts struggling with huge backlog of cases and continuous arrival of the incoming ones. According to the data published in "The 2019 EU Justice Scoreboard"[5], the Republic of Croatia ranks seventh according to the number of incoming cases in civil and commercial matters before first instance courts.[6]



The 2019 EU Justice Scoreboard[7]

An additional problem is the fact that the Republic of Croatia, when the speed of the resolution of these cases is concerned, is ranked only as number twenty-one.[8] At the same time, a large number of non-litigious cases, also including the non-contentious cases for division of assets in co-ownership are before Croatian courts. According to the data of the Council of Europe, the European Commission for the Efficiency of Justice/CEPEJ (2018 Edition), in 2016, over 70% of cases before Croatian first instance courts were non-litigious cases

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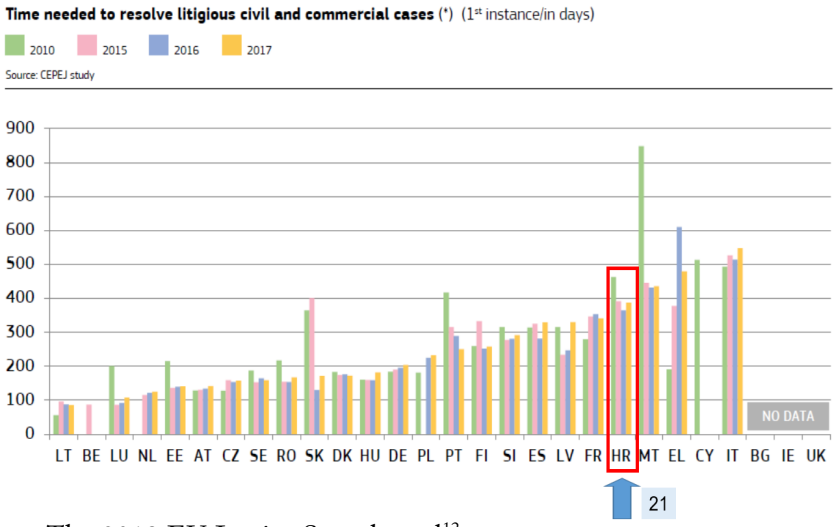
[5] "The 2019 EU Justice Scoreboard", Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions COM(2019) 198/2, available at:https://ec.europa.eu/info/sites/info/files/justice_scoreboard_2019_en.pdf (last visited: 16.11.2019).

[6] See: The 2019 EU Justice Scoreboard, p. 11.

[7] Taken from: The 2019 EU Justice Scoreboard, p. 11.

[8] See: The 2019 EU Justice Scoreboard, p. 13.

exptected to be resolved more quickly.[9] The number of non-contentious cases before Croatian courts is still very large. According to the data in the Statistical Review of 2018, published by the Ministry of Justice,[10] in 2018, as many as 19,977 of new non-contentious cases arrived and 18,764 of them were resolved, while 10,649 of non-contentious cases remained unresolved. When talking about non-contentious cases in 2018, the Clearance Rate/CR indicator was 93.13 %, whereas the Disposition Time/DT indicator (indicator of the time for the resolution of a case) for non-contentious cases was 207 days. [11]



The 2019 EU Justice Scoreboard[12]

The backlog of court cases is the main reason why the Republic of Croatia, in the past few years, has promoted and encouraged more and

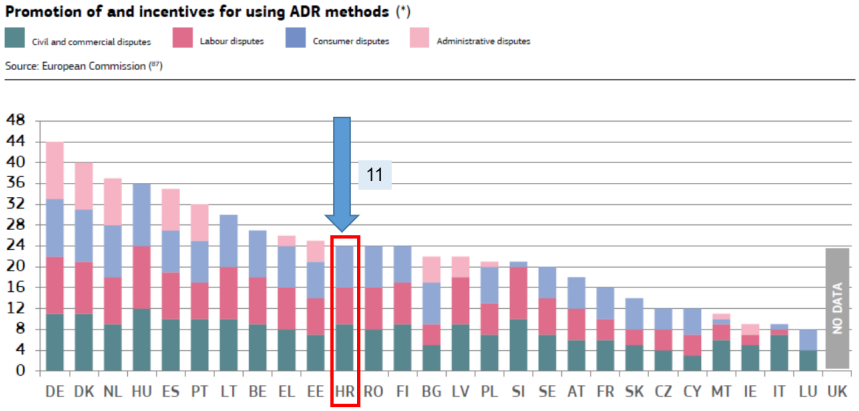
[9] See: The European Judicial Systems – Efficiency and Quality of Justice, CEPEJ STUDIES No. 26, 2018 Edition (2016 data), p. 244, availableat: https://rm.coe.int/rapport-avec-couv-18-09-2018-en/16808def9c (last visited on: 18.11.2019)

[10] Statistical Review of 2018 (*Statističkipregled za 2018 godinu),* Ministry of Justice of the Republic of Croatia*,* Zagreb, 2019, available at https://pravosudje.gov.hr/UserDocsImages/dokumenti/Pravo%20na%20pristup%20informacijama/Izvje%C5%A1%C4%87a/Statisti%C4%8Dko_izvjesce_2018.pdf (last visited: 18.11.2019)

[11] See: Statistical Review of 2018 (*Statističkipregled za 2018. godinu)*

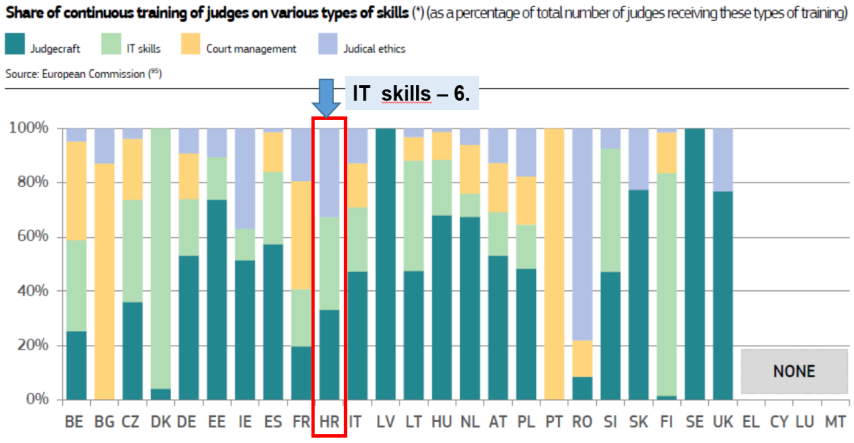
[12] Taken from "The 2019 EU Justice Scoreboard",p. 13.

more alternative dispute resolution cases, particularly in civil cases. According to the data available in „The 2019 EU Justice Scoreboard", the Republic of Croatia ranks 11th when the promotion and encouraging extra-judicial resolution of disputes is concerned.



The 2019 EU Justice Scoreboard[13]

However, in accordance with its strategic plans for the development of the judicial system, the Republic of Croatia invests a lot in continuous IT education of judges. The data presented in "The 2019 EU Justice Scoreboard", the Republic of Croatia is the 6th country when it comes to the judges' education in IT skills.



[13] Taken from: "The 2019 EU Justice Scoreboard", p. 29.

The 2019 EU Justice Scoreboard[14]

The presented data show that the Croatian judiciary, to increase its efficiency, is developing in two main directions. On the one hand, extra-judicial alternative dispute resolution procedures are promoted that can significantly contribute to the resolution of non-contentious cases. On the other hand, more and more is invested in the automatisation of business processes in court cases and in the development of various e-services and e-communications within the judiciary.[15] In that context, rendering decisions by applying algorithms in court proceedings can be looked upon as a way of alleviating the work of judges and speeding up the proceedings, particularly those involving a division of assets, which by their nature, are non-contentious proceedings.

In this text, the author analyses the possibilities of modernisation of the proceedings involving division of assets by applying algorithms. The provisions of alternative dispute resolution are also analysed that can be the basis for making an agreed co-owners' decision on division of assets by applying algorithms. The author also presents cases where, under Croatian law, the co-ownership is created and where it would be possible to decide on division of assets by applying algorithms. The aim of this paper is to analyse to what extent the Croatian mandatory rules on division of assets may impact the concept of division based on algorithms, i.e. automatic decisions on division to establish the prerequisites to modernise Croatian law by introducing algorithmic procedures in the divisions of assets, and which models of the application of algorithms in such proceedings would be optimal in Croatian law.

2. *Alternative dispute resolution under Croatian law*

In the Republic of Croatia, the concept of alternative dispute

[14] Taken from: "The 2019 EU Justice Scoreboard", p. 35.

[15] A good example is the reform of civil proceedings and land register proceedings carried out in 2019.

The Civil Procedure Act (OG Nos 53/1991, 91/1992, 112/1999, 129/2000, 88/2001, 117/2003, 88/2005, 2/2007, 96/2008, 84/2008, 123/2008, 57/2011, 25/2013, 89/2014, 70/2019) was amended (OG 70/2019) by a series of novelties in the area of electronic communications among the courts and the parties, submissions in electronic forms (e.g. Arts 106.a, 133, 133.d, 134a, 143.c *et al*). The new Land Register Act of 2019 also provides for an electronic submission of proposals for entry (Arts 105-107), automatization of some phases in the procedure of entry (Art. 108/2), Art. 49/4, 112) and the like.

resolution started developing when the first Mediation Act[16] came into force in October 2003. The Mediation Act/2003 was the first Act regulating a special method of alternative dispute resolution in Croatian legislation.[17] Since its adoption, alternative dispute resolution has experienced significant popularity and has increased the overall awareness of many advantages in comparison with the regular judicial process.[18] Since the entry into force of the first Mediation Act/2003 until today, the process of mediation, as a method of alternative dispute resolution, has become an increasingly important instrument for the resolution of disputes in the Croatian legal order. The scope of application of the proceedings based on alternative dispute resolution has been constantly extended by the introduction of new rules and the possibilities of alternative proceedings for the resolution of disputes. Indeed, there are more and more possibilities to use also algorithmic procedures in alternative dispute resolution of cases where it will be possible, by observing the principle of voluntariness (if there is the parties' agreement), to render decisions based on the results ensuing from the application of algorithms.

In February 2011, a completely new Mediation Act (MA) entered into force in Croatia.[19] Among other novelties, the MA implemented certain aspects of mediation in civil and commercial matters of Directive 2008/52/EC (The Mediation Directive).[20]The Mediation Act provides for the mediation in civil disputes including commercial, labour and other disputes, in matters involving rights which the parties

[16] Mediation Act of 2003 (OG, 163/2003, 79/2009).

[17] At that moment, only a few countries have such a special regulation.

For more see: Uzelac, Alan: Law on Concilliation: its genesis, sources and main principles, available at: http://www.alanuzelac.from.hr/pubs/D02Nacela%20zakona%20o%20mirenju.pdf (last visited: 16/11/2019)

[18] See: Draft Act on Mediation with the Final Draft Act (*PrijedlogZakona o mirenju s konačnimprijedlogomzakona)* (Proposal of the MA), available at: http://www.sabor.hr/Default.aspx?art=37310, page 3., last visited: 16/11/2019.

[19] The Mediation Act (OG 18/2011). The text of the legislation in English available at: https://hgk.hr/documents/mediation-act586b9f6251f81.pdf. For more on mediators see: https://mirenje.hr/o-mirenju/mirenje-u-hrvatskoj/institucije-za-mirenje/ (last visited:19/11/2019).

[20] Directive 2008/52/EC of the European Parliament and of the Council of 21 May 2008 on certain aspects of mediation in civil and commercial matters (*OJ L 136, 24.5.2008, pp. 3–8)*.

may freely dispose of.[21] The provisions of the MA also apply to mediation in other disputes where the nature of legal relations leading to such disputes, corresponds to these provisions, unless the rules for the resolution of such disputes are provided for in a separate act.[22] Bearing in mind the scope of the Mediation Directive,[23] the Croatian MA lays down that its provisions "*shall also apply accordingly to mediations in which one of the parties is domiciled, habitually resident, or seated outside the Republic of Croatia*"[24]. The availability of mediation and the raising of awareness, as the main purposes of the Mediation Directive, are especially proclaimed in the MA. Among other things, the aim of the MA is to facilitate the approach to mediation as the appropriate procedure for the resolution of disputes and to enhance the awareness of mediation by encouraging its application and ensuring a balanced relationship between mediation and court proceedings. [25] In the MA, the main definitions and principles are laid down in accordance with the Mediation Directive.[26] The obligations of the mediator, the conduct of mediation proceedings, the provision on confidentiality, the admissibility of evidence, the effects on the periods of limitation and prescription, as well as the powers of the body conducting the proceedings are all governed in accordance with the purposes set forth in the Mediation Directive.[27] Special provisions on mediation in cross-border disputes also comply with the objectives of the Mediation Directive.[28]According to the MA, "*mediation means any proceedings, regardless of whether conducted before the court, a mediation organisation or outside such institutions, in which the parties attempt to resolve their dispute amicably, with the assistance of a mediator or mediators who assist them in reaching a settlement agreement without having the authority to impose any binding solution on them*".[29] The

[21] See Art. 1, para. 1 MA.

[22] See Art. 1, para. 2 MA.

[23] See Arts 1, 2, Directive 2008/52/EC.

[24] Art. 1, para. 3 MA.

[25] See Art. 2, para.1 MA.

[26] A model for the regulation of mediation was the UNCITRAL Model Law on International Commercial Conciliation.

For more visit: http://www.uncitral.org/uncitral/en/uncitral_texts/arbitration/2002Model_conciliation.html(last visited: 19/11/2019).

[27] See Arts 8, 9, 14, 15, 17, 19 MA.

[28] See Arts 21-24 MA.

[29] Art. 3, para. 1 MA.

procedure of mediation ends by a settlement which binds the parties to fulfil the taken obligations. A special advantage of mediation is the fact that, under particular conditions, the settlement is considered to be an enforcement document on the basis of which a mandatory enforcement may directly be requested to fulfil the obligations established in the settlement.[30] At the same time, the institution of mediation proceedings does not result in the loss of the possibility to conduct civil or any other court or arbitral proceedings if the mediation proceedings are not successful. The institution of mediation proceedings suspends the period of limitation and it interrupts the procedural time limits for filing an action.[31] Mediation proceedings and the interpretation of the mediation rules laid down in the MA are based on the principles of good faith and internationally accepted mediation standards, the principle of voluntariness, the effectiveness of the proceedings, equal treatment of the parties, party autonomy, confidentiality of the proceedings and the mediators' impartiality.[32]

Another important legislation on alternative dispute resolution - Act on Alternative Dispute Resolution for Consumer Disputes (Act on Consumer ADR)[33] came into force on 31 December 2016. By this Act, Directive 2013/11/EU on alternative dispute resolution for consumer disputes (Directive on Consumer ADR) was transposed into Croatian Legal Order.[34] The Act on Consumer ADR also provides for the implementation of the Regulation (EU) No. 524/2013 on online dispute resolution of consumer disputes (Regula-

[30] A settlement agreement will be an enforcement title if it contains an obligation to perform an act over which the parties may reach a settlement and if it contains the obligor's statement on immediate authorisation of enforcement (Art. 13, para. 2 MA).

[31] See Art. 17, paras 1, 2 MA.

On the other hand, by special rules on the periods of limitation, if mediation terminates without a settlement, the parties are encouraged to reach a settlement. If mediation terminates without a settlement, it is considered that no suspension of limitation occurred (Art.17, para. 3 MA). However, if within 15 days after the termination of mediation a party files a claim to resolve a dispute, limitation is considered suspended at the moment the mediation proceedings were initiated (Art.17, para. 4 MA).

[32] Art. 4 MA.

[33] Act on Alternative Dispute Resolution for Consumer Disputes, (OG, 121/2016, 32/2019).

[34] Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes and amending Regulation (EC) No. 2006/2004 and Directive 2009/22/EC (*OJ L 165, 18/6/2013, pp. 63–79).*

tion on Consumer ODR).[35] The Act on Consumer ADR regulates alternative dispute resolution of domestic and cross-border disputes arising out of purchase contracts, or service contracts, between traders based in the Republic of Croatia and consumers domiciled in the EU. These proceedings take place before alternative dispute resolution bodies authorized to conduct mediation, or to make a non-binding, or a binding decision, determined in accordance with the provisions of the Act.[36] According to the Act on Consumer ADR, at the moment, there are eight ADR entities authorized to conduct mediation.[37] The purpose of the Act on Consumer ADR is to enable consumers to initiate procedures (to resolve disputes against traders on a voluntary basis) for alternative dispute resolution, ensuring independent, impartial, transparent, efficient, quick and cost-effective resolution of disputes to achieve a high level of consumer protection and a proper functioning of the internal market.[38] The Act on Consumer ADR regulates dispute resolution in two situations: in domestic disputes and cross-border disputes.[39] The Act on Consumer ADR also lays down that the Contact Point for Online Consumer Dispute Platforms, is the European Consumer Center Croatia/ECC-Net Croatia)[40] – a part of the European Consumer Centres Network/ECC-Net).[41] The decision-making in the consumer ADR pro-

[35] Regulation (EU) No. 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No. 2006/2004 and Directive 2009/22/EC (*OJ L 165, 18/6/2013*, pp. 1-12).

[36] Art. 1 of the Act on Consumer ADR.

[37] For the list of ADR entities visit the website of the Ministry of Economy, Entrepreneurship and Crafts http://potrosac.mingo.hr/hr/potrosac/clanak.php?id=12645 (last visited: 18/11/2019).

[38] Art. 3 of the Act on Consumer ADR.

[39] Domestic dispute is defined as a dispute arising out of a trade contract or a service contract, where at the time of ordering goods or services, the consumer's habitual residence was in the Republic of Croatia and the trader was established in the Republic of Croatia. A cross-border dispute means any dispute arising out of a contract of trade or service whereby at the time when a consumer ordered goods or services, his habitual residence was in a Member State of the EU other than the Republic of Croatia, and the trader was established in the Republic of Croatia (Art. 6, para.1 of the Act on Consumer ADR).

[40] Art. 29 of the Act on Consumer ADR.

[41] The European Consumer Center Croatia/ECC-Croatia, http://ecc-croatia.hr/(last visited: 18/11/2019).

ceedings is based on the principles of equity, freedom of establishing mutual relations and legality.[42]

The last reform of the Croatian civil procedure of 2019[43] significantly extended the scope of the application of alternative dispute resolution, and thus also the possibility, based on the agreement of the parties, of applying alternative models for rendering decisions in mediation proceedings by using algorithms. One of the aims of the CPA was "*to enhance the mediation proceedings as one of the alternative methods of dispute resolution by making it possible for the judges to advise the parties, or just encourage them to institute mediation proceedings before the court.*"[44] According to the most recent amendments to the CPA, mediation has become an important phase of civil proceedings. There is now also the possibility, within the civil proceedings before the court, to conduct mediation proceedings before a mediator of the court having jurisdiction for the proceedings. There are several situations where mediation is possible. First of all, the parties to the proceedings may propose their dispute to be resolved by mediation,[45] or a civil court may also refer them to mediation to be instituted within eight days.[46] The court makes such a decision by taking into consideration all the circumstances and, above all, the interest of the parties and any third persons connected with them, taking also into account the duration and of their relationships and the type of their mutual involvement. A decision on mediation may be rendered any time in the course of

[42] Arts 18,19, 29 of the Act on Consumer ADR.

[43] The Act on Amendments to the Civil Procedure Act/2019 (*Zakon o izmjenama i dopunama Zakona o parničnom postupku*/2019) (OG 70/2019). The Act entered into force on 24 July 2019. For more see: Koketi, Krešimir: Application for amicable dispute resolution as the procedural prerequisite for admissibility of an action, case law and the new stipulation (*Zahtjev za mirno rješenje sporova kao procesna pretpostavna dopustivosti tužbe, sudska praksa te novo zakonsko uređenje)*, *Odvjetnik*, 92, 1-2, 2019, pp. 28-35.

[44] Taken from the Final Draft of the Act on Amendments to the Civil Procedure Act, accessibleat: https://www.sabor.hr/sites/default/files/uploads/sabor/2019-05-30/162602/PZ_620.pdf, p. 40 (last visited: 16/11/2019). See also: Čuveljak, Jelena: Mediation on the basis of Amendments to the Civil Procedure Act 2019 (*Mirenje temeljem novele Zakona o parničnom postupku) 2019*, accessible at: http://www.iusinfo.hr/Article/Content.aspx?SOPI=CLN20V01D2019B1318&Doc=CLANCI_HR, last visited: 19/11/2019.

[45] Art. 186d. para. 2, CPA.

[46] See Art. 186d. para.1, CPA.

civil proceedings. Mediation proceedings are conducted by the mediator chosen from a list of mediators established by the president of the court. However, where both parties to the proceedings are joint stock companies, or legal persons whose majority share holder is the Republic of Croatia, or a local or regional self-government unit,[47] the court always refers them to mediation which is for them mandatory.[48] A settlement resulting from mediation proceedings is considered to be a court settlement[49] and it thus constitutes an enforcement document on the basis of which, a direct enforcement action may be instituted. This new approach to conducting civil proceedings is aimed at encouraging the parties to try to resolve their dispute by mediation despite the pending civil proceedings. However, even then the conduct of mediation within civil proceedings, and the possible settlement, are based on the principle of voluntariness. The parties are then subject to special rules, and a party who does not avail itself to attempted mediation, is no longer entitled to the compensation of any further costs before the first instance court.[50] However, even when the first instance judgment has already been rendered, and an ordinary legal remedy against it has already been lodged, the parties may agree on proposing the resolution of their dispute by mediation before a mediator of the court competent to decide on the legal remedy.[51] Moreover, the parties to civil proceedings may also agree to propose the resolution of their dispute before an out-of-court mediation institution. If that is the case, the civil court will stay its civil proceedings.[52][53]

[47] See Art. 186d of the CPA.

[48] Art. 186d, para.8, CPA. For more see: Milotić, Ivan: 2019 CAP Act (Permission Review - Trial Procedure - Costs - Efficiency - Mediation / Conciliation), (Novela ZPP-a iz 2019. (revizija po dopuštenju – oglednipostupak – troškovi – učinkovitost – medijacija / mirenje)), *Pravo i porezi*, 2019, 7-8, p. 57.

[49] Art. 186d para. 7 CPA.

[50] Art. 186d para. 9. CPA.

[51] Art. 186e CPA.

[52] Art. 186f CPA.

[53] All these rules on mediation in civil litigation also apply to all civil proceedings instituted prior to the entry into force of the Act on Amendments to the Civil Procedure Act/2019 (Art. 117, para. 2). In this way, it is possible that the parties, already in the course of the pending civil proceedings and during mediation, reach a settlement in accordance with the new mediation rules in civil litigation.

3. *Division of assets*

3.1 *Participation of several persons in the ownership of assets as a prerequisite for a division of assets*

In Croatian law, there are various types of unions where more persons, as holders of property rights, are entitled to ownership of one or several things. Such unions are created on various legal bases and have different effects on the relationships of persons participating in the ownership right. Division of assets owned by several persons depends on the type of their participation in the right of ownership. In Croatian law, the Property Act provides for two possible forms of participation of several persons in the right of ownership: co-ownership[5455] and joint ownership.[56] In separate laws governing the participation of several persons in the right of ownership based on various legal grounds (marriage, common-law marriage, same-sex marriage, succession, partnership, *et al*), the property law relations between persons taking part in the right of ownership are also provided for as co-ownership or joint ownership. The provisions of the PA on co-ownership and joint ownership apply subsidiarily to all cases of participation of several persons in the right of ownership, regardless of which separate act they are governed by and on which legal ground they are based.[57]

The most common case of several persons taking part in the right of ownership according to Croatian law is the co-ownership defined as

[54] Arts 36-56 PA. For more on co-ownership see: Josipović, T.: "International Encyclopedia for Property and Trust Law" – Croatia, Suppl. 19, Alphen aan den Rijn, 2013, pp. 76-80, Josipović, T.: Property Law, in: Josipović, Tatjana (ed.): Introduction to the Law of Croatia, Alphen aan den Rijn, 2014, pp. 106-107; Gavella, N. *et. al*.: Real Property Law (*Stvarnopravo)*, Zagreb, 2007, pp. 683-718.

[55] In Croatian Property Law, the regulation of condominiums is also based on the provisions of co-ownership. The owner of a flat/business premises co-owns the entire immovable (plot and the building on it) where the flat/business premises where the flat or the business premises are located (Art. 66, *et al* PA). For more see: Josipović, T.: Introduction to the Law of Croatia pp. 108, 109; Gavella, N. *et al*: *op. cit*., pp. 735-793: Klarić, P., Vedriš, M.: Civil Law (*Građansko pravo*), Zagreb, 2014, pp. 264-272.

[56] Arts 57-65.

[57] For more on co-ownership and joint ownership see Josipović, T.: Introduction to the Law of Croatia, pp. 106-108; Josipović, T.: International Encyclopaedia for Property and Trust Law, pp. 76-81, Gavella, N. *et al*: *op. cit*., pp. 683-735; Klarić P, Vedriš, M: *op. cit*., pp. 247-262.

ownership of a particle (co-ownership shares) of a physically undivided thing calculated pro rata to the whole thing owned.[58] Unless differently provided for by law, legal relationships among several persons taking part in the right of ownership on one or more things are always regulated as co-ownership. Co-owners own a physically undivided thing and they each own a part of it arithmetically calculated pro rata to the entire right of ownership. Such parts of ownership are called co-owned, proportional or aliquot shares. Co-ownership shares are determined as fractions. If there is a doubt about the size of co-ownership shares, they are considered to be equal.[59] Co-ownership may be created on various legal bases provided for in the Property Act (on a purchase contract where several persons buy a particular thing, a merger, confusion or commixture of things owned by different owners where a new movable is created, and the like). In some cases, co-ownership can be created by the provisions of a specific act.

The most frequent case of acquiring co-ownership on the basis of a separate act are matrimonial property regimes. i.e. matrimonial property of spouses, extra-marital spouses and same-sex partners. In Croatian law. matrimonial property regime is regulated as co-ownership regardless of the type of the union (marriage, common-law marriage, same-sex marriage). The Family Act (FA)[60] sets forth that the spouses are the co-owners of matrimonail property.[61] Matrimonial property encompasses all the assets acquired by the spouses on the basis of their work during their marital union or that have been derived from such property. This also includes lottery prizes and any income from intellectual and related rights acquired during the marriage union.[6263] Spouses are the co-owners of equal parts unless

[58] Art. 36, para.1 PA.

[59] Art. 36. para. 2 PA.

[60] Family Act (OG, 103/2015, 98/2019).

[61] For more see Hrabar, D: Family Law, in: Josipović, Tatjana (ed.): Introduction to the Law of Croatia, Alphen aan den Rijn, 2014, pp. 240-242.

[62] Art. 36 paras 1,2, FA.

[63] Property owned by a spouse at the moment of entering into marriage remains his or her own personal property. Own personal property also involves property acquired by spouses during their marriage on a legal foundation different from that stated in Article 36 of the FA (e.g. inheritance, donation or similar). An author's work is considered as personal property of the spouse who has created it (Art. 39 FA). For more see Hrabar, D.: *op. cit*., p. 241.

otherwise agreed by them.[64] There is a possiblity for spouses to agree on different proportions by signing the preneptial agreement (marital agreement) before or during their marriage, or during a divorce procedure.[65] In the case of a division of matrimonial property, a valid preneptial agreement applies instead of the FA provisions providing for the spouses' co-ownership. When there is no special agreement made between the spouses, irrefutable presumption (*presumptio iuris et de iure*) of co-ownership of equal parts/shares applies.[66] The same rules apply to the regulation of matrimonial property of extra-marital partners[67] and of same-sex partners, either formal, or informal.[68] Extra-marital partners and same-sex partners have both matrimonial and personal property. Matrimonial property is co-owned by the partners (co-ownership in equal parts/shares). Partners may agree on different property relations regarding their matrimonial property. As for division of assets considered as matrimonial property, the general provisions of the Property Act on dissolution of co-ownership apply. The provisions on co-ownership of the Succession Act (SA)[69] apply also to the inherited property following a decision on succession rendered in probate proceedings before the court, or a notary public, where it is established what constitutes the estate of inheritance, who are the heirs and what are their individual portions of inheritance, i.e.

[64] Art 36 para. 3, FA.

[65] Art. 40, FA.

[66] See Hrabar, D.: *op.cit.*, p. 241;

[67] Art. 11 para. 2, FA.

An extra-marital union is a life union of an unmarried woman and an unmarried man lasting for at least three years, or less if the extra-marital partners have a common child or if it is continued by entering into marriage (Art. 11 para. 1, FA)

[68] The same sex partnership is governed by the Same-Sex Life Partnership Act (OG 92/14, 98/19).

The matrimonial regime for the same-sex partnership is provided for in Articles 50-54 of the Same-Sex Life Partnership Act). A life partnership is a family life relationship between two persons of the same sex, concluded before a competent body, pursuant to the provisions of this Act. An informal life partnership is a family life relationship between two persons of the same sex who have not concluded a life partnership before a competent body provided that it has lasted no less than three years and from its beginning has met the requirements prescribed for the validity of a life partnership (Arts 2,3 of Same-Sex Life Partnership Act).

[69] Succession Act (OG 48/2003, 163/2003, 35/2005, 127/2013, 33/2015, 14/2019).

their shares in inherited property).[70] The size of the co-owned shares in inherited property depends on whether intestate or testamentary succesion is involved.[71] However, the legal relationships among the heirs in terms of co-ownership of the inherited assets and division of such co-ownership are governed by the rules on co-ownership referred to in the Property Act.

Another form of participation of several persons in the right of ownership - joint ownership, exists only where it is expressly determined by law that a thing may be jointly owned by several persons. Joint ownership is the ownership of several persons on a physically undivided thing whereby all of them have shares in it whose size is not determined, although it is determinable.[72] For example, Croatian law prescribes joint ownership for partnership assets formed according to a contract of partnership governed by the Obligations Act/OA[73]. The most frequent form of joint ownership, in practice, is the so-called inheritance community that is formed at the moment of the death of the descendant. Namely, at the time of the descendant's death, it is still not known how large are the heirs' shares in inherited property. Therefore, prior to the determination of the heirs and their shares in probate proceedings before the court or a notary public, all the heirs are considered to be joint owners of the inherited property. An inheritance community remains in existence until it is determined, in probate proceedings, which parts of the estate belong to individual heirs.[74] In all the mentioned cases, a division of joint property is carried out in two phases. In the first phase, the size of the shares in joint ownership is determined and a transformation of joint-ownership to co-ownership takes place.[75] In the second phase, a dissolution of co-ownership is carried out under the general rules on division of co-ownership.

[70] Art. 226, SA.

[71] For more see Gliha I, Josipović, T. Succession Law, Josipović, Tatjana (ed.): Introduction to the Law of Croatia, Alphen aan den Rijn, 2014, pp. 196,197; Gavella, N, Belaj, V.: Succession Law (*Nasljednopravo)*, Zagreb, 2008, pp. 485-490; Klarić, P., Vedriš, M; *op. cit*., pp. 772, 773.

[72] Art. 57 para. 1, PA.

[73] Arts 637- 660 of the Obligations Act (OG 35/2005, 41/2008, 125/2011, 78/2015, 29/2018). See Klarić, P. V, Martin; *op. cit*., pp. 568-577. Gorenc, V. *et al*: Commentary on the Obligations Act (*KomentarZakona o obveznimodnosima*), Zagreb, 2014, pp. 1024-1056.

[74] Art. 141 SA.

[75] Art. 63, para 2, PA.

3.2. *Methods of division of assets*

In Croatian law, the provisions on dissolution of co-ownership laid down in the Property Act[76] apply to a division of assets. The dissolution of co-ownership results in its total or partial expiry. Each co-owner acquires the right of ownership over a particular physical part of divided assets previously co-owned, or acquires some other right ensuing from the co-ownership share with which he or she participated in the dissolution (i.e. the right to be paid out in accordance with his or her co-ownership share after the asset is sold). In this process, the same rules on dissolution of co-ownership apply, regardless of the legal basis on which the co-ownership came into existence and regardless of whether it was co-ownership governed by a separate act (e.g. matrimonial property, inherited property). The conditions for a division of co-owned assets are also always the same: identification of assets, established/fixed shares, identification of co-owners, valid legal title for co-ownership.

The main principle on which a division of assets is based in Croatian law is the principle of voluntariness. A voluntary division of assets based on the co-owners' agreement takes precedence over all other methods of division. The co-owners decide in agreement on the method of division of assets. It is an activity of the so-called extraordinary administration that all the co-owners must agree upon. They all determine in agreement the method of a division of co-owned assets and they may choose any method that is possible and allowed.[77][78] Co-owners may also agree on a person to decide on the manner of dissolution. If they cannot agree on the manner of dissolution, they may each turn to the court.[79] The principle of voluntariness in connection with a division of assets comes into play in separate laws providing for special cases of property regimes

[76]Art. 47 – 56 PA. For more see: Josipović, T: Property Law, p. 107; Gavella, N. et al.: Real Property Law (Stvarno pravo), *op. cit*., pp. 704-716, Klarić, P., Vedriš, M.: *op. cit*. pp. 254-256.

[77]Art. 49, para. 1 PA. For more see: Josipović, T.: Property Law, pp. 106, 107; Gavella, N. *etal*: *op. cit*., pp. 706-710, Klarić P., Vedriš, M.: *op. cit*., p. 254; Maganić, Aleksandra: Dissolution of Co-Ownership (*Razvrgnućesuvlasničkezajednice)*, Collected Papers of the Faculty of Law of the University in Rijeka (*Zbornik Pravnogfakulteta Sveučilištau Rijeci*), 29, 1, 2008, pp. 30-31.

[78] If the statutory provision prohibits the specific method of division of the co-owned item, this prohibition does not relate to dissolution by payment or civil dissolution unless expressly extended to them (Art. 49 para. 2, PA).

[79] Art. 49, para. 3, PA.

governing co-ownership.Under the SA, the heirs, already in probate proceedings conducted upon the descendant death may, in agreement, propose to the court, or to a notary public, a division of the inherited property. A decision on dissolution must then be a part of the decision on succession. However, it is important that all heirs agree on the method of dissolution and propose it during probate proceedings.[80] The Family Act also expressly lays down that after the termination of marriage (e.g. divorce), the spouses agree on how to regulate their property relations in terms of their matrimonial property, which also includes an agreement on the method of division of their co-owned matrimonial property.[81]

The principle of voluntariness, when identifying the method of division of assets, would thus also include the possibility that the co-owners base their decision on division of assets on the results of the application of an algorithmic procedure for a fair division of assets. They could thus use an algorithmic procedure for a fair division of assets voluntarily and autonomously in their negotiations regarding the method of division of assets. Namely, the co-owners' decision on a voluntary division of assets does not require the participation of a public authority, a court, or a mediator. Indeed, it would also be possible that the co-owners, in conformity with the Mediation Act, institute mediation proceedings where the mediator could offer them a settlement based on an algorithmic procedure for a fair division of assets. In such a case, a decision on the settlement regarding a division of assets would ultimately also be made in agreement and in accordance with the will of all co-owners.

However, the principle of voluntariness is not expressly manifested in cases where there is no agreement among the co-owners on the method of division. It is then decided by the court in an extra-judicial procedure[82] that is provided for in the Act on Extra-Judicial Procedure.[83] It follows

[80] Art. 226, para. 3 SA.

[81] Art. 45 para. 1 FA.

[82] Art. 49 para. 4 PA.

[83] Act on Extra-Judicial Procedure (1934) applies as a legal rule based on the Act on the Manner of Application of Legal Regulations Adopted prior to 6 April 1941 (OG 73/1991). The Republic of Croatia still does not have a valid regulation on procedural rules governing extra-judicial proceedings. Also in: Jug, J: Dissolution of Co-Ownership of Immovables (Razvrgnuće suvlasništva na nekretninama*): Pravo u gospodarstvu;* 49, 1, 2010, pp.146-147.

The courts have repeatedly referred to the application of the Act on Extra-Judicial Proceedings. For example, see the judgment of the County Court in Varaždin

from the provisions of the PA on dissolution of co-ownership that no co-owner, regardless of the size of his or her share, can be forced to permanently remain in the co-ownership union against his or her will. Indeed, any co-owner is entitled to dissolve co-ownership, i.e. he or she may request its partition at any time, unless this would be to the detriment of other co-owners.[8485] The court then decides on division of assets[86] and in its identification of the method of division, it is bound by strict statutory provisions, by the agreement of the parties (if it exists) and by the right of any of the co-owners to a civil partition by payment.[87] If there is no co-owners' agreement, the court will dissolve co-ownership of divisible things by physical partition (movables), or by geometric partition (immovable).[88] If such partition would substantially diminish the value of a particular asset, civil termination would come into play.[89] When, by merger, confusion or commixture of other persons' things, a new thing is created and its separation is not possible or allowed, all previous owners

of 26/12/2006, Gž-1805/06-2, the judgment and the ruling of the County Court in Dubrovnik of 19/08/2015 Gž-885/13.

[84]Art. 47, para.1 PA.

E.g., the County Court in Varaždin, in its decision of 24/7/2018, Gž 730/2018-2, explained that "*a co-owner is entitled to seek dissolution of the co-ownership with regard to one, more or all immovables where the co-ownership exists without necessarily including, in his or her proposal for dissolution, all the immovables where he or she is a co-owner with other persons.*"

[85] A co-owner may not validly waive his right to dissolution in advance and it is only possible to stipulate limitations to the right to dissolution (Art. 47 para. 3 PA).

[86] Art. 50 PA.

[87] The right to a division by payment exists in two cases (Art. 51 PA). Any co-owner has the right to a dissolution by payment if his share makes more than 9/10 of the thing, or if he makes his interest probable to have the entire thing.

See the following judgments: judgment of the Supreme Court of the Republic of Croatia of 31/03/2009, VSRH Rev 1207/2007-2, decision of the Supreme Court of the Republic of Croatia of 11/12/2012, Rev 150/2001-2, and decision of the County Court in Varaždin of 08/12/2011, Gž-4244/11-2.

[88] The County Court in Varaždin, in its decision of 27/11/2018, Gž 1889/2018-2, pointed out that "*a sale in enforcement proceedings is the prescribed way of implementing civil termination when a geometric divisionis not possible".*

[89] The County Court in Bjelovar, in its judgment of 27/ 01/2010, Gž-1749/09-2, ruled that "*even when it is possible to divide an immovable geometrically (partition) in two parts whose surface areas correspond to the co-owners' shares, such a method of division cannot be accepted if by it, because of the size and the form, the value of the newly formed plots is significantly diminished".*

of these individual things become the co-owners of the newly created thing. They co-own the newly created thing in proportion to the values of their things and the useful work invested at the moment of the creation of the new thing. However, any co-owner of the newly created thing may, in relation to other co-owners, whose fault being the creation of the new thing, request a dissolution of the co-ownership. Such a co-owner may request that the newly created thing is surrendered to his or her ownership only, or to the ownership of any other co-owner, with an obligation to compensate accordingly all other co-owners. If a new thing is created without anyone's fault, the co-owner whose thing is considered to be of the highest value is entitled to purchase the entire thing.

Exceptionally, on the request of any of the co-owners, a division in court proceedings will be possible in the form of an equivalent dissolution of co-ownership.[90] In that case, the court will adjudicate that each co-owner is to get a thing in its entirety, in proportion to the size of their co-ownership shares, taking into account their needs. Finally, in the court proceedings for dissolution, if there is an agreement of all co-owners, it is possible that the court renders a decision on dissolution by the establishment of condominium on immovable property.[91]

In the case of a court dissolution where the court is bound by strict statutory provisions on the method of dissolution, the application of algorithmic procedure for a fair division of assets is significantly limited in comparison to the application of algorithms in the proceedings of voluntary dissolution. However, their application is not totally excluded. Algorithmic procedures for a fair division of assets could, for example, be the basis for rendering a court decision on equivalent dissolution of the co-ownership. The court then rules on a division of assets in view of the size of their shares and taking into account their needs. If the thing that belongs to a particular co-owner, based on such dissolution, exceeds the value of his co-ownership share, such co-owner is bound to pay the difference to other co-owners. The results of the application of an algorithmic procedure for a fair division of assets based on the expressed subjective references of co-owners may be an important orientation for the court to assess the justification of allocating things to individual co-owners in regard to their needs.[92] Such an approach could contribute to a dissolution which would not only be proportional but also "envy-free".[93]

[90] Art. 52 PA.

[91] Art. 53 PA.

[92] See Art. 52 para.1 PA.

[93] For more see Romeo, F., Giacalone, M., Dall'Agio, M.: CREA Project-Conflict

3.3. *Possible limitations for the application of algorithmic procedures for division of assets*

The principle of voluntariness on which a division of assets is based in Croatian law is restricted in various ways and for various reasons. On the one hand, the co-owners are protected in their mutual relations within their co-ownership by the mandatory provisions restricting the principle of voluntariness, as well as any third persons who have specific property rights on the assets.[94] On the other hand, particular public interests are also protected by the mandatory provisions restricting the freedom of making decisions on the method of division of assets (such as physical planning, protection of cultural heritage, the protection of agricultural land and the like). However, all these mandatory provisions restricting the principle of voluntariness in terms of a division of the co-ownership, also determine, in a specific way, both the concept of algorithms and the scope of application of an algorithmic procedure applied to division of assets. Mandatory provisions that must be taken into account when dividing assets may also significantly impact both the application of an algothmic procedure in domestic disputes connected with a division of assets, and particularly also the application of an algorithmic procedure in cross-border disputes connected with a division of assets.[95] Therefore, in every

Resolution Equitative Algorithms, p. 3, accessible at http://www.crea-project.eu/wp-content/uploads/2019/09/Iris-2018-CREA-Project-final-1.pdf, (last visited: 19/11/2019).

[94] Art. 56 PA. For more see: Josipović, T. International Encyclopaedia for Property and Trust Law, p. 79; Gavella, N., *et al*.: *op. cit*., pp. 717, 718.

[95] When applying an algothmic procedure in cross border disputes connected with the division of assets, special attention must be paid to the law applicable for making a decision on the division of assets on the basis of an agreement made by all co-owners. It will sometimes depend on the legal relations on which a co-owners' union is based (matrimonial property, inherited property, *et al*), and sometimes on the nature of the assets that are subject of a division (movables, immovables, intelectual property rights, *et al*), as well as where the assets are located. Therefore, in the area of the European Union, a number of the conflict-of-law rules governing the applicable law in various legal relations must be taken into account, as well as the framework within which the parties, to regulate their legal relations, may agree on the choice of the applicable law. The mandatory provisions of the applicable law then determine the framework for the possible application of an algorithmic procedure in cross-border disputes based on the agreement of the parties. See, for example Regulation (EC) No. 593/2008 of the European Parliament and of the Council of 17 June 2008 on the law

concrete case, the application of an algothmic procedure to divide assets should be preceded by an assessment whether there are any mandatory provisions which, in a certain way, restrict the co-owners' right on division of assets. At the moment, there is a whole series of such mandatory rules in Croatian law which may significantly restrict possible application of algorithmic procedures for division of assets even where there is an agreement concluded by the co-owners for reaching a decision on division of assets based on an algorithmic procedure.

In order to protect co-owners, it is expressly laid down in the PA that a co-owner may not in advance and permanently waive his or her right to request a dissolution of co-ownership and it is only possible to limit the right to dissolution by an agreement.[96] However, in order to protect other co-owners, a co-owner may not request dissolution at the time when it would be detrimental to other co-owners.[97]

To protect the co-owners acting in good faith, the right to dissolution is restricted whereby merger, confusion or commixture of other persons' things, a new thing is created and its separation is not possible or allowed, so that all previous owners of these individual things become co-owners of the newly created thing (the so-called unintentional co-ownership).[98] Any co-owner of the newly created thing may, in relation to other co-owners whose fault has been the

applicable to contractual obligations (Rome I) (*OJ L 177, 4.7.2008, pp. 6–16*); Regulation (EU) No 650/2012 of the European Parliament and of the Council of 4 July 2012on jurisdiction, applicable law, recognition and enforcement of decisions and acceptance and enforcement of authentic instruments in matters of succession and on the creation of a European Certificate of Succession (OJ L 201, 27 July 2012, pp. 107–134); Regulation (EU) 2016/1103 of 24 June 2016 implementing enhanced cooperation in the area of jurisdiction, applicable law and the recognition and enforcement of decisions in matters of matrimonial property regimes(*OJ L 183, 8.7.2016, pp. 1–29);* Regulation (EU) 2016/1104 of 24 June 2016 implementing enhanced cooperation in the area of jurisdiction, applicable law and the recognition and enforcement of decisions in matters of the property consequences of registered partnerships (*OJ L 183, 8.7.2016, pp. 30–56).*

[96] Art. 47 para. 3 PA.

For more on *the contractual limitation of the right to dissolution see: Sessa*, Đ. Dissolution of Co-Ownership (Immovables) (*Razvrgnućesuvlasničkezajednice*: *nekretnina*): Yearbook, 23, 2016, pp. 116-118.

[97] Art. 47 para. 2 PA.

[98] They co-own the newly created thing in proportion to the values of their things and the useful work invested at the moment of the creation of the new thing.

creation of the new thing, request dissolution of the co-ownership by civil partittion. Such a co-owner may request that the newly created thing is surrendered to his or her ownership only, or to the ownership of any other co-owner, with an obligation to compensate accordingly all other co-owners. If a new thing has been created without anyone's fault, the co-owner whose thing is considered to be of the highest value, is entitled to purchase the entire thing.[99] The regulation of dissolution of partnership property also provides for some limitations to protect the partner. Things whose existence is the result of a partner's contribution for the enjoyment and use by both partners will be returned to the partner who shall have no right to any compensation for accidental perishing or damage caused to the thing, nor for its depreciation due to regular use. In addition, in regard to common assets, partnership debts shall be settled first, and where these are not due or are doubtful, adequate provision shall be made for their settlement.[100]

Dissolution of co-ownership in case of inheritance community also recognises two mandatory rules for dissolution of co-ownership on inherited property. The first applies to household items. The household items that are not of any great value and only serve to meet daily needs of the heir who had lived with the descendant, and who is not his child, or his or her spouse, will be surrendered in accordance with the heir's request, and their value will be included in his or her inheritance share. If the value of household items exceeds the value of the inheritance share, the heir to whom these items are surrendered will pay in cash for such a difference to all other heirs.[101] In addition, any heir who has lived or worked together with the descendant is entitled to become the only owner of certain things that would otherwise belong to the inheritance shares of other heirs. The value of these things must be paid to other heirs in cash within a period determined by the court.[102] The Succesion Act also provides for some special co-heirs' rights in the case of dissolution. The co-heirs who had lived with the decedent or who contributed by their work together with the decedent, when it is probable that a justified need exists, may request that at the moment of dissolution, certain things be given to

[99] Art. 149 para. 2 PA.

[100] Art. 657, para. 2; Art. 658, para. 1 OA. Gorenc, V. *et al*: *op. cit*., pp. 1056-1058.

[101] Art. 144 para. 1 SA. For more see: Gavella, N; Belaj, V: *op. cit*., pp. 407-415, Klarić, P., Vedriš, M.:, *op. cit*., p. 717.

[102] Art. 143 para. 1 SA.

them (personal property, real property, groups of things) that would otherwise be included in the shares of other co-owners. This co-heir has an obligation to compensate in cash all other co-heirs for the value of these things.[103] An heir who is a farmer may, without having to prove a justified need, request that the agricultural land be left to him or her, as well as the things used to carry out agricultural activities and that he or she buys out other co-owners.[104] Finally, at the request of an heir who had lived in the same household with the decedent (but is not his or her descendant or spouse), the household items of insignificant value used to satisfy the heir's daily needs are left to that heir and their value is taken into account against his or her portion of inheritance.[105]

The restrictions prescribed to protect third persons are also directed to the protection of the rights of third persons on divided assets. There is a general rule that by a division of assets, the property rights of third persons do not cease to exist, such as liens, real property servitudes and the like. Thus, for example, a geometric division of the mortgaged immovable will create simultaneous mortgages for the mortgagee on all the new plots that resulted from division.[106] Property servitude burdening the entire immovable will then burden all the plots created by division.[107] Similarly, to protect creditors, specific restrictions regarding the dissolution of co-ownership on the assets subject to enforcement are provided for in the Enforcement Act (EA).[108] For example, after enforcement has been established on a co-owned immovable and recorded in the land register, all voluntary disposals over that immovable are forbidden, including those leading to dissolution of co-ownership.[109] The same rule applies when enforcement on co-owned movables is carried out.[110]

Mandatory provisions, by which, to protect public interest, freedom of decision-making regarding a dissolution of co-ownership is restricted, are provided for by special rules on geometrical partition of

[103] Art. 143/1 SA.

[104] Art. 143/2 SA.

[105] Art. 144 SA.

[106] Art. 298 para. 3 PA. For more on simultaneous mortgage see: Gavella, N, *et. al*: Real Property Law (*Stvarnopravo)*, Vol. (*svezak*) 2, 2007, pp. 357-360.

[107] Art. 183 PA.

[108] The Enforcement Act (OG 112/12, 25/13, 93/14, 55/16, 73/17, hereinafter: EA).

[109] Art. 84 para. 3 EA.

[110] Art. 142 EA.

immovables intended for construction (building plots). The Physical Planning Act[111] lays down a serious of restrictions for land partition.[112] Namely, partition of land plots is only possible if the newly formed plots are consistent in size and shape with the planned building plot and with the documents on physical planning. There is also a series of separate acts which, in case of the sale of movables or immovables of particular importance (cultural heritage, protected parts of the nature, and the like), including the sales because of dissolution of co-ownership, provide for the right of pre-emption of Republic of Croatia in the cases of selling such property.[113] Another example of mandatory restrictions for dissolution of co-ownership is set forth in the Cultural Heritage Act. If co-ownership exists on a collection of movable cultural goods, dissolution of co-ownership on smaller parts would not be possible because the obligation of the owner is to preserve the integrity of the collection.[114] One of the restrictions on the dissolution of co-ownership to protect public interests in terms of the integrity and efficient treatment of agricultural land is provided for in the Agricultural Land Act.[115] Co-ownership between the Republic of Croatia and any third persons of agricultural land will be dissolved by a geometric division when possible. However, it will be allowed only if the surface area of cadastral units created by division is more than 0.5 hectares.[116]

4. *Perspectives for the development of an algorithmic approach in the dissolution procedure*

Intense digitalisation and automatisation of the Croatian judiciary leaves more room for the use of algorithmic procedures for the resolution of legal disputes between parties, particularly in the

[111] Spatial Planning Act (OG 153/13, 65/17, 114/18, 39/19, 98/19), Arts 160-162.

[112] For more on the restrictions in cases of geometric division of immovables, see: Jug, J.:, *op. cit*., pp. 152-156.

[113] For example, see Art. 42 The Islands Act (OG 116/18), Art. 165 The Nature Protection Act (OG, 80/2013, 15/2018, 14/2019), Art. 37 The Cultural Heritage Act (OG 69/99, 151/03, 157/03, 100/04, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 98/15, 44/17, 90/18),

[114] See Art. 20 of The Cultural Heritage Act (OG 69/99, 151/03, 157/03, 100/04, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14 , 98/15, 44/17, 90/18).

[115] The Agricultural Land Act (OG 20/2018, 115/2018).

[116] Art. 75 of the Agricultural Land Act.

proceedings of alternative dispute resolution. In the future, such a trend of the application of algorithms[117] may also prevail in the proceedings where it is decided on division of assets which, on various legal bases, belong to several persons. Such a trend is also expected in Croatian law considering an increasingly intensive digitalisation of the justice system and development of e-service in the judiciary that have so far been very well accepted by Croatian citizens.[118]

Algorithmic approach, as a new alternative method for optimal dissolution, may have multiple positive effects on a dissolution procedure. The application of algorithms may enhance the partisan

[117] For more see: the European Commission for the efficiency of justice (CEPEJ): The European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and Their Environment, Strasbourg, 2018., available at: https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c, last visited: 22.11.2019, pp. 13-63.

[118] At present, the most common e-service in the Croatian judicial system, is the electronic communication between citizens and the courts through the central State portal called e-Građanin(https://gov.hr/e-gradjani/23). Statistical data on the electronic communication between citizens and the courts via e-services through the central State portal show a trend of a constant increase and the fact that citizens accept more and more modern electronic methods for the protection of their rights. According to the data by the Ministry of Justice on electronic communication with the Land Register in 2015, of the total number of electronically issued excerpts, 8.2% of them were issued through the e-Građanin. In 2018, it was even 52% (as many as 40,041 excerpts were issued through the e-Građanin system). The data based on the report of the Ministry of Justice on electronic communication with the Land Register and the Annual Reports on the work of land register departments of municipal courts are published at: https://pravosudje.gov.hr/pristup-informacijama-6341/strategije-planovi-i-izvjesca/izvjesce-o-radu-zemljisnoknjiznih-odjela/8746 (last visited 2.11.2019).

On the other hand, research shows that at the end of 2018, 41% of citizens used the *e-Građanin* system and that there is still a need for its affirmation and for the introduction of various other e-services. Statistical data taken from the presentation by Hendal "Citizens' Knowledge of Electronic Trading" developed on the basis of results obtained in the empirical survey within the project "Private Law and Some Aspects of the Digital Market" developed at the Faculty of Law of the University of Zagreb led by Professor Dr Sc. Tatjana Josipović. The collection of data by a telephone survey conducted by Hendal d.o.o. via CATI system was based on a questionnaire prepared by the working team of Faculty of Law in Zagreb during the project "Private Law and Some Aspects of the Digital Market" " financed by the University of Zagreb. The research was conducted in November 2018 on the national representative sample of 1,000 inhabitants of the Republic of Croatia above the age of 18 years according to gender, age, region and size of the settlement.

autonomy both in terms of the choice of the method of division and the decision on a fair division of individual assets that suit the interests of all co-owners. Algorithmic procedures contribute to a decrease of costs and they simplify and speed up the procedure of dissolution. They also ensure an objective and independent approach to taking into consideration the interests of co-owners in a dissolution procedure. The application of algorithms in dissolution procedures can offer a fair and envy-free solution for rendering a decision on division of assets. The starting point for the creation of algorithms within the context of a dissolution procedure is the establishment of an envy-free-environment between the parties participating in the process of dissolution. The idea is to ensure not only a proportional, but also an envy-free and equitable division where not a single party envies the other party's share. Namely, the concept of algorithms for division of assets is based on the idea that each co-owner should receive the largest portion of the assets he or she considers as being the largest or the most valuable, or that each party should prefer his or her individual items to the corresponding items of other parties. Such a division may also be equitable because all the parties think that the part they receive is worth the same as the parts received by other parties (so-called equitative algorithms).[119] This is precisely why an algorithmic solution for division of assets is based on the concept where the parties participating in the dissolution procedure previously assign their subjective attributions of value, preferences (likes/dislikes) or rankings to the existing assets. It is expected that the algorithmic solution for the dissolution procedure based on the expressed preferences of the parties will correspond to their interests and that it can lead to a rational, friendly and consensual agreement on division of assets.[120] In the process of division, algorithms would have the role

[119] Amato, A, Amato, F., Cozzolino, G.; Giacalone, M.: Equitative Algorithms for Legal Conflict Resolution, in: Barolli L., Hellinckx P., Natwichai J. (ed.): Advances on P2P, Parallel, Grid, Cloud and Internet Computing. 3PGCIC 2019. Lecture Notes in Networks and Systems, Vol. 96. Springer, first online: 20.10.2019, available at: https://link.springer.com/chapter/10.1007/978-3-030-33509-0_55, last visited: 22.11.2019, pp. 589-597.

[120] V. CORONA, F., DALL'AGLIO, M, MORELLI, G.: The application of fair division systems in cases involving the judicial division of assets, pp. 2, 3, published at http://www.crea-project.eu/wp-content/uploads/2019/09/Jusletter-IT_the-application-of-f_d434640630_de-DEF.pdf(last visited: 20.11.2019); ROMEO, F., GIACIALONE, M., DALL'AGLIO, M.: CREA Project-Conflict Resolution Equitative Algorithms, pp. 2,3.

of an independent and impartial instrument that helps the parties to make their decision on division of assets they consider to be equitable.

The concept of the regulation of dissolution procedures in Croatian law is suitable for the application of algorithmic procedures both in terms of the preconditions for deciding on division of assets and the legal principles on which the process of making decisions in the dissolution procedure is based. On the one hand, the application of algorithmic procedures requires that all the parameters and facts, on which the application of algorithms is based, are established in advance[121] and that not a single fact used in an algorithmic procedure is disputed by the parties. In the context of dissolution procedures, this condition is met by the requirement that the procedure of dissolution may be instituted only if, beforehand, the parties (co-owners) have been identified, the composition of the assets to be dissolved and the size of the co-owned parts have been established, as well as that in connection with all these facts, nothing has been disputed by the parties. On the other hand, the application of algorithmic procedures also requires that there is an agreement of all parties regarding the criteria for the application of algorithms and their readiness to act in accordance with the rules of the procedure on which the application of algorithms and the accomplishment of the results obtained by their application are based. Since the main principle of a dissolution procedure in Croatian law is the principle of voluntariness, this requirement for the application of algorithmic procedures in the procedure of division of assets has also been met. Within the limits of the parties' (co-owners) free decision-making on the method of dissolution of the co-ownership and on the criteria of its dissolution, the assets that are subject to dissolution, and where there are no mandatory restrictions regarding the method of division, there are no obstacles for the parties to apply the results of algorithmic procedures as the basis for agreeing on their dissolution decision. The application of algorithms in dissolution procedures is in the end actually only determined by statutory restrictions that otherwise also restrict the co-owners' freedom to decide in agreement on the method of division of their co-ownership. Therefore, the application of algorithms in dissolution procedures can primarily be manifested in

[121] In that regard, it is also emphasised in the relevant literature that„*using algorithms in a legal context means to translate facts (that should be economically and/or legally relevant) into figures that support decision-making.*" Takenfrom*:* Rott, P.: A Consumer Perspecitve on Algorithms, Almeida, L., Gamito, M.C., Đurović, M., Purnhagen, K.P (eds). The Transformation of Economic Law, Oxford, 2019, p. 44.

the procedures of dissolution carried out in agreement, regardless of whether a division is made on the basis of the parties' agreement without the participation of a public authority, or it is carried out in judicial non-contentious proceedings, or in mediation proceedings. In all these situations the results of the application of algorithms, if all the co-owners agree, may support a decision-making process of dividing assets. In the proceedings of judicial dissolutions of co-ownership, there is also room for a limited application of algorithms, despite the fact that dissolution is carried out on the basis of a request of only one of the co-owners, on relevant interests and needs of the co-owners (e.g. in the situation of an equivalent dissolution of co-ownership).

However, it is very important to take into account the fact that the possibility for decisions being made on the basis of equitable algorithms significantly alters the traditional concept of division of assets and the traditional paradigm based on division of assets with regard to their market value. The application of algorithmic procedures, particularly in court proceedings and in alternative dispute resolution proceedings, requires some changes of the procedural rules to make it possible for the parties to make a decision on dissolution on the basis of the results of algorithmic procedures in the way and in the form that ensures its effective and full implementation among the co-owners and before public authorities. In a large number of cases, it will be necessary that an agreed decision on a division based on an algorithmic solution be made in the form of a formal act as the basis for the implementation of a decision on division (e.g. entry in the land register, registration of the right, proving the right, payment of taxes, enforcement settlements and the like).

In addition, algorithmic procedures also require a different approach to the concept of fairness in mutual relations among co-owners and a specific appreciation of their mutual interests and preferences regarding the assets that are subject to a division. Algorithms start from the so-called subjective fairness defined and created by the parties by expressing their subjective assessments of the value of individual assets or their ranking, taking into consideration their interests. Algorithms based on taking account of subjective fairness are determined by the the algorithm creators' (code writers) values they were guided by when developing algorithms, primarily by their understanding of fairness when dividing particular types of assets. The important criteria for the assessment and adjustment of subjectively expressed interests of the parties in the procedure of division and the concept of expressing their subjective preferences are defined by algorithmic code writers depending on their opinion on what is considered as being envy-free

and equitable and which factors are relevant for a fair division.[122] Therefore, despite the fact that the application of algorithms in dissolution procedures may have numerous positive effects, they cannot fully replace human beings in the decision-making process of dividing assets. Algorithmic solutions may be a good starting point for the process of negotiations among the parties regarding division of assets and they can offer a new and a different solution based on the adjustment of their previously expressed subjective preferences. However, this algorithmic solution can be accepted only if all the parties in dissolution proceedings believe that it is an equitable solution and if every individual party believes that the offered algorithmic solution corresponds to his or her interests. Indeed, it seems that it cannot be expected that algorithmic solutions for division of assets will at the same time constitute the basis for an automatic adoption of binding decisions on the method of division (e.g. by using artificial intelligence). It is more realistic to expect that in most cases, algorithmic solutions will be the basis for further discussions and negotiations about the method of division, as well as an orientation for the parties to choose possible methods of fair division of assets. Corrections will particularly be necessary in situations where there will be many co-owners, a large number of different assets (divisible, indivisible), significant differences in the value of individual assets and algorithmic solutions by which the shares will only be redistributed and which, because of the final termination of the co-ownership, require the payments in cash to be made to other co-owners. Finally, possible corrections will have to be made because of numerous mandatory rules restricting the methods and the scope of division of assets. Namely, algorithms start from a presumption that there is an unlimited legal and factual possibility of disposition of assets that are subject to division. In practice, however, in each concrete case, the mandatory restrictions in acquiring the

[122] Thus, for example, algorithmic code writers within the CREA project are of the opinion that when creating equitable algorithms for division, despite the fact that they are based on the expression of subjective preferences of the parties, when defining these preferences, one cannot neglect the market values of the disputed items involved in division. See Corona, F., Dall'Aglio, M, Morelli, G.: "The Application of Fair Division Systems in Cases Involving the Judicial Division of Assets", 3.

See the examples for the application of the so-called Egalitarian and the CEE/Nash Equilibrium, published in Corona, F., Dall'Aglio, M., Morelli, G.: "The application of fair division systems in cases involving the judicial division of assets", *op. cit*., pp. 6, 7.

right to a division must be taken into account which, at the end of the day, significantly determine the effects of a division of assets.

The application of algorithmic procedures and the effects of algorithmic solutions on the process of agreement on how to divide the existing assets must be based on the principle of voluntariness, and other principles on which the regulation of co-ownership relations and the insurance of high security standards for the protection of subjective private rights and legal security is based. Therefore, an introduction of technological novelties based on algorithmic procedures is a highly demanding task both for the legislator and for the parties using these procedures. However, it seems that the possibility of applying algorithmic procedures in the future is unavoidable to enable further development of the legal order in accordance with the requirements of a digital society in which the justice system is increasingly oriented to the provision of various e-services. Regarding the present positive experiences and a constant rise in the use of these services, a digital transformation of the process of division of assets in Croatian law will probably also be well accepted.

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MAKSIMILIJAN GALE* – KATARINA ZAJC**

ANALYSIS OF RULES GOVERNING THE DISSOLUTION OF THE SPOUSES' ASSETS IN DIVORCE AND INHERITANCE PROCEEDINGS – THE CASE OF SLOVENIA

Abstract The article analyses contractual freedom between spouses from the legal and economic perspective, based on the institutes of prenuptial agreement and testament and purpose of the mandatory rules and what justifies their presence in the area of civil law. The presence of mandatory rules, which confront parties' autonomy, can be observed in both analysed legal areas, namely in the area of family law and inheritance law. The limitation of the autonomy of will is evident in the field of inheritance law in particular. The article also confirms that in Slovenia also, mandatory rules pursue social and economic efficiency function.

1. *Introduction*

In the article, we will examine, after overviewing rules governing the dissolution of the Spouses' assets in divorce and inheritance proceedings, the economic function of mandatory provisions in the overviewed provisions on inheritance and divorce law.

Our assumption is that there are two basic functions of the law of succession, namely wealth transmission - efficiency function and redistribution system - social function, the same goes for the dissolution of the spouses' assets in divorce proceedings.[1,2] Even though divorce and inheritance law are both part of civil law field where the default rules are the norm, we see that many legal rules in two respective fields are actually mandatory. When examining them, we came to the conclusion, in line with the literature, that mandatory rules either follow an economic function or social function.

After the introduction, the second chapter of the article will introduce some theory on civil legal default and mandatory provisions as

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[1] De Waal, MJ. "The Social and Economic Foundations of the Law of Succession." Stellenbosch Law Review, vol. 8, no. 2, 1997, p. 162-175. HeinOnline.

[2] For an excellent overview on the functions of the law on successin see also: Friedman, Lawrence M. "The Law of the Living, the Law of the Dead: Property, Succession, and Society." Wisconsin Law Review, vol. 1966, no. 2, 1966, p. 340-378. HeinOnline.

well as their economic function. The third chapter will overview Slovenian legal regulation on inheritance and marital law, with special emphasis on the mandatory and default rules found within these two legal fields. The mandatory rules in marital and inheritance law will be separately discussed from economic point of view as well, to answer the question whether and when mandating mandatory rules follow the economic or social function and why. The conclusion will follow.

2. *About the civil legal rules in general and economics of mandatory and default rules*

One of the essential features of civil law norms is their default legal nature. Legal theory states that the main distinction between default and mandatory legal norms stems from their compulsory or non-compulsory nature. Mandatory norms are characterised by a coercive nature, since such norms command or prohibit certain conduct for legal entities without giving them an option for altering the content of the norms in any way. Usually the mandatory norms are found in area of public law, for example in administrative and criminal law. The nature of the default provisions, however, is different. Their main feature is that they are binding on the parties only if they do not agree otherwise.[3] This chapter focuses on the analysis of civil law rules, which determine the distribution of the property of the spouses in case of divorce and inheritance.

The will of contracting parties plays a very important part in civil law. In this regard Juhart[4] states, that unlike some other legal disciplines, the statutory norm in civil law is not the only nor the most important regulatory element. Contrary, the distinguishing characteristic of civil law is the power of the will of the subjects of a certain »civil law relationship«. The subject is therefore able to formulate, either by himself or in agreement with the will of the other subject in the civil law relationship, a legal rule that is binding in the same way as a legal norm in other legal areas.[5] In other words, in the area of civil law individuals are given the opportunity to freely formulate, within the limits of what is permissible, the content of the legal norms, which become binding for the parties. The latter is, as mentioned, the main characteristic of default legal norms. Despite the fact that the default nature of

[3] Pavčnik Marijan, Teorijaprava, 5th edition, IUS Software, GV Založba, 2015, p. 105.

[4] Juhart Miha, Dispozitivno pravilo civilnega prava, Podjetje in delo, no. 5-6, 1996, p. 1086-1090.

[5] *Ibidem.*

legal norms is one of the distinctive signs of civil law[6], it should be noted, that not all civil law provisions are optional in nature. Juhart divides civil law provisions into four categories, namely, definite mandatory provisions, indefinite mandatory provisions, primary default provisions and secondary default provisions.[7]

Mandatory civil law rules are rules that consist of an abstract hypothesis and a normative sanction. The abstract hypothesis determines how the addressee should act, whereas the normative sanction determines the consequences when the addressee of the abstract hypothesis fails to comply with it. An example of such a norm in the field of inheritance law is Article 59 of the Inheritance Act, since the first paragraph provides that a testament can be made by anyone with a capacity of judgement and who has reached the age of fifteen. Furthermore, the second paragraph provides that the testament is invalid if the testator has not reached fifteen years of age at the time he or she made it, or was incapable of judgment at that time.

It should be noted at this point that the hypothesis of certain factual situation is often not found in just one statutory provision. The content of the hypothesis of certain factual situation is actually contained in several statutory provisions that must be linked into the substantive unit to which the prescribed sanction relates. Family Code for example provides conditions for validity of the marriage in Articles 23 – 27, while Article 45 states that contrary to the named provisions, the marriage is invalid. Civil-law provisions that fall into the group of specific mandatory provisions are similar to provisions in other fields of law, since parties cannot agree on different content that the one stipulated in the regulation.

The group of indefinite mandatory provisions includes provisions, which bind the addressees. The main difference with definite mandatory provisions is in the method of provision formatting. According to Juhart[8] the law provides the hypothesis and the sanction for definite mandatory provisions, while for indefinite mandatory provisions only the sanction is provided. Significant feature of indefinite mandatory provisions is the important role of the judge in formulating the provision. An example of indefinite mandatory provisions are rules created by judges based on the fundamental principles, such as principle of good faith, principle of conscientiousness and fairness, principle of

[6] Štempihar 1962 cites optionality as one of the main features of civil law. See: Štempihar Jurij, Osnovecivilnegaprava I., Skripta, Ljubljana, 1962, p.2.

[7] JUHART MIHA, Dispozitivnopravilocivilnegaprava, Podjetje in delo, no. 5-6, 1996, p. 1086-1090.

[8] *Ibidem.*

due care and attention etc. One of the principles in the field of family law is the principle of equality of partners, which is set out in the Article 21 of the Family Code and in the Article 53 of Constitution of the Republic of Slovenia. Although law does not directly prescribe the sanction for non-compliance with aforementioned principle, it can be concluded that no legal consequences can stem from agreements and actions that contravene the principle of equality of partners.[9]

Furthermore, such norms can be found in the area of inheritance law as well, where the provision of Article 42 of the Inheritance Act defines the reasons under which the testator may disinherit an heir who has the right to necessary share. The mentioned Article stipulates in the first point that the testator may disinherit the heir who has the right to the necessary portion, if he or she has transgressed against the decedent by violating any lawful or moral duties. The Inheritance Act does not precisely define the concept of moral duty. It is therefore a concept whose content is determined by the court in each specific case. By ruling what can be considered as violation of moral duty in a particular case, the court forms a precise content of the legal norm.

Juhart designates the primary default provisions as the heart of civil law, since these provisions characterize the area of civil law the most. This is because they allow the parties to freely formulate provisions based on their will, which are then binding on them. Furthermore, it should be emphasized that such rules have *inter partes* effect and often coexist with statutory provisions. However, the provisions that are formulated by parties are used primarily, whereas the statutory provisions are applied only if it is not possible to establish the content of the provisions that were formulated by the parties. In the area of the division of matrimonial property, many provisions are of such nature. An example is a contract between spouses, by which the spouses independently determine their property regime. Article 65 of the Family Code stipulates that the spouses are subjected to the property regime stipulated by the Code, unless they agree on the content of the property regime with a contract for the regulation of their property. Only when the spouses are unable or unwilling to agree, the property regime stipulated by law (i.e. the lawful property regime) applies to them.[10] The statutory regime is in comparison with the contractual regime of a subsidiary nature. The same applies for a statuary regime in the field of succession law. The decedent may freely dispose of his or her property. The content of the will is therefore of optional nature. In

[9] *Ibidem.*

[10] NOVAK BARBARA, Premoženjskirežim med zakoncema po novemDružinskemzakoniku, Odvetnik, no. 85, 2018, p. 50.

other words, this means that the testator is free to decide whether to make a testament at all, and, if so, how to divide his or her property. In the following part of the paper, it will be presented that in doing so, default rules simultaneously collide with the mandatory provisions of inheritance law, which, despite the principle of free will, cannot be excluded by the testator.

As secondary default provisions Juhart describes provisions that apply when the parties have not formulated their own provisions despite the fact that they had the opportunity to do so, due to the default nature of the statutory provisions. Into this category therefore fall all those statutory provisions that are of optional nature and the content of which can parties alter by primary default provisions (for example contractual terms). An example of such norms are the Article 67 of the Family Code, which stipulates the common property, the Article 68, which defines the spouses' share on common property and many other provisions. Provisions of the Inheritance Act related to legal succession (intestate succession) are of such nature as well.

To summarize, from legal perspective parties in contract law are more or less free to arrange legal relationships among themselves, however there are certain circumstances in which they are not allowed to contract around certain rules and mandatory rules apply. On the other hand, since more or less all contracts are incomplete due to high transaction costs, and parties therefore do not contract for every possible situation, legal regimes provide default rule, which apply in these cases.[11]

The question therefore arises, from the economic point of view, why do we need mandatory and default rules and whether they are efficient, therefore increasing the welfare in the economy. Default rules, according to economic theory are efficient when they provide off-the-shelf rules, so that parties do not need to contract for every possible situation and can rely on rules provided by legislation. They should be such that mimic parties' behaviour when contract in perfect competition, in other words, such that parties would contract for in perfect competition.[12] Any other default rules are not efficient and distort the decision-making and decrease the welfare in the economy. Mandatory rules on the other hand, viewing them from the economics perspective, are a consequence of a market failure, a situation when markets are not perfect, due to asymmetric information, monopoly power, pu-

[11] See: Baker, Tom and Logue, Kyle D., "Mandatory Rules and Default Rules in Insurance Contracts" (2015). Faculty Scholarship. Paper 582.

[12] In the situation of perfect competition, parties have all the information that there exists and therefore there is no asymmetry of information.

bic goods and/or externalities.[13] Economic theory views mandatory rules from two perspectives, claiming that some mandatory rules reflect government paternalism in order to protect the contracting parties and treat them as inefficient on one hand or such that protect parties outside a contract, when a contract causes negative or positive externalities on third parties and are welfare increasing, on the other hand.[14] As such, mandatory rules can be effective, since they guarantee a certain amount or rights that cannot be circumvented, but on the other hand, they can be risky, since they rise price, shrink markets and impose regressive subsidies.[15] For example, in consumer protection law mandatory warrantees protect all consumers, but protect also those that would not want to have mandatory warranty and therefore have to pay higher prices because of mandatory warranty. We will evaluate some of the mandatory provisions as determined in either divorce proceedings or inheritance proceedings in order to determine whether they have economic function and therefore increase efficiency or whether they have social function and their welfare consequences are not certain.

3. *Overview of divorce and inheritance law that apply to spouses*

3.1. *The analysis of property rules among spouses in case of divorce*

The Family Code (hereinafter FC)[16], which came into force on 15th of April 2019, contrary to the previous Marriage and Family Relations Act[17] enables spouses to arrange their property regime in a way that is different that the FC provides as default rules. This means that the spouses can arrange in advance the portion/share of each spouse on the property that will be created during their marriage. Further-

[13] Externalities are situations in which action of one party affects the situation of third parties either positively or negativelly. Since the acting party does not take into account this costs and benefits, the decisions are not efficient from the economic point of view.

[14] Ayres, Ian and Gertner, Robert, "Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules" (1989). Faculty Scholarship Series. 1545.

[15] BAR-GILL, OREN AND BEN-SHAHAR, OMRI, Regulatory Techniques in Consumer Protection: A Critique of European Consumer Contract Law (June 1, 2012). Common Market Law Review, Vol. 50, p. 109.

[16] Family Code (Official Gazette of RS, no. 15/17, 21/18 – ZNOrg in 22/19).

[17] Marriage and Family Relations Act (Official Gazzete of RS, no. 69/04 – official consolidated text, 101/07 – dec. US, 90/11 – dec. US, 84/12 – dec. US, 82/15 – dec. US, 15/17 – DZ and 30/18 – ZSVI).

more, such contract has to be in the form of notarial deed (second paragraph of the Article 64). The spouses' share of the property issue is particularly important in case of divorce, when the entire property must be divided. Posner[18] believes that sometimes it can be difficult to estimate what an appropriate share of an individual partner should be. This is especially relevant when one of them has a very low income or when all the assets have been acquired with the income of only one partner, since the other partner has been devoted solely to the household. From this point of view, a property distribution agreement also known as prenuptial agreement is a positive instrument, since it enables clear division of assets upon divorce. Frumkes[19] states that prenuptial agreements are particularly useful in situations when one of the spouses has children from a prior relationship, if it is not the first marriage for one of them, if one of the future spouses owns a business, has acquired assets before the marriage or has significant wealth. Furthermore, Frumkes points out that prenuptial agreements should also be considered by all those individuals who have to give up certain rights due to the marriage, such as a change in lifestyle or location.[20] Similarly, Weich[21] notes that prenuptial agreements are positive because they enable partners to avoid the ugly aspects of a divorce.

Based on the data of the Statistical Office of the Republic of Slovenia[22], it is possible to deduce that on average around 6,700 marriages are concluded in Slovenia annually, whereas 2,400 couples are divorced. This means that the annual divorce rate is around 36%.

TABLE 1: Slovenian data on marriages and divorces, 1999-2018

ar	Number of Marriages	Number of Divorces
1999	7716	2074
2000	7201	2125
2001	6935	2274
2002	7064	2457
2003	6756	2461

[18] POSNER RICHARD A., Economic analysis of law, 5th edition, A Division of Aspen Publishers, Inc., 1998, p. 162.

[19] Frumkes Melvyn S., Why a Prenuptial agreement, Family Advocate, no.3, vol.33, Winter 2011, p. 7, HeinOnline.

[20] *Ibidem*.

[21] WEICH CECILE C., Love on the Dotted Line – Craft a Prenuptial Agreement Carefully to Withstand Any Future Challenges, ABA Journal, vl. 80, no. 10, October 1994, p. 50, HeinOnline.

[22] Statistical office of Republic of Slovenia, https://www.stat.si/StatWeb/, 7th of November 2019.

2004	6558	2411
2005	5769	2647
2006	6368	2334
2007	6373	2617
2008	6703	2246
2009	6542	2297
2010	6528	2430
2011	6671	2298
2012	7057	2509
2013	6254	2351
2014	6571	2469
2015	6449	2432
2016	6667	2531
2017	6481	2387
2018	7256	2347

Source: Statistical office of Republic of Slovenia

According to the data presented in the table, the number of marriages and the number of divorces has not changed significantly in the last 20 years. Considering the fact that the share of divorces in Slovenia is relatively large, it can be assumed that the prenuptial agreement, which is presented in the following paragraphs, will play an important role in the upcoming periods.

It appears from the legislative proposal of the FC that the legislator has decided to adopt the institute of prenuptial agreement in order to allow spouses greater freedom to dispose of their property. As the legislator acknowledges, the restrictions of the previous legal regime, which did not allow any agreement on the property regime between spouses, were too strict.[23] The Government of the Republic of Slovenia realizes that even with the interpretation of the constitutional provision of the social function of property rights, it is impossible to justify the compulsory character of the existing property regime as the exclusive regime among spouses. Furthermore, it has been recognised that the interference with the autonomy of the spouses' will cannot be justified by any right or interest, which would take precedence over freedom of choice of two independent subjects.[24] At the same time, the legislative proposal stresses that the state may retain a monopoly on the protection of certain persons, such as children or creditors by setting individual coercive norms, however, the restriction that completely limits the property regime is too strict.[25]

[23] Legislative proposal of the Family Code, The Government of the Republic of Slovenia, EVA: 2016-2611-0062.

[24] *Ibidem*, p. 12.

[25] *Ibidem.*

The Article 85 of the Slovenian Family Code defines prenuptial agreement as a contract whereby the spouses set their property regime, which is different from the legal one. In the prenuptial agreement, the spouses can define matrimonial property regime that applies for the duration of the marriage as well as for divorce. The Slovene legal theory emphasizes that the succession clauses should be considered as forbidden in the prenuptial agreement, since they are omitted from the first paragraph of Article 85 of FC. Therefore, the aforementioned Article enables the agreement among spouses only in case of divorce and does not include situations when the marriage is dissolved on any other ground, for example in case of death. It means that contracts of inheritance among spouses are forbidden.[26] The law stipulates that before the prenuptial agreement is concluded, the spouses have an obligation to inform each other of their property/assets status, otherwise the agreement is voidable.

Despite the freedom, which emerges from the contractual property regime, it has to be emphasized that spouses' freedom is limited. The prenuptial agreement allows the spouses to determine a property regime different from the legal one independently; they may agree on a different way of managing and disposing of the joint assets than it is provided in the Family Code; they may agree on the scope and division of the joint assets; on the size of their shares on the joint assets; they may reach an agreement how to divide the assets during the marriage or in the case of divorce; an agreement on the investment of work and /or assets in real estate, which is part of the separate property of the other spouse, on the amount of the claim and on its insurance; an agreement on the investment in other spouse's company and an agreement on the spouses' entrepreneurial assets; an agreements on alimony for the duration of the marriage and in the event of divorce.[27] Nevertheless, Žnidaršič[28] points out that, in addition to general restrictions based on legal and public order, the Family Code provides special restrictions when drafting a prenuptial agreement. Restrictions are particularly present in the field of housing protection (Articles 59 and 109 of FC), regarding decisions they make on common matters (Article 60 of FC), fulfilment of their mutual needs and family needs (Article 61 of FC), reciprocal alimony matters (Articles 62 and 100-108 of FC), and regarding their obligation to return other spouse's gifts (Article 110 of FC). Therefore, it can be acknowledged that the regula-

[26] Žnidaršič Skubic Viktorija, Erjavec Nataša in: Komentardružinskegazakonika, editor Novak Barbara, Ljubljana, Uradni list RepublikeSlovenije, 2019, p. 263.

[27] *Ibidem*, p. 264.

[28] Žnidaršič Viktorija, Pogodba o ureditvipremoženjskopravnihrazmerij med zakoncema, Pravniletopis, 2018, p. 119.

tion of property relations between spouses is of optional nature within the scope of restrictions imposed by the mandatory norms.

One of the most important limitations imposed by FC is the restriction related to the formality of the contractual agreement. FC as mentioned, stipulates that the contractual agreements between spouses must be in the form of a notarial deed. The purpose of this particular provision can be indirectly observed from the Article 87 of the FC, which stipulates the notary's obligation to clarify the content of the contract and its consequences to the parties.

Before a contract is concluded, the spouses must be informed about the legal property regime and about the property rights and obligations which derive from the FC. The notary should provide unbiased advice to both spouses and must ensure that both parties fully understand the meaning and the legal consequences of the contract. Additionally, the notary's obligation is to review the contract so that its provisions are in compliance with constitution, mandatory rules and moral principles.

One of the main purposes of a notarial deed, as it follows from the FC wording, is to inform the parties about the content of the contract before it is signed. The notary's clarification ensures that parties are not misled and are therefore fully aware of the rights they waive due to the signing of the contract. Simultaneously, the notary takes care that the parties of the contract do not commit themselves to something that is prohibited by the mandatory norms.

Once the property distribution agreement is registered in the public register[29], it has *erga omnes* effects as well. It means that upon the registration, the information about the existence of the property distribution agreement among spouses becomes public. Therefore, the notary's duty is not only to inform spouses about the internal effects of the agreement but also about its external effects, which derive from the registration. According to the data of the register of property distribution agreements, 75 such agreements have been concluded in Slovenia in the period from 15th of April 2019, when the FC stepped into force, until today (7th of November 2019).

As already mentioned, if the spouses do not define their property relations contractually, the legal property regime rules apply. It means that provisions of FC, which govern ownership, property shares and other property issues, apply.

The Article 66 of the Code stipulates that that the legal property regime between the spouses consists of the common property regime on the common property[30] and the separate property regime on the spous-

[29] The register is kept by the Chamber of notaries of Slovenia.

[30] From the time of entering into marriage and throughout its duration all the as-

es' separate property[31]. At this point, it should be emphasized that the spouses' common assets belong to the spouses together and that their shares are not determined, furthermore they have to manage and dispose of the property together and in agreement. Therefore, the law stipulates that none of the spouses can freely dispose with his or her indefinite share in the common property with legal acts *inter vivos*. They have to manage and dispose of the property together and in agreement.

The contractual freedom among spouses is admissible even regarding property issues, which derive from the gainful activity in which the spouses are involved together. In this case, their assets are considered based on the multilateral contract they have concluded. If there is no such contract, the rules of their contractual property regime shall apply. If the property regime contract has not been concluded or if there are no relevant provisions regarding this issue, the provisions of the legal property regime shall apply.[32] Similarly, spouses can agree on the existence of the claim, its amount and its insurance, which derives from the investments into the separate property of the other spouse.

Optional is also the provision, which imposes spouses the obligation to return gifts of greater value to each other in the event of divorce. The law stipulates that the spouses may reach a different agreement, however it has to be in the form of a notarial deed.

The important aspect, which can be arranged contractually among spouses is the right to request the alimony from the other spouse, which is enacted in Article 100 of the FC. The Code stipulates that a spouse who has no means of subsistence and is unemployed without fault has the right to request alimony from the other spouse in a divorce proceeding or with a lawsuit, which has to be filed within one year of the legally binding divorce.

According to the case-law, the beneficiary must first exhaust all his or her means of subsistence and only then they may be entitled to the alimony by the ex-spouse.[33]

The law explicitly states that an agreement on alimony among the

sets gained through the work of the spouses represent their common property. Spouses' common property is also all the property acquired on the basis of common property as well as all the property that derives therefrom.

[31] The property, held by a spouse at the time of the marriage, as well as all subsequent gratuitously acquired property (gifts, inheritance), is the spouse's separate property. In addition, objects intended solely for the personal use of one of the spouses are part of the spouse's separate property as well.

[32] Article 81 of FC.

[33] Ljubljana Higher Court judgement, VSL judgement IV Cp 1430/2015, 27th of May 2015.

spouses in the event of a divorce is legally admissible. It has to be stressed that the law does not prescribe any special content of the agreement, however according to the Article 101 of the FC, the form of enforceable notarial deed is the obligatory condition for its validity. According to the Article 97, in the case of a consensual divorce, agreement in the form of a notarial deed, which is non-enforceable, is sufficient. An agreement can be concluded at the time of entering into marriage, throughout its duration as well as at the time of divorce. The FC explicitly states that the spouses can waive the right of alimony, however it must not jeopardize children's interests.[34] Namely, the protection of children's interests is one of the fundamental principles of the FC, which has to be respected by everyone.

The complex nature of the Alimony institute has been acknowledged in the case law as well. The Ljubljana Higher court in the VSL Judgement II Cp 2532/2017, dated 28th of February 2018, stated that the alimony right is in principle compensatory right; however, some elements of inheritance law can be detected in this institute as well. As observed by the court, the range of beneficiaries of the compensation for lost alimony or lost assistance is wider than the range of those, who would be entitled to request the alimony by the deceased.

Furthermore, the legal- economic theory emphasises that the nature of alimony granted to a spouse at the time of divorce is complex. Posner[35] states that the alimony granted to the spouse upon divorce has three different economic functions. Firstly, it represents a form of compensation to the spouse for violations of the "marital contract". Secondly, it represents a method of repayment to a woman (in a traditional marriage) of her share on the assets created through the duration of the marriage. Thirdly, the most important economic function is that the compensation can be considered as severance pay or unemployment benefits.

Similarly, Murray states that compensation can serve different purposes. While the division of property in divorce proceedings is intended to give the spouses a share to which they are entitled to, the compensation is in some systems either a kind of replenishment or assistance to equal or equitable sharing of intangible marital property.

Differently from alimony, the FC treats the spouse's right of housing protection after the divorce. The housing protection provision is mandatory, since the law does not stipulate that the spouses can agree otherwise or that they can exclude the protection upon agreement.

[34] Article 101 of the FC.

[35] Posner Richard A., Economic analysis of law, 5th edition, A Division of Aspen Publishers, Inc., 1998, p. 164.

Namely, this provision is not intended to protect spouses but to protect the interests of children, which cannot be waived by spouses. The ex-spouse is entitled to housing protection only if the benefits of the child require so.

3.1.1. Economic and social function of Slovene divorce law

As mentioned, from 2019, the prenuptial agreement is allowed and as the empirical data show, it is gaining grounds. It should be pointed out that even before 2019, spouses found a number of by-passes to the lack of pre-nuptial agreement, but they were not a perfect substitute for the arrangement that is now in place. From the outset, we see that the agreement is regulated in such a way that has predominantly economic function as pointed out above and the parties are free to agree on any kind of distribution of the property gain throughout their marriage. As already pointed out, spouses have the most information of any party, including courts, on how to distribute their property, which increases the efficiency of the distribution of property. However, the law, to exercise a social function of the marriage law and correct for some possible externalities of the pre-nuptial agreement, mandates some mandatory rules that the spouses cannot contract around, mainly to protect young children that cannot take care of themselves, spouses after the divorce if they do not have sufficient means, and creditors.

Social function of mandatory law:

- Pre-nuptial agreement needs to be in a notary – public form and the notaries have to inform the parties (Article 87 of the Family Code) what kind of contract they are signing in order to decrease informational asymmetry and protect the party of the agreement that might not have the economic power to resist signing the pre-nuptial agreement;
- After divorce, even though the spouses had a pre-nuptial agreement and arranged for one to get apartment in which they lived together, the court can decide, for a certain amount of time, that the spouse can stay in the apartment (Article 109. of the Family Code);
- A contract whereby anyone leaves his or her legacy or part of it to his or her spouse or to someone else is invalid (Article 103 of the Inheritance Code).
- The pre-nuptial agreement cannot contract around the duty of spouses to contribute to family needs according to their abilities (Article 61 of the Family Code)
- The spouses, if their means allow, should contribute to the living expenses of the other spouse if they do not have means without their fault (Article 62 of the Family Code);

- Spouses are obliged, regardless of provision of pre-nuptial agreement, to return to the other spouse all presents that are not proportional to the wealth of the giving spouse (Article 110 of the Family Code).

Economic function of mandatory law:

- The Family Code, in order to protect creditors, does not allow that one of the spouses can contract away his/her right to manage common property. This way creditors are protected, since they can rely that common property is managed by both spouses and not only one;
- In order to protect the creditors of either spouse, the pre-nuptial agreements need to be registered in the register at the Notary Public Chamber of Slovenia.

To sum up, mandatory law pertaining to the pre-nuptial agreement mostly has social function in order to protect children and the spouse who does not have means to protect themselves after the divorce. However, economic functions are important since they protect creditors so that they put them on notice how the property will be divided in case of divorce and they can act accordingly and protect themselves when contracting with spouses.

3.2. *The analysis of property rules among spouses in case of inheritance*

As mentioned, the spouses cannot dispose with their unspecified share in the community property on the basis of the legal transaction *inter vivos*. A legal transaction contrary to this rule is void.[36] However, this does not mean that spouses are unable to dispose of community property in case of death (*mortis causa*). The spouses are free to dispose of all their property in the testament, including an indefinite share in the community property. As the subject of this paper is the analysis of the property norms among spouses, the following paragraphs will shed light on the norms of succession law that affect the financial status of the surviving spouse.

The Inheritance Act (hereinafter IA)[37] stipulates that in Slovenia the estate can be inherited either by law or by testament.[38]

The effect of testament is very similar to the effect of the prenup-

[36] NOVAK BARBARA, Družinskopravo, 2. edition, Ljubljana, Uradni list Republike Slovenije, 2017, p. 105.

[37] Inheritance Act(Official Gazette of SRS, no. 15/76, 23/78, Official Gazette of RS, no. 13/94 – ZN, 40/94 – dec. US, 117/00 – dec. US, 67/01, 83/01 – OZ, 73/04 – ZN-C, 31/13 – dec. US and 63/16).

[38] Article 7 of IA.

tial agreement. As already mentioned, if the spouses define their property relations contractually, the legal property regime rules will not apply. Similar effect applies for the testament. Testamentary inheritance excludes inheritance determined by law.[39] A testament, unlike an agreement on the property regime between spouses, is a unilateral legal transaction. Hence, the will of a single party, in the specific case the testator's will, is sufficient and the consent of the heir, who is entitled to the heritage based on the testament, is unnecessary.[40] The decedent is autonomous in disposing of his or her property. Differently from concluding the contract, the decedent is not bound by the will of other civil law subjects. Therefore, he or she may take decisions independently and modify the testament independently.

Nevertheless, the testator's autonomy is not unlimited. Generally, the testator can freely dispose of his or her property, however, the IA contains some mandatory provisions, which must consequently be considered in the testament. The fact that the testator is restricted in disposing of his or her property, *inter alia* derives from the Article 8 of the IA, which stipulates that the testator may dispose of his or her property in a manner and within the limits set by the law. Additionally, the Article 62 of the IA explicitly provides that: a valid testament is the one, which is in the legal prescribed form and under the conditions laid down by law. Župančič and Skubic[41] list four conditions that must be fulfilled in order to ensure that the testament is valid. Namely, the conditions are: firstly, the testator's testamentary ability; secondly, the testament must demonstrate the testator's true and real will; thirdly, the compliance with the prescribed form; and fourthly, the permissible content of the testament as well as permissible basis of the testamentary disposition.[42]

According to the Article 59 of the IA, everyone who is capable of judgment and has reached the age of fifteen can make a testament. The prerequisites for the validity of a testament are mandatory. The mandatory nature of the norms follows from the second paragraph of the Article 59, which states that a testament, which does not meet the aforementioned conditions is invalid. The law stipulates that the loss of ability to judge, which has occurred after the testament was done, does not affect its validity.

Regarding the true and real will of the testator, Article 60 states

[39] MOŽINA DAMJAN, ŽNIDARŠIČ SKUBIC VIKTORIJA, in: Uvod v civilnopravo, JuhartMiha…[et al.], Ljubljana, Uradni list Republike Slovenije, 2011, p. 31.

[40] ZUPANČIČ KAREL, ŽNIDARŠIČ SKUBIC VIKTORIJA, Dednopravo, 3rd edition, Ljubljana, Uradni list Republike Slovenije, 2009, p.113.

[41] *Ibidem.*

[42] *Ibidem.*

that if the testator was either threatened or forced to make a testament, or if he or she chose to make it because of a trick or because he or she was mistaken, such testament is invalid.

Furthermore, form is important for the validity of the testament as well. Article 62 of the IA stipulates that the only valid testament is the one that meets the prescribed form. The purposes of the prescribed form are according to Zupančič and Skubic to ensure the testament represents the testator's last will (*animotestandi*), to ensure a certain degree of seriousness and thoughtfulness of the testator's decision, to facilitate prove and to ensure the testator that not every reckless statement will count as a statement of his or her last will.[43]

In terms of content, as Zupančič and Skubic note, the IA does not contain general provisions, therefore the provisions of the Obligations Code (hereinafter OC)[44] should apply to assess the content of a testament.[45] OC stipulates that the content of the testament must be possible, admissible, determined or determinable (the second paragraph of the Article 34 of the OC) as well as the basis of the testamentary disposition must be admissible (the first paragraph of Article 39 of the CC). The content of a testament can either be factually or legally impossible. The content is factually impossible e.g., whenever a testator disposes in his or her testament with a thing that no longer exists. On the other hand, the content is legally impossible e.g., whenever a testator disposes in a testament with a thing, which is not part of his or her property. The admissibility of the will, according to Article 37 of the OC, is assessed in terms of whether the content of a testament is contrary to the constitutional principles of the society, to mandatory norms or to the moral principles of the society. It should be emphasized that it is possible scenario that only a single provision of a testament is void.[46] In that case, the void provision does not affect the validity of the whole testament. IA stipulates that the content of a testament must be determined or at least determinable[47]; otherwise, under Article 35 of the OC, such testament is void. As already stressed out, the IA does not contain special provisions, which would stipulate a different, special sanction from the one stipulated by the OC.

An important limitation on the testator's autonomy represents the

[43] *Ibidem*, p.122.

[44] Obligations Code (Official Gazette of RS, no. 97/07 – official consolidated text, 64/16 – dec. US and 20/18 – OROZ631).

[45] ZUPANČIČ KAREL, ŽNIDARŠIČ SKUBIC VIKTORIJA, Dednopravo, 3rd edition, Ljubljana, Uradni list RepublikeSlovenije, 2009, p.124.

[46] 4th paragraph of Article 60 of IA, Article 88 of OC.

[47] Article 83 of IA.

institute of the necessary share, which determines that part of the estate that the testator cannot freely dispose of.[48] The necessary share limits the autonomy of the spouses in a way that they are obliged to devote to each other at least half of the share to which the surviving spouse would be entitled to according to the inheritance order. Beside the surviving spouse, the necessary heirs are also the deceased person's descendants, his/her adopted children and their descendants, his/her parents and his/her spouse. The grandfathers, grandmothers, siblings are necessary heirs only when they are permanently incapable of work and have none of the means required for sustaining a livelihood. In addition, the IA stipulates that the persons listed above are necessary heirs only if they are entitled to inherit under the statutory order of inheritance. Since the subject of the paper is the matrimonial property regime in the case of inheritance, the focus will be on spouses. Other necessary heirs will be discussed only briefly.

The law states that the surviving spouse is entitled to at least one half of the share that would belong to him or her under the law (i.e. in case the testator did not make a testament).

The necessary share of the spouse in the particular case depends on the fact whether the decedent had children and if so, how many of them. Namely, the circumstance of existence of children of the deceased defines, which inheritance legal order will be applied.

The necessary share is directly related to the provisions of the IA, which determine inheritance based on the law, i.e. inheritance provisions that apply when there is no testament. The Article 10 of the IA stipulates that the deceased's estate is inherited by his or her descendants, adopted children and their descendants, spouse, parents, adoptive parent and that person's relatives, the deceased's brothers and sisters and their descendants, and the deceased's grandfathers and grandmothers and their descendants. These persons inherit in accordance with the order of inheritance, where the heirs from the closer order of inheritance exclude from inheritance persons from a more distant order of inheritance. According to this, IA defines three inheritance orders.

The heirs of the first order of inheritance are the deceased person's descendants and spouse, as well as extra-marital partner or partner from a civil union. They inherit equal shares before all others. For example, if the deceased had one child and a spouse, according to the IA, each of them would inherit one-half of the decedent's estate. In this case, the necessary share of the spouse would represent one quar-

[48] Ljubljana Higher Court decision, VSL decision II Cp 2768/2016, 14th of December2016.

ter of the decedent's estate. If the deceased had two children, each of them would inherit a third of the decedent's estate and the surviving spouse would inherit one-third. In this case, the necessary share of the spouse would represent one sixth of the decedent's estate, etc. Additionally, the law stipulates that their children (the deceased's grandchildren) in equal shares inherit the part of the estate that would initially have gone to a person if they had outlived the deceased.[49]

In the second order of inheritance, the estate of a deceased person with no living descendants is inherited by his or her parents and by his or her spouse. The deceased person's parents inherit equal shares of one half of the estate and his or her spouse inherits the other half. In this case, the necessary share of the spouse is equal to one quarter of the decedent's estate. Similarly, as in the first inheritance order, their descendants inherit the part of the estate that would initially have gone to beneficiaries of the second inheritance order if they had outlived the deceased. If the deceased person has no living spouse, his or her parents inherit equal shares of the entire estate. If both parents predecease the deceased person and neither have left any descendants, the entire estate is inherited by the deceased's surviving spouse. [50]

On the basis of the third order of succession the deceased's grandparents are entitled to inherit. This order of succession applies when the decedent has neither a spouse nor a parent or spouse, who has outlived the decedent.

Regarding the inheritance between spouses, it is worth noting the provision of Article 33 of the IA, which stipulates that household objects intended for the satisfaction of their daily lives belong to the surviving spouse, the decedent's descendants and the adoptive parents and their descendants who lived with the decedent in the same household. The Act lists some of such household objects as examples: furniture, household appliances and other household equipment, bedding and others. The aforementioned objects are not taken into account in the calculation of the necessary share and are also not calculated to the heir in his or her hereditary share. In doing so, the law explicitly exempts items of greater value.

The important aspect of Slovenian inheritance law are restrictions imposed by the Inheritance of Agricultural Holdings Act (hereinafter IAHA)[51], which regulates the inheritance of the protected farmlands. The aforementioned act is in relation to the IA *lexspecialis*. Conse-

[49] Article 12 of IA.

[50] Article 16 and 17 of IA.

[51] Inheritance of Agricultural Holdings Act (Official Gazette of RS, no. 70/95, 54/99 – dec. US and 30/13).

quently, the provisions on inheritance from the IA apply only when IAHA does not contain special provisions. Zupančič and Skubic[52] state that the term in the title of the act "agricultural holding" is taken from the previous Act and is, considering the content of the IAHA, completely superfluous, since the law only regulates protected farmlands.[53]

In accordance with IAHA a protected farmland must meet two conditions. The first condition is related to the ownership while the second to the size of the agricultural unit. The law stipulates that a protected farmland is an agricultural or agro-forestry economic unit owned by one person or by a married couple or persons living in a registered same-sex partner community, or in the co-ownership of one parent and child or the adoptee or his or her descendant. It must cover at least 5 hectares and not more than 100 hectares of comparable agricultural area. The basis for the comparison is 1 hectare of fields or gardens. Valuation for other areas, such as forests, orchards, vineyards and other similar areas, are specified in the Act.

A special characteristic of inheritance based on the IAHA is that only one heir can inherit a farm. Only in cases where the law explicitly provides, more heirs can inherit the protected farmland.[54] Furthermore, an heir to a protected farmland can only be a person who is according to the order of inheritance entitled to inherit wherein the IA rules on orders of succession applies.[55]

The IAHA separately deals with inheritance in cases where a protected farmland belongs to one person only and in cases where it is owned by several persons.

When the decedent is the sole owner of the farmland and there are more potential heirs, the IAHA stipulates that the heir of the farmland is the one who intends to work on the farmland and is chosen by other potential heirs unanimously. If they cannot agree on this matter, priority is given to the one who has already demonstrated the intention to work in a way that he or she has been trained or is still being trained in farming or forestry. If there are more such heirs, priority is given to those who have grown up on the farm and have contributed to the preservation or development of the farm through their work or earnings. Under the same conditions, the spouse's inheritance of the protected farm has priority if it competes with the deceased's off - springs. When persons who are or will be trained in agricultural activities

[52] ZUPANČIČ KAREL, ŽNIDARŠIČ SKUBIC VIKTORIJA, Dednopravo, 3rd edition, Ljubljana, Uradni list Republike Slovenije, 2009, p. 296.

[53] Article 1 of IAHA.

[54] Article 5 of IAHA.

[55] Article 6 of IAHA.

compete for inheritance with persons who are or will be trained in other activities, the latter are not considered as heirs to the farm. The law specifically regulates inheritance in the case when the protected farm largely or wholly derives from the spouse's previous spouse. If the decedent married again and at the same time has children with the new spouse, then offspring from the previous marriage have priority over the offspring and the spouse from the new marriage. In addition, the IAHA lays down two criteria that are appropriate when only one heir cannot be determined based on the rules presented above. The criteria are: proximity of relation and better qualification for farming, as well as the wishes of the surviving spouse.[56] Regarding the first criteria (i.e. proximity of relation), the legal theory points out that the same criteria derive also from the succession orders based on the IA and is therefore superfluous.[57]

On the other hand, when the decedent is not the sole owner of the protected farmland, since it belonged also to his surviving spouse (either as their joint property, or as separate property of one or the other, or they had joint ownership on the farm), the IAHA stipulates that the decedent's share belongs to the surviving spouse. [58] If both spouses die at the same time, the provisions of the Article 7 of IAHA, which determines the inheritance of a protected farmland owned by one person, shall apply.[59] In addition, the Act stipulates that if in one of the spouses has heirs who are not at the same time the heirs of the other spouse, these heirs are treated as if they were in the same relation to that other spouse. However, where the majority of the farmland belongs in the special property of one of the spouses, his relatives have priority in succession.

The law also regulates the situation when the protected farmland is in the co-ownership of one of the parents and the child or the adoptee or his or her descendant. In this case, the heir is the co-owner who outlived the descendant, if he or she has a legitimate inheritance right. Otherwise, the heir is determined on the basis of the Article 7 of the IAHA presented above.

Notwithstanding the provisions of the Article 7 of the IAHA, which defines the inheritance of the protected farmland, the takeover of a farm may be restricted in some cases. In accordance with the Article 11 of IAHA the inheritance can be restricted to a person who is, due to men-

[56] Article 7 of IAHA.

[57] ZUPANČIČ KAREL, ŽNIDARŠIČ SKUBIC VIKTORIJA, Dednopravo, 3rd edition, Ljubljana, Uradni list Republike Slovenije, 2009, p. 299.

[58] Article 8 of IAHA.

[59] See the previous paragraph.

tal illness, mental disorder or physical impairment, clearly incapable of permanently managing the protected farmland. Furthermore, the same applies if he or she has a tendency to waste money, alcoholism or drug abuse, which indicates that he or she will not be able to manage the protected farmland well. Article 11 provides the same consequence (i.e. exclusion of inheritance) for a person who has been absent for more than two years without informing of his or her new place of residence. Nevertheless, the IAHA stipulates that justifiable absence can be war or war captivity. It should be emphasized that the exclusion of an heir from taking over a protected farmland is possible only if there are more than one heir in the same inheritance order and at least one of them is not excluded. In addition, the heir who proposes the exclusion of the other, he or she must prove the existence of exclusionary reasons. Among the not excluded potential heirs, the heir of the protected farmland is the one who would be the heir if there had not been the excluded heir. In accordance with the Slovenian case law, it should be noted that in doing so, the court takes into account only reasons which prevent the heir from properly managing and supervising farm work. Merely physical inability is not a sufficient reason.[60] In accordance with the Article 12, the reason for excluding the potential heir from inheritance may also be his or her ownership of another protected farmland. In other words, to the extent that the hereditary beneficiary already owns one a protected farmland, other beneficiaries may request that he or she should be excluded from the inheritance of the particular protected farmland.

Forasmuch there is no one among the heirs who qualifies for the inheritance of the protected farmland, all heirs who are called to inheritance on the basis of the general lawful inheritance order may inherit. This is at the same time the only reason when a protected farm can be divided into physical parts.[61]

The spouse, the decedent's parents, the decedent's children, adoptees and their descendants, who do not inherit the protected farmland, inherit the monetary value of the necessary share under the general rules on inheritance. It should be emphasised that the persons entitled to the necessary share are entitled only if they are able to inherit by the general criteria determined in the IA. Into the necessary share of these heirs is, regardless of the testator's will, calculated everything that is otherwise calculated in the hereditary share according to the general rules on inheritance, which regulate the calculation of gifts and bequests in the hereditary share. Zupančič and Skubic point out

[60] Ljubljana Higher Court decision, VSL decision II Cp 1109/2000, 12th of September 2001.

[61] Article 13 of IAHA.

that IAHA uses the notion of a necessary share differently from IA. In the sense of the IA the necessary share is the part of the succession property that the testator cannot freely dispose of. Therefore, on the basis of IA, we only deal with the institute of a necessary share in the case of testamentary inheritance, but as soon as a succession occurs by law, the institute of a necessary share is not applicable. According to the IAHA, the role of the necessary share is however different. It represents a claim toward the heir who inherited the farmland. Therefore, we deal with the institute of a necessary share not only in the case of testamentary inheritance but also in case when inheritance proceeds as determined by law. Unlike the general regulation on inheritance, the IAHA also states that the heir is obliged to pay the shares in cash and therefore only exceptionally the land or other real estate and movable property may constitute a necessary share if it is at the same time not relevant for the economic activity of the protected farmland.

Additionally, the law allows the necessary share to be increased at the request of the heir whenever he or she does not have the necessary means of subsistence. It has to be stressed out that at the request of the heir of the farmland the necessary share can also be reduced if the heir's expenses of the protected farmland exceed the value of all necessary shares or if the economic ability of a protected farm would be jeopardized. Peculiarity of the IAHA regarding the necessary share is also the provision that the necessary share must be paid by the heir who inherited the protected farmland within the deadline set by the court, depending on the economic capacity of the protected farmland and the social situation of the heir. This time limit can be up to five years, and in exceptional cases up to ten years. [62]

A surviving spouse who has not inherited the farm and is at the same time not able to make a living with his or her property, may require that the heir of the farmland enables him or her means of subsistence for life.[63] Furthermore, the IAHA also allows a surviving spouse who did not inherit the farmland to obtain the right of usufruct on the protected farmland if certain conditions are met. [64]

If the spouse of the deceased contributed to the value of the protected farmland, IAHA stipulates that he or she may request exclusion of the value of the work or share equal to his or hers contributions. This share however cannot be granted in kind, except for the things that are not crucial for the farmland. The same rule applies to de-

[62] Article 15 of IAHA.

[63] Article 17 of IAHA.

[64] IAHA sets the conditions in the second, third and fourth paragraph of Article 17.

ceased's offspring. [65]It should be pointed out that the share is not always paid or allocated to the beneficiaries in kind.

The IAHA authorises the court to convert the right of a share into the right of subsistence for life, due to health, social and other reasons (e.g. the economic capacity of the farmland and similar)[66]. It can be done upon the request of the beneficiaries (the spouse and deceased's offspring who contributed to the farm's greater value), or upon the request of the heir, who inherited the farmland.

An heir who has acquired a farmland based on the IAHA cannot freely dispose of it. The law stipulates that an heir who disposes of an inherited protected farmland or a substantial part of it before the expiration of ten years after he or she has acquired the protected farmland and at the same time does not acquire another farmland, agricultural land or forest, or the assets acquired by it, or does not invest in a protected farmland no later than one year after the disposal, he or she must, at the request off all legal heirs, pay off or pay the difference, so that they are not deprived of the hereditary shares which they would receive under the general rules on inheritance. Similar applies for the heir who leases the inherited protected farmland or a substantial part of it or otherwise ceases to use it intentionally before the expiry of ten years. The law exempts emergencies, such as: serving in the army.[67] In the case of the sale or lease of a protected farmland or part of it, the co-heirs have the pre-emptive right.[68]

From the presented regulation, it can be concluded that the inheritance of protected farmlands has some peculiarities in comparison with the general inheritance under the IA. The reason for specific legislation is clear. It can be observed from the first article of the IAHA, which stipulates that the special regulation of inheritance of protected farmlands seeks to prevent fragmentation of farmlands and at the same time it intends to ensure that the heir can take over the farmland under conditions he or she can bear. According to the legislator, this creates opportunities for preserving and strengthening the economic, social and ecological function of protected farmlands. Despite the fact that the IAHA contains many mandatory rules, which limit the autonomy of the testator, it can be acknowledged that the testator's will is still not entirely irrelevant.

The testator can leave the protected farmland only to one heir. Additionally, according to the law the heir can only be a natural person. Exceptionally, the testator may leave the protected farmland to

[65] Article 20 of IAHA.

[66] Second paragraph of the Article 20 of IAHA.

[67] Article 19 of IAHA.

[68] *Ibidem.*

several heirs, namely when he or she leaves the farm: either to the spouses or to one parent and a child or to the adopted child or his or her descendant.

Nevertheless, in these cases the protected farmland should not be divided into physical parts. The testator may dedicate a legacy, which contains a part of a protected farmland, however it should not significantly affect the economic capacity of the protected farm. If the monetary and other legacies would put a heavy burden on the heir of the protected farmland, the court may reduce them at the request of the heir.

In case the testator disposes in a testament contrary to the mandatory legal restrictions, the law stipulates that succession is conducted directly by the law. Legal transactions *inter vivos* aimed at circumventing the IAHA mandatory provisions are void.

Similar restrictions on inheritance as stipulated by the IAHA are also provided by the Agricultural Communities Act (hereinafter ACA)[69]. As the IAHA, the ACA is in relation to the IA *lexspecialis*as well. Therefore, the provisions of the IA apply, unless the ACA provides otherwise.

The ACA provides that only one heir may inherit the property of a member of the agricultural community.[70] This restriction applies not only to intestate inheritance but to testate inheritance as well.[71] In the event that the testator has not made a testament, or has designated more than one heir in the testament, inheritance proceeds by law.

It stipulates that in the case of multiple heirs in the same inheritance order, priority is given to an heir who expresses interest in participating in the agricultural community and is chosen by mutual agreement by all heirs. If it is impossible to identified one heir based on the previous provision, the heir who has domicile in the municipality where the agrarian community is located inherits the farm.

If there are more heirs who meet these conditions, a relative from the local community where the agrarian community is located shall prevail. If it is still impossible to determine an heir, a nearer relative has priority over others. Under the same conditions, the heir chosen by the board of directors of the agrarian community shall prevail. If it is not possible to determine an heir by these rules, he or she is determined by the court, taking into account several factors.[72]

In case the legacy has no heirs, it becomes the property of the municipality where the agricultural community is located. Regarding necessary shares, the ACA stipulates that the value of the legacy on the

[69] Agricultural Communities Act (Official Gazette of RS, no. 74/15).

[70] Article 49 of ACA.

[71] Article 53 of ACA.

[72] Article 50 of ACA.

basis of which the necessary share is calculated shall be determined according to the criteria established by the government. The deadline for payment of the necessary share is determined by the court according to the economic capacity and social situation of the heir. In accordance with the second paragraph of Article 52 of the ACA, the deadline may not be less than one year and not longer than ten years.

3.2.1. Economic and social function of Slovene inheritance law

The basic function of the inheritance law is wealth transmission and redistribution system.[73] Wealth transmission and redistribution is important since determines, to a certain extent, the wealth of nations and the transmission can either be efficient or inefficient and can have long lasting effects on the economies. There are many answers to what kind of functions the inheritance law should have. According to de Wall[74] it provides the chief means in which the social order carries over time, it may serve as an incentive to produce creativity and hard work, it may motivate individuals to take care of their successors, can accommodate individuals to express themselves, it helps people be free from government intervention, it promotes the life of functioning of the assets in spite of death of the owners, it enables taking care of family even after death but also might incentives rent seeking in order to get the inheritance.[75] Therefore, inheritance rules serve either social or economic function. According to the social function, which treats family as important institution, the law should ensure that the basic needs of immediate family are taken care off. Usually this goal is achieved with mandatory rules, which require that testators cannot freely dispose of their wealth and that the circle of potential heirs is very small. The economic function of inheritance protects freedom of contracting and is important tool of transfer of wealth. Therefore, even though testators can dispose of their wealth as they see fit, there are certain mandatory rules that restrict their freedom and they have either an economic, or social function.[76]

The social function of the law on succession is based on the premise that family is a social unit that needs to be preserved and protected.

[73] De Waal, MJ. "The Social and Economic Foundations of the Law of Succession." Stellenbosch Law Review, vol. 8, no. 2, 1997, p. 162-175. HeinOnline.

[74] *Ibidem*.

[75] BUCHANAN, JAMES, M., 1983, Rent Seeking, Noncompensated transfers, and Law of Succession, Journal of Law and Economics, vol. XXVI, April 1983.

[76] For an excellent overview see: Lawrence M. Friedman, The Law of the Living, the Law of the Dead: Property, Succession, and Society, 1966 Wis. L. Rev. 340 (1966).

Therefore, the deceased cannot dispose with his whole wealth as he sees fit and there are therefore necessary shares and heirs, that the circle of heirs is small and there are certain other restrictions how the deceased can dispose of wealth. As per economic function of the law on succession, the deceased is free to dispose of his property as he sees fit and the principle is therefore, in words of Friedman: *"… necessary to economic system and is presupposed by it."*[77] Restrictions on the wealth transfer from generation to generation are frown upon.

Even though the testator is free to dispose of his wealth at the time of death according to Slovenian law, certain restrictions apply. If he/she does not dispose with his or her wealth in the manner prescribed by law, i.e. testament, then the law provides default rules as to who inherits the property after his/her death, which are next of kin. We can conclude that the law therefore follows the social function in this case since it assumes that the deceased would want to transfer his/her property to those that are closest to him or her. However, if the testator decides to determine the persons that would inherit his wealth, mandatory rules apply as to the form in which his or her wishes are expressed and as to who is a necessary heir.

One of mandatory rules prescribes the legal form in which the testator expresses his or her wish to distribute his or her property. Since it is important to follow the wished of the testator, it makes sense that the law provides mandatory rules that regulate in which form the will of the testator needs to be expressed. If it is not, then the will is declared void and the default rules apply as to the distribution of his/her property. However, even with respect to the how the testator wants to distribute his or her property after his or her death, mandatory rules apply. Following De Wall[78], we will overview provisions that have economic function and later on the ones that have social function.[79]

Economic function:

- Certain farms, in accordance to theInheritance of Agricultural Holdings Act can be inherited only by one heir so as to prevent the multiple and inefficient ownership of fertile land in Slovenia.

[77] *Ibidem.*

[78] De Waal, MJ. "The Social and Economic Foundations of the Law of Succession." Stellenbosch Law Review, vol. 8, no. 2, 1997, p. 162-175. HeinOnline.

[79] Even though taxes have an important influence on the type and size of the wealth transfers, it will not be a subject of this article. For an excellent overview see: Gale, Willim G, Hines Jr., James R. and J. Slemrod, ed., 2001, Rethinking Estate and Gift Taxation, Brookings Institution Press, Washington, D.C..

- The same applies to the shares of the testator in the farming cooperatives, which can be inherited, except in special circumstance, only by one person that is a heir in accordance with Inheritance law;
- Lex Commissoria is prohibited, one of the arguments being that it prevents dynastic arrangements, which distort the markets.[80]

Social function:

- Slovenian law in Article 25 of the IA prescribes necessary share, that belongs to the next of kin, usually to children and a spouse, and when they have no means to support themselves, even to parents and brothers and sisters of the deceased, despite the provision in the testators will to indicate otherwise. The necessary share can only be revoked if the heir is not worthy of inheritance for moral reasons.
- According to the Article 33 of the Inheritance law, all the people living in the same household as the testator, have the right to inherit household items, such as furniture, bedding, kitchen appliances and such. The testator cannot dispose of them in a different manner.

4. *Conclusion*

The article analyses the Slovenian divorce and inheritance law that applies to spouses. It can be acknowledged that the Slovenian civil law leaves relatively extensive leeway to the contractual parties in forming their property relations. To understand the contractual freedom between spouses, the institutes of prenuptial agreement and testament have been analysed from the legal and economic perspective. Despite the extensive freedom, which is granted to spouses by default rules, the analysis shows that the parties' autonomy is not entirely unlimited. The presence of mandatory rules, which confront parties' autonomy, can be observed in both analysed legal areas, namely in the area of family law and inheritance law. The limitation of the autonomy of will is evident in the field of inheritance law in particular. As it has been clarified, the decedent cannot entirely dispose of his or her property. There are several limitations, such as the institute of a necessary share, limitations related to disposition of protected farmlands according to the provisions of Inheritance of Agricultural Holdings Act, limitations that derive from the Agricultural Communities Act and several others that have been pointed out in the paper.

Therefore, it has been analysed in the paper what is the purpose of

[80] For an overview see: Lawrence M. Friedman, The Law of the Living, the Law of the Dead: Property, Succession, and Society, 1966 Wis. L. Rev. 340 (1966).

the mandatory rules and what justifies their presence in the area of civil law. As it follows from the presented cases, mandatory rules are especially present when a specific interest or objective is pursued by the state. According to economic theory, it can be concluded, that mandatory rules pursue either economic or social function. As it has been found out, this is the case also in Slovenia.

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CONFLICT RESOLUTION WITH EQUITATIVE ALGORITHMS: REFLECTIONS ON THE SUBJECT OF VOLUNTARY AND JUDICIAL DIVISION OF ASSETS IN THE ITALIAN LEGAL SYSTEM**

Abstract The essay analysis intends to carry out some reflections regarding the possible fields of application of the equitative algorithms in the field of private law and, specifically, to the institutions of the contractual and inheritance division. The main premise of the dividing phenomenon is "being in communion", where, with the term "communion", it is customary to identify the so-called ordinary communion, that is, which finds its discipline, where the title or the law does not provide otherwise, in the articles 1100 ss. Italian civil code and which includes the concrete cases where ownership or other real rights are shared by several people. Although the general principle is undoubtedly that of the faculty of dividing which existing communist right of empowerment, experience (in fact and in law) teaches, however, how: a) not everything can be considered susceptible of division; b) the satisfaction of the individual is almost never achieved. Hence the need to implement algorithmic tools at the service of citizens in order to create a "fair division".

1. *Indivisible goods and attribution criteria*

The traditional assumption of the divisive phenomenon is the "be-

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** This paper is part of the project, co-financed by the European Commission, CREA (Conflict Resolution with Equitative Algorithms) which aims to introduce new forms of access to justice, opting for a privatized method of dispute resolution, such as assistance to lawyers, negotiators, mediators and judges, to guide the parties to reach a fair agreement, applying algorithmic procedures - in much already studied from a mathematical and economic point of view (always keeping in mind, as far as possible, the theory of "Adjusted Winner procedures" by S. Brams and A. Taylor; on this point see M. DALL'AGLIO, *The Adjusted Winner procedure by S. Brams and A. Taylor*, in *http://people.unipmn.it/fragnelli/stud/GTAA/Campione_2a.pdf*.) and methods of artificial intelligence in the legal field (on the proposal of the use of neural networks in the legal field, see already F. ROMEO and M. GIACCIO, *Classification by Means of Neural Networks, New Classification Methods*, in *Forum Ware*,1993, 14-22; F. ROMEO, *Neural networks*, in *Keywords*, 34, 2005, 165-182), safeguarding minimum procedural guarantees.

ing in communion", where, with the term "communion", it is customary to identify the c.d. ordinary communion, that is the one that finds its discipline, if the title or the law does not provide otherwise, in the arts. 1100 ss. of Italian Civil Code (c.c.) and which includes the specific cases in which the property or other real right is shared by more than one person.

The construction of the division presents some peculiarities of a systematic order, which from now on must be brought to light. First of all, the division is not the only instrument capable of dissolving a communion, of eliminating, that is, a situation of co-ownership of (real) rights. Hence, the need to distinguish this institute from others who, while producing the effect of making the communion end, do not possess the characteristics of division.

In fact, while in relation to some hypotheses there are no hesitations in identifying cases of dissolution of the communion of a non-divisive nature (such as, for example, the abdicative renunciation of the right of one of the participants in the communion of two, the usury of the right by only one of the participants or a stranger, the separate sale of the shares to one of the participants, the loss of the common asset, the donation of the share, the purchase of the same for succession mortis due to joint heirs)[1], in relation to other hypotheses, many difficulties still remain.

The reference goes above all to the acts "equivalent to the division", which are also subject to termination due to injury (art. 764, co. 1 c.c.)[2] but which are not defined or identified by the law. The delimitation of the case of deeds other than the division, but equivalent to it, in fact, depends largely on the conceptual definition attributed to the division contract[3].

[1] A. LUMINOSO, *The division contract system*, in *Riv. dir. civ.*, 2009, 3 ss.

[2] On this point see A. MORA, *The division contract*, Milan, 1995, 380 ss. The aforementioned A. notes that "*as long as the division was qualified as an emptio-venditio, the extent of the injury was necessarily the same as the sale, an ultra dimidium lesion (...) is mainly due to Pothier, the merit of having definitively established the distinction between the sale and the division and the principle of equality in the division*", definitively indicating the extent of the injury beyond the fourth.

[3] As is known, to a narrow conception of division, called natural division (see G. DEIANA, *Concept and legal nature of the division contract*, in *Riv. dir. civ.*, 1939, 15 ss. which denies scientific relevance to the distinction between natural division and civil division, considering only the first as a true division. This illustrious A. is attributed the double merit of having, on the one hand, distinguished the contractual division from the exchange, which was often assimilated, and on the other, to have defined the division contract as a typical contract concerning the dissolution of the division

The interesting aspect concerns the final effect of the dissolution of the communion and the assignment of the proportional value of the quote. The proof of this is due to the fact that the legislator has also extended to other acts the remedy of withdrawal[4], typical of the division contract.

In this functional perspective, the possible qualification of the services arising from the division in terms of correspondence appears legitimate and justified, where the attribution to each of the partners of a proportional value of the quote is based on the essential interdependence between the assigned portions.

Basically, the correspondence is a guarantee and instrument to realize the proportionality between the value of the portion assigned with respect to the whole and in a measure consistent with the share held by the co-participant[5]. On this point a careful author, reflecting on the contractual division, has qualified the essence in terms of functionality to the realization of a proportional distribution among the co-participant[6]: it is therefore on the level of the real distributive intentions pursued by the partners that we must reason about the substantial qualification of the contractual division.

Secondly, the contract does not represent the only divisional technique, since, as known, the positive legal system provides for the judicial division in addition to the contractual (or friendly) division.

If the function of the distribution of goods and rights already under communion proves to be fulfilled by the individual negotiating event, the latter may well qualify as "divisional", even if the state of

through the attribution, to the participants, of values proportional to the shares), it is opposed, a wider one, called civil division (A. CICU, *The hereditary division*, Milan, 1947, 36 ss.; G. MIRABELLI, *Around the division contract*, in *Arch. giur.*, 1949, 7 ss.). Through the first, there is division in the cases in which the communion is dissolved, through the attribution of goods belonging exclusively to it, in proportion to the share of each shareholder. Otherwise, in the second hypothesis, in all those cases in which the communion is dissolved, the attributions of goods are made, which were not part of it; for example, by assigning all the assets to one or more parties, by giving the other cash adjustments proportional to the value of their share, or by selling assets that are difficult to divide by a third, proportionally allocating the proceeds to all the participants in the division.

[4] In the sense of effect of an actionable misrepresentation making the contract voidable and giving the innocent party the right to rescind the contract and/or claim damages.

[5] G. GAZZARA, voice *Division (private law)*, in *Enc. dir.*, XIII, Milan, 1964, 421.

[6] G. AMADIO, *Distribution function and distribution techniques in the division contract*, in *Division contract and party autonomy*, Milan, 2008, 31.

communion does not constitute a necessary temporal *prius* compared to the negotiating event and even if the technique of conveyance in concrete terms can be used as translational negotiating structures[7].

All this, however, would seem to require an enhancement of the finalistic perspective of the division act[8] since the attribution of the sole property of the single property (common and perhaps indivisible pursuant to artt. 720 and 722 c.c.), especially to the case of "involuntary" communions, to the occurrence of an inheritance event.

Thus, although the general principle is undoubtedly that of the faculty of dividing (an expression of the potestative right existing for each communist), experience (in fact and juridical) teaches, however, that: a) not everything can be considered susceptible to division; b) the actual satisfaction of the individual is almost never achieved.

The Principles on the subject consistently affirmed in jurisprudence are those according to which, in matters of judicial division, the non-comfortable divisibility of a building[9] by integrating an exception to the potestative right of each participant to the communion to obtain the goods in kind, it can be considered legitimately practicable only when the recurrence of its conditions, constituted by the impossibility of splitting the building, or its feasibility to punishment, is rigorously ascertained of considerable depreciation, or the impossibility of actually forming portions that are capable of autonomous and free enjoyment, not compromised by easement, excessive weight or limitations, taking into account the usual destination and the previous use of the asset itself[10].

The reasons for the affirmed non-divisibility of the property can be deduced, for example, from its small size, from the precarious struc-

[7] A. PISCHETOLA, *The division contract. Civil and tax profiles*, Milan, 2018, XII.

[8] On this specific point see G. AMADIO, *op. cit.*, 32 ss., which he says that now, both with reference to institutes known as the collation, and with reference to new legal institutions such as the family pact, one can argue in terms of possible "divisions without communion". See also v. S. DELLE MONACHE, *Necessary succession and system of protection of the legitimate person*, Milan, 2008, 185 ss.; Id., *Division and family contract*, in *Riv. dir. civ*., 2012, 767 ss.

[9] In jurisprudence, among many pronunciations, see Cass. civ., 10.1.2014, n. 407, in *Giur. it*., 2014, 1084 ss., with note of M. FRANCISETTI BROLIN, *Goods not easily divisible and attribution criteria*; Cass. civ., 27.10.2004, n. 20821, in *Fam. pers. succ.*, 2005, 505 ss., with note of A. MORA, *Property not easily divisible, allocation by drawing lots and attribution criteria*.

[10] In the case-law, see for a particular application of this orientation Trib. Modena, 3.7.2007, in *Fam. pers. succ.*, 2008, 133 ss., with note of M. PROTO,*Alienation, on the part of the coheirs, of quotas relating to specific goods "not easily divisible*".

ture of the first floor, from the very slight surface development of the two elevations, from the distribution of the rooms and from the placement of the building.

2. *The position of Italian jurisprudence*

On this point, a sentence of the Supreme Court that dates back to the end of 2015 is particularly interesting[11]: Section II of the Court of Cassation, with sentence n. 22663 of November 5, 2015, took a position on a long-standing question concerning the identification of the hypotheses in which the Judges of merit are allowed to exploit their "*prudent appreciation of the reasons of opportunity and convenience*" in order to justify an application of the art. 720 c.c. notwithstanding the ordinary solution[12].

Article 720 c.c., entitled "*Non-divisible buildings*", establishes that in cases where, following the opening of a succession, an immovable property is configured on an immovable property which the heirs request to be dissolved, the assignment of the same must take place in favor of the major shareholder, or of several co-heirs who jointly request it.

The aforementioned article provides for the assignment in favor of the individual holder of the largest quote, or in favor of several co-owners who jointly request the allocation. In this last case the goods, once the hereditary communion are dissolved through the division, will fall among the assignees in ordinary communion[13].

[11] Cass. civ., sez. II, 5.11.2015 n. 22663, in *Corr. giur.*, 2016, 1059 ss., with note of F. VENOSTA, *Properties not divisible, art. 720 c.c. and limits to the judge's discretion*.

[12] Very critical of this discretion is F. VENOSTA, *The division contract*, in *Tratt. dir. civ. Sacco*, Turin, 2014, 20 ss., according to which the derogability of the regulations applies to the parties, but in the judicial division "*the provisions of the civil code bind the judge. The parties demand that the judge perform the division, and the judge must make a division; that is, it must follow the procedure established by law and must adopt a final provision whose content corresponds to the legal concept of the division. In this regard, the relevance of the rules that are taken into consideration has no relevance ...; nor the circumstance that the norms rely largely on the judge's discretion, since the judge, exercising his own discretion correctly, nevertheless applies the rules*".

[13] A. BURDESE, *The hereditary division*, in *Tratt. dir. civ. it. Vassalli*, Turin, 1980, 159; A. CICU, *The hereditary division*, cit., 77; A. CIATTI, *The hereditary division*, in *Law of successions*, II, a cura di R. Calvo e G. Perlingieri, Naples, 2009, 1111, nt. 205. In jurisprudence, s. Cass. civ., 23.2.2007, n. 4224, in *Giust. civ.*, 2008, 2581 ss. according to which "*the dissolution of the hereditary communion is not incompatible with the continuation of a state of ordinary communion with respect to the single goods already*

It must be clarified, however, that the assignment of the asset that cannot be easily divided can be made by the judge only when an express request to that effect is made by the contractor[14], while, in the absence of such a voluntary element, the good must be sold[15].

Article 720 then establishes that in this case it is necessary to include in the portions "preferably" the whole thing, assigning it to the one among the participants who is entitled to the largest quote or in the portions of several co-heirs, provided that they have requested the joint assignment, and in this case, among these, a situation of ordinary communion on the thing itself will be established.

Otherwise you will have to proceed with the sale with the enchantment of the good. However, it is a question of determining when the building – but the same problem can also be posed for the furniture, the universality of furniture, the company or the intellectual and industrial property right[16], – can be considered not easily divisible: according to what the same *litteralegis* of the art. 720, similar assessment must be made not with reference to the divisional operation, but rather by looking at the single thing considered[17].

In fact, since the column we talk about "*non-divisible buildings*" while the statement speaks of "*properties that cannot be easily divided*". The aim is to indicate to the interpreter that the right to goods in nature and that (recessive with respect to the first) to the qualitative homogeneity of the portions (art. 727) stop where, to give them full implementation, it would be necessary to operate harmful or excessively onerous subdivisions of the goods included in the axis or to impose on them burdensome servitude or to attribute them so that they could not realize their just and full functionality, thereby diminishing irremediably in value[18].

included in the hereditary axis in division, so that the conjunctive attribution of hereditary goods does not give rise to the so-called excerpt from quote or a partial division".

[14] On this point see already G. DE STEFANO, *Matters regarding comfortable division*, in *Riv. dir. comm*., 1946, I, 241 ss.

[15] This provision provides for the sale only at a residual level of the auction sale (as opposed to the provisions of Article 988 of the Italian Civil Code of 1865), providing for assignment to one of the co-heirs to be preferable: and this solution attempts to reconcile the fundamental rule of the hereditary division (right to assets in kind, as it follows from art. 718 c.c.) with the peculiarity of certain assets to which, by virtue of their functional or material indivisibility, said rule cannot be fully applied. s. F. GIGLIOTTI, *Substantial profiles of the judicial division of hereditary properties not easily divisible*, in *Giust. civ.*, 1993, II, 522 ss.

[16] C. MIRAGLIA, *La divisione ereditaria*, Padua, 2006, 202.

[17] Cass. civ., 15.10.2010, n. 21319, in *Giust. civ*., 2010, I, 2430 ss.

[18] L. CARIOTA FERRARA, *Succession due to death. General part*, Naples, 1955, 754.

It is useful to specify that the judgment of comparison between the quotas is limited to the quotas of co-heirs who actually request the assignment, and does not extend to the quotas of those who do not ask; so that if the major quoter does not ask for the assignment, but they ask for one or the more minor listed, the judge must assign the asset to the greater of the requesting quotas. A possible different solution, which wanted to lean on a strictly literal interpretation of the norm, it would neglect the relative character of the concept of "major" or "minor" quote, and would contrast with the need to make the application of the rule as close as possible to the principle of division in nature, which would be totally and unjustifiably pretended if the good was sold at auction even in the presence of some assignment request.

The criterion of the maximum possible compatibility with the division in nature also helps to solve another problem, on which on the other hand there is a wide uniformity of views: that of the treatment of the situation which sees, in the same hereditary axis, the presence of more indivisible goods, but not in sufficient numbers to ensure a more or less balanced distribution in all the quotas.

To literally apply the art. 720 it could also to think that every indivisible good must be assigned to the greatest quote, as long as it requests it. Systematic interpretation, in harmony with principles, however, allows this to happen only if he is the only one who has applied for assignment; if the applicants are more than one, instead, it is assigned first the most important asset to the major shareholder, and then the other assets to the holders of the quotas gradually minor entity, in order to obtain a distribution that allows everyone, as far as possible and according to the mechanism of the art. 720 adapted to the circumstances, to receive part of the inheritance in kind[19].

The case in question concerned the division of a building not easily divisible into joint ownership by five siblings. In the course of the proceedings one of the participants (the plaintiff) bought the shares of two of them, and as the holder, to such an extent, of the largest share, asks for the assignment of the entire asset pursuant to art. 720 c.c.

The same application was made, jointly, also by the other two survivors, on the assumption that they managed together a restaurant allocated in the building and that the assignment to the major quoter would have jeopardized the continuity of the company, in which a reason to justify the exception to the legal criterion of the greater quote.

The Court of Appeal accepted the request of the plaintiff, "*not recognizing the possibility of resorting to another alternative award criterion*"; the Supreme Court, on the other hand, annulled this sentence with a

[19] F. VENOSTA, *op. cit.*, 32.

postponement, considering that the Territorial Court had erred in believing that the individual economic interest of any of the participants did not justify the departure from the legal criterion, and consequently had not adequately assessed the consistency of the interest in continuing, in the property subject to division, the management of the restaurant.

The Supreme Court, after expressing its intention to follow the most recent orientation, clarified that in the channel of the c.d. "serious reasons" may also legitimately include the economic and individual interests of the applicants and affirmed a new principle concerning the value of commercial activities. Indeed, in the Court's decision an interpretation of the art. 720 c.c. in evolutionary terms, aimed at meeting the needs of the current economic environment.

In particular, the Supreme Court highlighted that in a historical moment in which there are many companies that found themselves forced to cease their activity, the interest in business continuity has now become part of the priorities rooted in the sensitivity of the associates[20].

In this case, the Court therefore verified that the minority shareholders were managers of bar/restaurant activities in the premises subject to hereditary communion and that this business boasted real and quantifiable goodwill; moreover, it has enhanced what was revealed by the applicants, or that the loss of the premises could have been followed by the impossibility of continuing the economic activity and, certainly, the loss of goodwill.

The performance of a commercial economic activity that guarantees an income as well as the owners of the same, also to the subjects employed in it must, according to the Supreme Court, be qualified as a relevant reason, suitable to legitimize a solution derogating from the criterion of "*preferential assignment to the shareholder holder of the largest share*".

It is known that, also in matters of division, Italian judges tend to reserve a very wide discretion in the application of legal criteria[21], with the sole limitation of adequate motivation.

[20] This reasoning, moreover, would seem to follow in the wake of what was theorized by N. LIPARI, *The civil law between law and judgment*, Milan, 2017, 47 ss., concerning "interpretative communities" and in relation to the relationship that should exist between doctrine and jurisprudence, recalling the American philosopher Stanley Fish and his theory: S. FISH, *Is there a text in this class? The authority of interpretive communities*, Harvard, 1980.

[21] On the evolution of the role of the judge see MAR. NUZZO, *The problem of the predictability of decisions: juridical calculation according to precedents*, in *Legal calculability*, edited by A. Carleo, Bononia, 2017, 142, in whose opinion the task of the judge who, from a functional point of view, carries out the comparative evaluation of the interests at stake in order to establish which of them is in practice worthy of protec-

On the contrary, the prevailing doctrine proposes a restrictive orientation that reaches the sign of

excluding any discretion of the judge, who should strictly follow the preference criteria indicated by the law.

The sentence in question is inserted in the jurisprudential vein that recognizes the discretionary power of the judge to the widest extent, also referring to the hypotheses in which there exists an individual economic interest of any of the participants, and not only a "common" interest, that is referable to the whole of the sharing. It may be an internal interest in the divisional procedure, as it happens when the judges derogate from the legal criterion in the name of what they call the "common interest" of the participants, provided that it is of such a nature and consistency to prevail on the general principle of division in nature.

If, on the other hand, it is an interest extraneous to the divisional procedure, and therefore individual, the burden of motivation on its pre-eminent character should be considered particularly stringent, and, it is repeated, necessarily linked to recognizable normative directives. For example, it is difficult to challenge the pre-eminence of interests, not otherwise protectable, which relate to fundamental human needs, such as housing, especially when there are children involved.

A fortiori, if the legislator intended to avoid splitting up the asset in all cases where the operation is prejudicial to the public economy, it certainly cannot be assumed that he himself, in attributing the asset to a shareholder instead of an other, allow the possibility that the same harm that is proposed to avoid introducing the art. 720 c.c.

However it is perhaps appropriate to specify, in general, that any evaluation in this field is intrinsically comparative, when there is a choice between more conflicting interests; and that comparison should also take into account the dimensional relationship between the quotas of which the different applicants respectively hold: it can happen, in fact, that an interest in pre-eminent abstract must cede, if the bearer holds a share of far less than that of the major quoter; and that, on the other hand, a not particularly relevant interest should nevertheless prevail if the odds of the contenders are almost identical.

tion, "*also becomes that of identifying the protection techniques appropriate to the effective implementation of the protected interest, choosing the most efficient remedy for this purpose that he is authorized to select from within the entire conceptual toolbox of substantive law, based on assessments that affect the adequacy, proportionality and reasonableness of the remedy*". From the judge's point of view, see the interesting notations on the role of the judge and on the "living law" by L. NAZZICONE, *The ethics of the judge and legal certainty.Desecretoconflictucurarummearum*, in *Giustiziacivile.com*, 2018.

The sentence, therefore, makes it possible to raise the economic interest, understood as an interest in maintaining a business in life, a "serious reason, suitable to justify" the application of the art. 720 c.c. notwithstanding the general assignment criterion.

The system of equitable algorithms that underlie this proposal could integrate within it the transposition of the concept of "economic interest" in order to guarantee the best possible satisfaction for the parties, also envisaging the possibility that, during the division, the parties themselves prefer a cash balance.

3. *Mandatory rules in the hereditary division system*

A second issue to be addressed is the identification of the mandatory and therefore available rights provided for in our legal system. The mandatory rules are essentially those designed to protect the interests of creditors and the successors' rights of individual heirs.

A situation of hereditary communion is realized when the inheritance is devolved to those who are called, who expressly or tacitly accept it, or in any case acquire it by law. In order for the hereditary communion to come into existence, it is necessary, as is known, that the division of the individual things forming part of the hereditary compendium has not already been effected by the testator with the specific attribution of the assets to each of the heirs: if then in the will the *de cuius* has specifically attributed certain assets to some of the heirs, leaving other things undivided, the hereditary communion will have as its object only these latter goods.

It is a known and shared fact that the co-ownership of rights represents a source of disagreements between the partners[22], widely justifying the legislator's disfavor for the permanence, or temporal extension, of the right to joint rights. Indeed, one of the structural features of the institution of communion consists in its natural tendency towards dissolution[23]; this tendency is favored by the legislator who, following the rule of Roman law according to which "*in communione nemo compellitur invitus detineri*", established, in the context of communions characterized by the attribution of rights to several subjects for quotas[24],

[22] G. BONILINI, voice *Division*, in *Digesto civ.*, VI, 1990, Turin, 482.

[23] The favor of the order for the contextual and integral dissolution of the hereditary communion must be considered implicitly codified in the art. 727 c.c. and in the art. 713 c.c. (G. AZZARITI, *The division contract*, in *Treaty of private law*, directed by P. Rescigno, 2ª ed., VI, 2, Turin, 1997, 393 ss.).

[24] S. MARTUCCELLI, *Situations of fact and co-ownership of the law. Compound studies*, Milan, 2000, 58-59.

art. 1111 c.c. that each of the participants can always ask for the dissolution of the communion[25].

It must, however, be observed that the discipline of the dissolution of any community of rights can only derive from the complex of provisions scattered in the civil code. The synoptic framework of the rules dictated in terms of division, therefore, must record the presence of rules common to the ordinary division and to the hereditary one, or, in reverse, specifically applicable to the hereditary division only.

The hereditary division in Italy is regulated by the art. 713 to the art. 768 *octies* of the civil code.

As for the group of rules for the protection of individual heirs, the provisions on the right to request division are imperative (articles 713-717); on the methods with which to concretely implement the division (articles 718-731) and in particular on the formation of the portions pursuant to arts. 727-728 and 729 c.c.; the rules on "collation" (articles 737-751 of the civil code), which require the heirs to give the hereditary donations received from the deceased; those on the right of first refusal in the alienation of the share pursuant to art. 732 c.c. and on the guarantee between joint heirs (articles 758-759 of the civil code).

As for the laws protecting the interests of creditors, the provisions governing the distribution of the hereditary debts among the heirs are imperative (articles 752-756 of the civil code).

To create a "Common European Reference Framework" concerning available rights, it would be essential to consider, first of all, the rule that provides for the faculty to demand the division, with the limits imposed by the testator (art. 713 c.c.) or by law for the case of minor and unborn children (art. 715 c.c.). Equally useful is the regulation on collation, which describes the cases in which it is obligatory to give the inheritance of the donations received and the cases in which the collation is not due (art. 738 cc: donations of modest value made to the spouse; art. 741 c.c.: assignments due to marriage or to start a professional activity etc.). Finally, it would be appropriate to consider art. 727 c.c. dedicated to the criteria for portion formation.

The system of equitative algorithms should be careful, for example, to ensure compliance with the art. 737 of the civil code, which provides for the obligation for the children and their descendants, and for the spouse to confer on the hereditary mass all that they have received in donation from the deceased (c.d. collation), unless this has dispensed them.

[25] G. BRANCA, *Communion in the buildings*, in *Comm. Scialoja-Branca*, *sub* artt. 1100-1139, Bononia-Rome, 1982, 271 ss.; P. GRECO, *The property*, in *Comm. cod. civ.*, III, 3, Turin, 1968, 120 ss.; A. PALAZZO, voice *Communion*, in *Digesto civ.*, III, Turin, 1988, 180 ss.

Therefore the choice was between an "egalitarian allocation" or a "competitive balance".

If a child has received a donation house, that donation is considered as a sort of anticipation of the inheritance quote. On the death of the donor father, the child will be required to give the hereditary good in kind; alternatively, the value of the house may be attributed to its share, so that when the portions are formed, he will receive inheritance assets for a value equal to the amount due to him less the value of the donated house.

In the absence of a will, by virtue of the succession *ex lege* the spouse is entitled to half the inheritance if he is competing with a child, a third party if he is competing with more than one child (art. 581 c.c.).

In the absence of children, the spouse who competes with ascendants and/or brothers and sisters of the deceased, is entitled to two thirds of the inheritance (art. 582 c.c.)[26]. In the absence of children, ascendants, brothers and sisters, the entire inheritance is assigned to the spouse (art. 583 c.c.). To the spouse (but today also to the surviving part of the civil union[27]) however, as is well known, the right to housing and use of the family home pertaining to art. 540 c.c.[28].

[26] The vocation of the spouse is not excluded from that of any other successor. Following the subsidiary reform, implemented with l. 10.12.2012, n. 219 e con il d. lgs. 28.12.2013, n. 154, which introduced, in the legal order, the principle of the uniqueness of the status of a child (C.M. BIANCA, *Italian law knows only children*, in *Riv. dir. civ.*, 2013, 1 ss.; most recently, A. GORASSINI, *A new juridical phoneme: son. The unique status of child in the time of the eclipse of civil law*, in *Europa dir. priv.*, 2018, 385 ss.), the relationship arises both if the parentage took place within the marriage, and in the event that it took place outside of it, and in the case in which the child is adopted, with the exception of the adopters greater than the age (art. 74). Therefore the relationship of kinship today is independent from the origin of the relationship of filiation. In identifying the subjects participating in the contest with the spouse, the new scope of the concept of kinship must be taken into account.

[27] G. BONILINI, *The succession mortis causa of the surviving part of the civil union*, in *Treaty of family law*, directed by G. Bonilini, V, *Civil union and cohabitation*, Turin, 2017, 476 ss.

[28] On the right to housing and the right to use the furniture provided for by art. 540, co. 2, c.c., see R. CALVO, *The successor rights of the spouse*, in *Law of succession and donations*, I, edited by R. Calvo and G. Perlingieri, Naples, 2013, 633 ss.; C. COPPOLA, *The rights of housing and use due under the law*, in *Treaty of family law*, I, *Family and marriage*, directed by G. Bonilini, Turin, 2016, 983 ss.; G.F. BASINI, *The successor rights of the separated spouse*, in *Treaty of family law*, III, *Family and marriage*, directed by G. Bonilini, Turin, 2016, 2274 ss.; M.G. FALZONECALVISI, *The right of resi-*

Article 720 c.c. provides that the buildings, present in the inheritance, not easily divisible, or whose division would prejudice the public economy or hygiene, must be entirely assigned to a single heir. Article 722 of the code also applies the same provision to the buildings that the law declares to be indivisible in the interest of national production.

The rule governs the hypothesis of the non-divisibility of immovable property and constitutes an exception to the general principle set by art. 718 c.c.[29].

For easy divisibility, we must understand the possibility of splitting the asset into as many quotas as there are co-heirs[30], and in particular when, in relation to the structure of the asset, it is possible to form a number of homogeneous quotas equal to that of the partners and not when the possible homogeneous quotas are lower than them[31]; it is also necessary that any division does not adversely affect the original economic destination of the asset.

There must be regard to the number of the quotas that are due to the original called that they have accepted, without having to point out the fact that one of the sharing parties was succeeded at the time of the division by a plurality of subjects, finding the relative recognition right only subsequently with regard to the further division of the share due to their lender.

By envisaging the hypothesis in which the property is not divisible or not easily divisible, the art. 720 differs from art. 729, which on the contrary governs the division of the divisible buildings, with the con-

dence of the surviving spouse, Naples, 1993; L. Mengoni, *Legitimate successions*, *Art. 565-586*, in *Comm. Scialoja-Branca*, *subart. 584*, Rome, 1985, 99 ss.; A. MIRONE, *The successors rights of the spouse*, Naples, 1984, 110 ss.; C. TRINCHILLO, *The succession treatment of the surviving spouse in the discipline dictated by the new family law*, in *Studies in honor of Guido Capozzi*, Milan, 1992, I, 2, 1214 ss.; G. VICARI, *The housing and use rights reserved for the surviving spouse*, in *Dir. fam. pers*., 1978, 1314 ss.; L. MEZZANOTTE, *The anomalous succession of the spouse*, Naples, 1989, 43 ss.; A. RAVAZZONI, *The rights of housing and use in favor of the surviving spouse*, in *Dir. fam. pers*., 1978, 222 ss.

[29] Which states that each participant has the right to a portion in kind of goods in communion. This right does not consist in the realization of a fractioning of the individual entities belonging to the same category, but in the proportional division of the assets included in the three categories of furniture, buildings and credits (in jurisprudence v. Cass. civ., 20.2.1992, n. 2086, in *Riv. not*., 1993, 120 ss., with note of P. GHIGLIERI, *Right to assets in nature and invisibility of the same*).

[30] Cass. civ., 20.1.1986, n. 364, in *Riv. not*., 1986, 532.

[31] Cass. civ., 3.5.1996, n. 4111, in *Pluris*.

sequence that for the hypothesis envisaged by art. 720, it will not be possible to apply the criterion of the draw, and likewise the possibility of a split in kind of the good will remain extraneous, while the auction sale remains a residual remedy to be used when none of the participants wants to take advantage of the faculty of attribution of the entire[32].

Moreover, the improvements made by one of the participants, to the non-divisible good, are part, for the principle of accession, to the good itself, with the consequence that of them, must be taken into account for the purposes of estimating the asset[33]; on the other hand, in the case in which each of the participants has been assigned separate apartments, such as portions of a single building, which has subsequently been the subject of construction works carried out respectively by each of the participants, the principle of accession is to exclude the existence of right to the compensation for the improvements, of which the individual shareholder, who sustained the expense, has benefited, assigning the asset interested in the improvements themselves.

An example of Italian law that considers goods indivisible as a result of transfers due to death, or between the living, in the interest of national production, is contained in l. 3.6.1940, n. 1078 (art. 1) which prohibits the division, for the duration of thirty years, of the farm units established in reclamation areas by colonization bodies or by reclamation consortia and assigned in ownership to direct farmers. Other examples are contained in l. 14.8.1971, n. 817 (art. 11) which establishes a constraint of indivisibility for fifteen years of the funds acquired with the credit facilities granted by the State for the formation or expansion of the farmer property; and in l. 22.4.1941, n. 633 (art. 115), on the subject of intellectual works, which provides that the right to use the

[32] So Cass. civ., 27.10.2000, n. 14165, in *Rep. Giur. it*., *Division*, 2000, n. 27. In the jurisprudence of merit v. Court of Treviso, 21.3.2009, in *Pluris*. In doctrine, among others, see G. AMADIO, *The division - General provisions*, in *Succession and donations*, I, edited by G. Amadio - F.M. D'Ettore - M. Ermini - M. Jeva - S.T. Masucci - E. Moscati, in *Succession, donations, assets*, II, in *Civil Law*, directed by N. Lipari and P. Rescigno and coordinated by A. Zoppini, Milan, 2009, 272; choice considered more practical as "*the division with a draw would require the formation of a greater quantity of equal portions to be assigned to the participants in such numbers as to equalize the unequal values of the respective quotas*" (A. MORA, *The judicial division*, in *Communion and division hereditary*, IV, in *Treaty of law of successions and donations*, directed by G. Bonilini, Milan, 2009, 286); *contra* P. FORCHIELLI e F. ANGELONI, *From the division*, in *Comm. Scialoja-Branca*, Bononia-Rome, 2000, 154 ss., according to which the draw should be carried out.

[33] Cass. civ., 2.2.1999, n, 857, in *Foro it.*, I, 2000, 939 ss.; see also App. Genova, 1.8.2005, in *Pluris*.

work must remain undivided among the heirs for three years from the author's death.

4. *Looking for a "fair & satisfactory division"*

Hence the need to use algorithmic tools, appropriately configured and in the necessary respect of the mandatory rules, at the service of the citizen to create a "fair & satisfactory division".

Furthermore, an algorithm that allows the parties to express their opinion on the preference of certain goods over others and how this can affect the functioning of the algorithm itself. Algorithmic automation can concern, in fact, both the execution phase and the contract formation in the strict sense: the reference goes to the c.d. smart contracts, which are not contracts (in a legal sense), but computer programs that allow operations to be performed[34].

Smart contracts, although not contracts in the legal sense, can integrate acts of the contractual event, "*where the algorithms that integrate them are programmed to carry out acts that constitute phases (or exhaust) the conclusion or execution of a contract*"[35].

The examples show that the problem of smart contracts is, first and foremost all, terminology. They are not contracts, but automatic execution methods of the contract.

[34] In foreign literatured, see M. RASKIN, *The Law of Smart Contracts*, available at the site*http://ssrn.com*. Among the Italian authors s. D. DI SABATO, *Smart contracts: robot that manage contractual risk*, in *Contr. impr.*, 2017, 378 ss.; P. CUCCURU, *Blockchain and automation.Reflections on smart contracts*, in *Nuova giur. civ. comm.*, 2017, 107 ss.; G. FINOCCHIARO, *The contract in the age of artificial intelligence*, in *Riv. trim. dir. proc. civ.*, 2018, 441 ss.;F. DI CIOMMO, *Smart Contract and (not) law. The case of financial markets*, in *Nuovo dir. civ.*, 2019, 122 ss.

[35] I.A. CAGGIANO, *The contract in the digital world*, in *The Third Millennium Contract. In dialogue with Guido Alpa*, edited by L. Gatt, Naples, Naples, 2018, 62-63, which adds that "*It is thus possible that a smart contract or more smart contracts is / are planned to / in such a way as to identify when the requests of two or more parties coincide (for the purpose of concluding a contract, for example); or, to transfer a specific digital asset (or its representation) to the occurrence of a given condition, having intercepted another algorithm which is programmed (for example for payment) upon the occurrence of the same condition. For example, a protocol can be instructed in order to sell/buy a certain type of asset (eg shareholdings) once the price reaches a certain threshold or further conditions are met (according to the IT-ITEN computer sequence). It is also possible that a smart contract plays a role only in the contract execution phase, providing online payment once the good is delivered to the buyer, or in terms of duration*".

In an environment healthy technology (neutral), that is, protected from conditioning misleading outsiders, the risk that the predetermined route within which the operation must take place is diverted - for example, the risk of possible default - is contained within limits very low because robots, as mentioned, will hold (or should) comply o orders received[36], so under conditions pre-set will perform the service, or in any case will carry out the effects desired by the rules according to which one's own are set algorithms.

Furthermore, the algorithm is generally programmed to handle each contingency (and for this reason we speak of "smart contract"[37]) and therefore to minimize, *rectius* tendentially (or hopefully) to eliminate, the possibility that following the new facts the parties may disagree or in any case be unforeseeable the balance of the relationship.

Finally, it goes without saying that the conduct of the economic operation through the algorithm allows to greatly reduce time and costs of each transaction.

Another interesting topic that I would like to raise and not to dwell on here concerns the possible malfunctioning of the algorithm (which obviously does not depend on a strictly technical cause)[38].

It would seem, in first analysis, the malfunctioning of the algorithm, even if prepared by a third party with respect to the parties, it could therefore be placed on the assessment plans of the breach or the fortuitous case but always remembering that there may be cases in which the debtor is not in default, even if the unforeseeable case has not occurred or in cases where the occurrence of the fortuitous does not imply in itself, necessarily and automatically, the exoneration of the debtor[39].

The position of the author is sufficiently outlined and clear with reference to the assessment of risk in the business activity, where the economic organization ensures that the responsibility is always connected with an assessment based on guilt[40].

[36] E. FINN, *What Algoritms Want. Imaginagion in the Age of Computing*, Boston, 2017.

[37] For a critical reflection on the possibility of fully defining the phenomenon, s. E. MIK, *Smart Contracts: Terminology, technical limitations and real world complexity*, in *Law, Innovation and Technology*, 2017, pp. 269 ss.; M. RASKIN, *The law and legality of smart contracts*, in *Georgetown law tech review*, 2017, pp. 305 ss.; C. TUR FAÙNDEZ, *Smart contracts. Análisis jurídico*, Madrid, 2018; A.J. KOLBER, *Not-so-smart blockchain contracts and artificial responsability*, in *Stanford technology law review*, 2018, 198 ss.

[38] On which more fully A.M. GAMBINO, *The seven deadly sins of robot-judges (between blockchain and AI)*, in *Dimt*, 13.12.2018.

[39] G. ALPA, *The contract in general. Sources, theories, methods*, I, Milan, 2014, 529 ss.

[40]In the literature related to the economic analysis of law, the reference goes to R. POSNER, *Economic Analysis of Law*, Boston-Toronto, 1973, 15 ss.

The order of evaluations carried out in general on the problem of risk gives some indications on the solutions relating to the problem which, with regard to automated contracts, has been set: also in the face of the different experiential data (the operation of an instrument whose functioning whose choices may not be foreseeable by the user) and the relative novelty of the same, an approach that adheres to the reading of living law[41], determines its imputability to the contractual party or to the contractual parties, in accordance with the negotiated borders or those proper to the chosen contractual type.

In this way, the computer program that operates in the contract (technological tool) is considered a means, with attribution of the acts and activities determined by the algorithm to the parties that benefit from it based on the contractual provisions. In doctrine, however, it is believed that there is a further level of reading of the experiential data, which could lead to a different interpretation of the phenomenon: "*it, however, in the current state comes out of the meshes of the positive datum – and of its current interpretation – and therefore it differs from methodological positivism which is proper to legal realism in its usual sense. In other words, it is a de iure condendo perspective*"[42].

This perspective can lead to distinguishing based on the degree of autonomy of the agent (algorithm): that is, whether to consider algorithms if they are mere tools or if they are equipped with ability to learn and decide. The approach that the EU is pursuing in this regard, devoting specific attention and interventions on robotics, would seem to be precisely the latter, with possible imputation of activity to the algorithm itself of the activities put in place and responsibility for any negative consequences.

This perspective was adopted by the Resolution of the European Parliament of 16 February 2017 on "*Recommendations to the Commission concerning rules of civil law on robotics*", which not only poses a problem of recognition of the electronic personality for autonomous and decision-making robots (§ 59, letter f) but also of contractual liability of the machines, given that "*the deficiencies of the current regulatory framework also with regard to contractual liability, since the machines designed to choose their counterparts, negotiate contractual terms, conclude contracts and decide whether or that is, implementing them makes the traditional rules inapplicable*" (cons. AG).

On this point with an almost equal approach see also the recent

[41] Which, as a careful Professor says, "*has space even where the current law speaks. But it has a great deal where it is silent*" (thus A. GENTILI, *Private Autonomy and Verification Power*, in *Riv. dir. civ*., 2017, 1367).

[42] I.A. CAGGIANO, *The contract in the digital world*, cit., 72.

Resolution of the European Parliament of 12 February 2019 "Report *on a comprehensive European industrial policy on artificial intelligence and robotics*"[43].

The setting in the identification of the discipline to adopt implies a fundamental choice between the possibility of consider the robot as an advanced technological tool, but still always a means for carrying out the activity that must in any case be brought back to the man who takes advantage of it and responds to it and the science fiction eventuality – but not so much – of enhancing the capacity of the robots to make choices and therefore be responsible for the activity accomplished.

Obviously the question is full of philosophical and legal implications[44].

European Parliament notes that the technological progress of the last decade, allowed robots to develop certain autonomous and cognitive characteristics - for example the ability to learn from experience and make almost independent decisions. Autonomy of a robot can be defined as the ability to make decisions and to implement them in the external world, independently of a control or an external influence[45]. And "*the more robots are autonomous, the less they can be considered as mere instruments in the hands of other actors*"[46]. These characteristics obviously determine the need to reflect first on the suitability of the ordinary rules on liability and on the opportunity to create a new category with specific features and own implications.

In addition to risks, the possibilities offered by evolution must not be lost sight of technology in the legal field. The application of algorithms to forms of e-justice to define small disputes (so-called small claims) could be the answer to the problem of the withdrawal of juris-

[43] Available on *www.eur–lex.europa.eu*.

[44] Among others s. M. LUCIANI, *The robotic judicial decision*, in *Nuovo dir. civ.*, 2018, 1 ss.; G. RESTA, *Govern Technological innovation: algorithmic decisions, digital rights and principle of equality*, in *Pol. dir.*, 2019, 199 ss.

[45] G. TEUBNER, *Digital legal entities? On the private status of autonomous software agents*, edited by P. Femia, Naples, 2019, 72 ss., believes that the algorithms operate as digital representatives of human subjects, according to a reconstruction based on "a prudent analogy" with the rules on representation. The author refers to B. Latour's definition of "actants", functional to distinguish the acting ability of software agents from the acting ability of human beings (B. Latour, *No innovation without representation! A parliament of things for new socio-scientific experiments*, in *Know, do, power*, edited by M. Bucchi, SoveriaMannelli, 2006, 67 ss.

[46] Resolution of the European Parliament of 16.2.2017 on "*Recommendations to the Commission concerning rules of civil law on robotics*".

diction compared with the need to protect the weak parts of a contractual relationship. A jurisdiction that is eroding in terms of effectiveness[47]. The correct functioning of the equitative algorithms is left to the concrete application: in this context it is essential to develop a new culture of operators as well as citizens.

The above considerations underlie a reflection even more, which cannot be addressed as obvious here, on the future role of law (and, in particular, of private law[48]) also in relation to the technique[49].

It is, as is evident, a topic that is undoubtedly fascinating and worthy of further study, within a path that at the moment still seems full of dogmatic and non-dogmatic obstacles.

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[47] Believes that the principle of effectiveness "*has become a canon of measurement of legality*", P. GROSSI, *A commitment for today's jurist: rethinking the sources of law*, Naples, 2008, 67. On this point see also N. IRTI, *Legal meaning of effectiveness*, Naples, 2009, *passim*.

[48] On the crisis of private law before technological evolution, see C. PERLINGIERI and L. RUGGERI (edited by), *Internet and private law*, Naples, 2015; F. DI CIOMMO, *Internet and the crisis of private law: globalization, dematerialization and virtual anonymity*, in *Riv. crit. dir. priv.*, 2003, 11 ss.

[49] On this point see already the dialogue between Natalino Irti and Emanuele Severino, condensed in N. IRTI and E. SEVERINO, *Dialogue on law and technique*, Rome-Bari, 2001.

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