DISRUPTIVE TECHNOLOGIES AND THE RULE OF LAW: AUTOPOIESIS ON AN INTERCONNECTED SOCIETY

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Abstract: Disruptive technologies are expanding and information flow increasing. Due to the new technologies, we are facing unavoidable new challenges and ongoing changes. However, the law as the meta-technology crucial for the fourth revolution still thrives on an algorithmic and data-driven world. The law adjusts itself to the new realities, framing the ought to be's of society, being reshaped by progressive developments. As such a mirror held up against life, it now reflects an interconnected, cosmopolitan, and global world. As a result, following the wishes and needs of markets and societies per se, corporations, private parties, universities, and even governments and natural persons are in a constant process of global legal rules creation. A process similar to the Lex mercatoria, able to effectively frame the fast-paced advances, as an autopoietic legal process - now driven by nontraditional players. A variety of technologies and processes are getting incorporated into the law - such as dispute resolution over algorithms, simplified international contracts, social “quasi-legal” sanctions widely spread by social media, protection of intellectual property, through and especially by the use of machine learning, AI and autonomous technologies - growing in importance and being materialized in previously inconceivable ways. Binding and self-enforceable, the reshaped rule of law follows society's expectations, framing autonomous technologies and artificial intelligence, yet being framed by those, ensuring our rights globally, in an effective but innovative way.

Keywords: disruptive technologies; rule of law; autopoiesis.

INTRODUCTION

Powell’s radio voice was tense in Donovan's car: "Now, look, let's start with the three fundamental Rules of Robotics - the three rules that are built most deeply into a robot's positronic brain." In the darkness, his gloved fingers ticked off each point.
"We have: One, a robot may not injure a human being, or, through inaction, allow a human being to come to harm."
"Right!"
"Two," continued Powell, "a robot must obey the orders given it by human beings except where such orders would conflict with the First

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Law."
"Right!"
"And three, a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws."
"Right! Now, where are we?"

Byerley has been once more appointed World Coordinator and expresses concerns over anti-Machine movements, asking Calvin’s support for an anti-machine movement witch-hunt (request denied). Machines henceforth are free to interpret the first rule based on its belief to be on humanity’s best interest.¹

---ISAAC ASIMOV

Ultimately, the decision of creating a new law comes up, based on interpretations of the previous laws, even surpassing the ground rule. I wouldn’t dare to start a discussion about Artificial Intelligence, new disruptive technologies, and the Rule of Law without quoting first “I, Robot” by Isaac Asimov.

Society is changing. We are changing and technology is (and has always been) the moving gear of it. As such the first revolutions, our developments were triggered by the use of tools beyond ourselves, as our main strengths are our intelligence and creativity. Now we are developing and creating through and by technology.

As I will dare to say, we are long passing the homo sapiens status quo, and getting closer to the homo technologicus one. Coexisting with our own creation: the robots.

No. It isn’t a science fiction movie nor a conception of a distant reality. We are already here as we can observe in our daily activities, as simple as purchasing something online, solving a buyer/seller online dispute, or even booking a flight.

Disruptive technologies are expanding, and information flow increasing, and we are facing unavoidable new challenges. As society changes, we change our way to interact with reality. Law, like a mirror held up against life, now reflects an interconnected, cosmopolitan, and global society.

I. LAW AS A META-TECHNOLOGY AND THE LEX MERCATORIA

Law is the meta-technology crucial for this fourth revolution, thriving on an algorithmic and data-driven world, it adjusts itself to the new realities

framing the ought to be’s of reality.

As a result, following the wishes and needs of markets and societies *per se*, private entities, corporations, society, and governments are on the path to create genuine global legal rules.

A variety of technologies are getting incorporated into the law and enabling this law “creation” so to say,—as such dispute resolution by and over algorithms, simplified international contracts, intellectual property protection on an autonomous way growing in importance and being incorporated into the law in previously inconceivable ways.

Along this path, former strictly traditional state-centered views of the law can no longer follow all the twists of society. Henceforth, the own conception of what law is, shall be understood through different lenses, forged as a hybrid and (partially) private held global legal system.

This process can be observed as similar to the *Lex mercatoria*, being one able to effectively frame the fast-paced advances, of this autopoietic legal process—now driven by nontraditional players. As an autopoietic legal system, we must assume as per Luhman’s and Teubner’s theories, that it is part of a communication system that reproduces itself in self-referential processes, such as legal decisions and norms. Henceforth, by determining if a form of communication is part of this system, the legal system must operate as a binary code (yes or no, 0 or 1). A code that must be translated into programs to determine what is the law (yes, 1) and what isn’t (no, 0). In this sort of legal system, the law operates with combinations of normative closures, upholding existent norms but also leaning by legal problems, providing mechanisms for its change and framing those upcoming problems—by creating new norms on itself. Law cannot be conceived as a separate entity in society, but as contradictory as it may sounds, it is also a result of internal processes maintained through the closure of the system and self-reference, connected with the problems brought by this interconnected society. “Only the law can change the law”, the legal system reproduces itself “through legal events and only by legal events”.

As a result, adjusting to the market and pushed by economic forces, corporations, governments, universities, and other global players continues toward this new process of norm creation following a similar path of the well-known *Lex mercatoria*.

As such in the medieval European legal system, which has been

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3 By economics I mean maximizing utility of society members – or users; and pardon my lack of proper sociological specific knowledge but on my view nowadays an unavoidable blurriness between markets and societies.

4 I would dare to say “law” creation.
developed by merchants and was based on customs and good practices, sustained by agreements - the autonomy of the will -, it still transcends national legal boundaries and national legal systems, as corporations, governments, universities, and other global players need this new process of law creation to frame ongoing digital and borderless interactions. Considering algorithms, connections, and self-learning technologies, traditional legal doctrines, and traditional state law simply cannot follow all the twists of technological advances.

A situation that subsists due to the need for fast and efficient adjustments, beyond state borders, as a result of the speed of which new technologies are emerging, triggered by algorithms, connections, and self-learning technologies. A new process that almost states alike, but held by and for all kinds of parties, now globally. Mechanisms that allow the efficient enforcement of our rights, on a global scale, as a result of the technological revolution.

To accept this concept, we may need to embrace the fact that even state law is created by the will of others, which is now informatized, electronic, and borderless. As well by reflecting on all possible issues, we should bear in mind that corruption, human flaws, self-interested or even opinions also are a problem inside traditional legal systems—as exceptions, not as rules otherwise, they would also collapse on itself—and so it goes for new technologies.

II. CONNECTIONS AND RE-SHAPED SOCIETIES: THE REVOLUTIONS

By the time I wrote this paper, almost 60% of the global population is already connected to the internet. A fast-expanding number that unavoidably changes everything, as a true path towards the fourth revolution, where the *homo technologicus* takes the stand.

Well, as we know, the three first industrial revolutions substantially altered the world by the introduction of technology in production and expedited processes. However, the 4th revolution has altered it even deeper (and especially faster). As a result of this expansion and the consequent speed of information exchange, new legal and regulatory challenges are created at an incredible speed, and law and the States must adapt themselves to remain effective.

Moreover, it is inevitable to realize that communication through these new technologies substantially alters social and economic dynamics. This leads to essential cooperation between the public and the private sector, which have a mutual interest to be a part of and to be prepared for this ongoing technological expansion. Changes that are certainly tortuous and complex - but far from bad.
In this context, new tools emerge as ways to create and enforce the law. Societies tend to seek legal stability, predictability, as well as accountability in the most adverse contexts.

III. NEW TOOLS, NEW SANCTIONS

New types of sanctions are emerging. Social sanctions, widely spread through social media, Ranking Websites\(^5\), and other electronic mechanisms (e.g. Uber driver and customer evaluation mechanism) are reshaping companies - and even natural persons - relations with the law. The fear of a social sanction widely spread inside the “internet” became a real burden, a substantial one even worse than any kind of state sanctions. Those are, on my view, “quasi-legal” sanctions, as the image damages – and ultimately the financial damages – are a proper legal sanction. Surely this process can cause arbitrariness as such as “fake news” and other kinds of misinformation, nevertheless, we had the same issue under state law, as the lawsuit itself - depending on the content - can damage a reputation or a person, regardless of being guilty or not, as a sanction on itself. Surely one issue does not justify others, but my point is: the young generation does not seek state law any longer for some kind of disputes, as such an online purchase that went sideways, but rather seek the algorithms and contract-based (or perhaps consent-based) dispute settlement.

Another point is that the parties are taking an active part of this process, regardless of its size and power, but measured by its influence and size on the network.

As a result of or a response to this process, companies are also forging new mechanisms, as such global compliance and widespread codes of conduct, thus creating laws on the path.

As a pragmatic example of this process, legal compliance and corporate governance are growing inside corporations, as a way to materialize the social wishes and desires into “laws” within their “codes” (of conduct) or public statements and policies. Those are self-enforceable and yet binding (internally and externally), but always aligned to state principles and to the rule of law (even if a different one). This is part of the autopoietic process of the law within a connected society and triggered not exclusively but also by the fear of those social “quasi-legal” sanctions.

While those sanctions are emerging, new dispute settlement systems as well, as such algorithms law enforcement and decision making (YouTube content ID, eBay simplified international contracts and arbitrations procedures at eBay dispute resolution).

\(^5\) As such companies’ evaluations on Yelp, Amazon, TripAdvisor, and others.
Mostly, those dispute settlements are contractual based (or perhaps Informed Consent based) and those sanctions (mostly) based on the reputational damages, arising from quasi-legal sanctions where social media virialized information and assessments, subjecting enterprises to a global scrutiny. Those are no longer punctual and now spread on a speed that turns it into an actual burden for companies.

As we are getting closer and closer to a pure AI, it’s possible flaws and issues might even be a reflex of our own flaws and problems. For this, States do need to prepare and adjust themselves and their internal legal system to accommodate different disruptive situations, or perhaps a coexisting legal system.

Some countries are already on this path. As an example, in Japan, they created Tokku: special zones where they can test AI, autonomous technologies, and algorithms under special legal rules: Having an overall aim to set up a sort of interface for robots and society. In those zones, scientists and regular people can test robots and observe whether they fulfill their specifications in ways that are acceptable and comfortable to us, vis-à-vis the uncertainty of machine safety and legal liabilities.

Another on how technology is reshaping even states relations with the law and the legal process, for example, Brazil already established and adopted a full electronic legal procedure and it is now testing the possibility to use AI to filter cases, as a kompetenz check and in future, perhaps even assisting judged in deciding cases.

At first, we shall have our will programmed into machines codes, or even the laws of robotics, as part of our expectations. Yet, we are still in a transitional situation. Machine learning is a reality and our principles are changing through and by the fast path of the internet. Machines can adjust and “evolve” to fulfill our wishes - which in my view is where the true danger of technology is.

Nevertheless, our deepest desire is still legal stability and predictability as well as a truly transnational justice, even if contractually based (lex mercatoria), therefore we already are “allowing” machines to represent us, to create the law for us and to enforce it for us.

Startups and legal techs are an example on itself on how reality is urging for adjustments. They are re-shaping things we traditionally need on society (the own name: startups, are an attempt to re-shape traditional small companies by “rebranding” it). They modify our access to health, transparency, data processing, insurance, legal assistance, and even money. This is a clear example of how we are changing, and robots are only the natural results of our anxieties, driven by the homo technologicus. Thus, why

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6 Ugo Pagallo classes.
not reshape the rule of law?

IV. THE STATES AND THE LAW

A priori, such situation might mislead us to the conclusion that private parties through connectivity and its spillovers as such private-owned algorithms alongside with machine learning are possibly usurping state's competencies or diminishing state roles towards a privately held justice, or self-regulation. This is not accurate. In this context the state is not yet efficient enough to follow all the tweaks and twists of global technological society, and therefore deliberately decides to adjust its role to a more adequate and efficient one (as the ultimate rule provider). States become more passive (but not necessarily pacific), able to interfere only and once needed. This “delegation” so to say, allows States to reinvest the money, time, and effort in different capabilities, as such becoming another player, with an entrepreneurial side, tagging along at this global economic and technological process. Private held justice and law is a global compromise.

States can now keep a healthy distance from B2B and B2C relations - but always able to intervene once necessary. In this way, law enforcement becomes more efficient, especially because active enforcement is no longer essential, as more passive and preventive enforcement - by compliance programs and algorithms – are taking place (ex ante and post facto).

V. STARFISHES AND THE LAW: FISSION AND REGENERATIONS OF RIGHTS

What a Starfish reproductive system has to do with the law?

Pardon this oversimplification as I am not a biologist, nevertheless in simple terms: they can reproduce traditionally, by sexual reproduction, or as evolution by asexual reproduction as well: fission and regeneration. This occurs when, for example, it loses an arm, and it regenerates into another Starfish - and the lost arm grows back again.

In my view, this is how the law is developing under our new society. As part of its “evolution” and considering the moment we have been living, it can create itself and reproduce itself in nontraditional ways.

A path in which even fundamental rights (and human rights) are subjected to. They expand and multiply since the social impacts are so drastic that old rights are constantly being ripped off and by the pieces, new rights are created and incorporated in a constant reproduction by fission and regeneration. Like a starfish, the law can reproduce by the traditional state-centered way or by adapting itself to the new realities. To remain dynamically it sometimes loses

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7 Business-to-Business or Business-to-Consumers.
important parts, which slowly regenerates themselves and creates something completely new along this path.

In this regard, we frequently observe global, mass-propagated and widely publicized corporate acts, which in conjunction with the social “sanctions” widely applied by and through new technologies (coming up after eventual violations of the “rights” of users and even nonusers, thus triggering a “retraction” regarding such acts and decisions and subsequent recognition of the “breaches” caused) this generates fission of rights, which regenerates later on into others not yet regulated (or not yet even known). On a subsequent stage, those situations are materialized and merged into internal regulations and codes of conduct (self-generated rules) – created and applied by compliance departments. Subsequently, the state formalizes such anxieties, framing it within a state-sanctioned law status. Nothing prevents robots to develop their rights in a similar way.

Like the starfish, the law still reproduces on a regular way under state law, but once a piece of this law detaches (fission) from the State(s) and goes into the global network arena, it can reproduce itself by regenerating into a new law. Yet this process is not instead of state law but in addition to it.

VI. PRAGMATIC CASE EXAMPLE OF FISSION AND REGENERATION OF RIGHTS

A Pragmatic case example of this process is the right to privacy. It suffered a process of fission and subsequent regeneration - which in my view - into a new fundamental right: The Data Protection Rights. Thus, the process would be more or less the following to:

i) First, corporations’ decisions to use personal information indiscriminately, violating the privacy of users (and even nonusers of their services). Mediatic scandals take place, such as those at Cambridge Analytics, triggering global public scrutiny among such corporate decisions;

ii) Subsequently, social (or market) self-sanction takes place, materialized in evaluations, criticism, and “boycotts” to those companies, impacting directly on the image - and obviously on the profits;

iii) Therefore, in an attempt to repair (or rather, recover), they recognize such “errors” by normalizing them into internal guidelines, describing it at the terms and codes of the service of conduct, (a process of self-generation of a rule). We observe subsequently the self-application by the compliance departments.

iv) Eventually, states exercise their power by framing those norms into a legal frame as such GDPR in Europe and LGPD in Brazil. Ultimately a new Fundamental Law is created.
Law, as we have established can be created and developed in the most adverse contexts, regardless of a traditional *leviathan*\(^8\) figure enforcing a Rule of Law or not.

Autonomous technologies and artificial intelligence, alongside with Machine Learning and vastly global connectivity on a pluralized information flow may allow “Robots” to produce rights and norms. Surely a new process of global law is being forged beyond states borders, now an algorithm-based one.

On different and past research, I have noted and wrote that arbitration at the Investor-State Dispute resolution on ICSID is creating truly global legal rules (*laws*). ICSID arbitration takes place wherever possible and states and private parties are treated as equal players. It is a global contract-based dispute resolution process, but as long as the arbitrators are judging cases based on their past cases, repeating themselves and producing ultimately cases law (common law approach), the law is being created. It is binding, global, and created apart from the state. It is an autopoietic process of law creation (human-driven).

Now we are facing a similar process. A contract-based (or perhaps *consent-based*) process (*Lex mercatoria*) where new technologies as such YouTube’s content ID and ongoing developments at machine learning and AI changing the dynamics and creating legal norms. As an example, we shall observe YouTube’s Content ID, which according to their explanation, it’s a process where:

Copyright owners can use a system called Content ID to easily identify and manage their content on YouTube. Videos uploaded to YouTube are scanned against a database of files that have been submitted to us by content owners.

Copyright owners get to decide what happens when the content in a video on YouTube matches the work they own. When this happens, the video gets a Content ID claim.\(^9\)

Algorithms are deciding our cases. What if, once AI develops even further (if not done yet) those algorithms decide to, as such in ICSID arbitration, follow their own past decisions hence create law? Or as such in Asimov’s tale, decide to interpret their laws? This is a process extremely viable which I believe it’s already happening or at least on the path to happen.

Following this example, more than just a dispute resolution system, it’s

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9 YouTube Policies Terms of Use and Content ID.
ex-ante (able to predict and show eventual infringements) and ex-post (blocking, allowing disputes and removing contents). It an active approach to law, creating enforcing and on some basis “predicting” (Minority Report\textsuperscript{10} style) unlawful behaviors to secure property rights beyond the state’s authorities and states boarders.

Surely there are several issues with this, as such transparency and accountability, because their codes that determine this process, are privately held ones, protected by copyrights and not open. But as we reshape the law, flaws will survive even within the most advanced technologies.

The reason is rather simple: we are fallible. As such in traditional law, the most capable judges can make mistakes. There is a kind of cliché phrase nonetheless true: flaws make us humans. Perhaps flaws in technologies are merely a reflex of our own.

Once the algorithms start to base the decisions on their own past decisions, we shall have a truly autopoietic process of global law creation by and towards machines. At this point, the autonomous autopoietic process of law created by robots shall take place on a normative perspective as well.

VIII. A NEW PROCESS? NOT QUITE

The common citizen doesn’t even perceive how deep those changes are, but they are already happening and the normative impacts upon law are huge.

The regular user itself already taking advantage of those technologies and most importantly: being protected by new kinds of laws, as the state legal framework protection no longer provides an efficient outcome to this

For instance, we may quote an eBay purchase, as an example. A global citizen in Brazil and China establish an international contract, a foreign exchange contract, a freight contract with all the incoterms, and several others. If the product is not delivered or if the consumer does not pay for it, the easiest way to secure your rights is not by state law, but rather by eBay dispute resolution. Otherwise, it would be extremely costly to enforce it via state law.

Machines are taking place. Computer decisions are binary (0 or 1, yes or no) which remounts’ way back to Leibniz criminal law system.

Gottfried Leibniz invented the basis for binary code, way back in 1689 and it appears in his article \textit{Explication de l’Arithmétique Binaire}, where he was trying to find a system that converts logic’s verbal statements into pure mathematical ones, proposing later on inclusive a criminal law system based on it.

As we see, this isn’t new, but an ongoing process with hundreds of years.

\textsuperscript{10} Movie: Minority Report.
Law still is based on tradition, even if dealing with technological advances. Nevertheless, computers are getting more sophisticated as the quantic computer technology grows. Quantic computers are not:

…limited to two states as the binary one; they encode information as quantum bits, or qubits, which can exist in superposition. Qubits represent atoms, ions, photons, or electrons and their respective control devices that are working together to act as computer memory and a processor.\footnote{Leibniz G., 1879. Explication de l'Arithmétique Binaire.}

In my view, and in simple terms (and I apologize in advance to the true experts on this for my oversimplifications or oversights), it means that their decision are made beyond the binary codes, processing on unrestricted ways and instead of deciding 0 or 1, it can be decided ranging from 0 until 1, therefore able to a vast combination of decisions. Perhaps closer to our DNA storage and/or human brain processing power, the quantic computer ranges from infinite combinations to solve a problem. At this point, the interdisciplinary and cross-dimensional sense of the human alike processing shall take place also upon algorithm-based law, but this is a future conception.

**IX. TECHNOLOGICAL DILEMMAS**

Computers and robots can produce norms. As part of an utilitarian dilemma, the utility which they bring to our busy and complicate life compensates the issues by providing us with happiness (caused by time-saving effects and others). For instance, we ignore privacy violations to have our passwords and emails automatically populated in google pages, despite the issues.

Moreover, eventually on the trolley dilemma, a machine or autonomous technology (up to now programmed by us) might be able to decide to sacrifice themselves (regardless of the third law) to save more people or even to save other machines.

Once we get to it, law (which is already going throw a process of fission and regeneration as part of its global autopoiesis) will be completely reshaped. Some might consider the ought to be’s of this, as “what if they kill us?”. “What if they decide to be bad? But remember - humans do the same -, and as such bad decisions come up from good old judges, machines are not infallible, so we aren’t.

As such in the *lex mercatoria*, all this process is based on the autonomy of the will, created upon contracts and agreements. Or even: perhaps based on informed consent legal creation.

Hart stated that the solution for the uncertainty of primary rules is a rule
of recognition. A rule that is a collection of standards and requisites that govern the validity of all rules, conferring power to new ones by validating them.

Even if we walk through Hart’s rules of recognition, we might observe that society or most important market is conferring validity to those rules, on a re-shaped yet progressive way, where the state assumes an interventionist role on a “need to do” basis to assure that this new legal process is kept on track. A principiologial phase so to say, at least on the Rules of Recognition. Certainly, the secondary rules are therefore being adapted to this new scenario, as the primary rules already changed.

Law as a Meta-technology is crucial for the fourth revolution as algorithmic and data-driven, moreover, as a regulative system, it does not compete with further regulative systems, such as technology, and the forces of the market, that are also reshaping of social norms (only natural as society changes). Law is a reflex of societies…and those are certainly changing. Even if towards a harmonized mathematical legal chaos.

X. LAW AND JUSTICE: ORGANIC SYSTEM, ADAPTABLE TO REALITIES (“MIRROR HELD UP AGAINST LIFE”)

As Lawrence Friedman described, the law is a mirror held up against life. By aligning these facts with the speed of information flows - only possible due to the more democratic and accessible evolution of communication (more or less 60% of the global population has access to the internet) - the social control mechanism and market sanctions, intermediated by the electronic tools available becomes also an effective and financially harmful tool to enforce the law (worse to the corporation than any possible state sanctions).

Besides, various human and fundamental rights can be effectively enforced and extended through their use.

Systems which allow, for example, “self-assessment” of companies (such as company ranking sites and reviews) control mechanisms and intellectual property disputes (sanctions by YouTube content ID), international purchase and sale disputes through trade facilitation platforms (eBay arbitration together with PayPal money flow control), among many others, are modifying and allowing effective systems. Compliance and Corporate Governance, on the other hand often open and publicly available (reporting channels, codes of conduct published online) as well self-enforcing laws upon the corporations, are changing how we face the law.

Such solutions are substantially modifying how law is created and enforced, and most likely changing the very nature of the rule of law.

Technological developments, alongside with active participation of society, and the adaptation of states to this new reality, are enabling the
experience of a substantial social change affecting how the law is understood and applied globally. This evolution, indispensable to our development, its merely part of the 4th revolution, and as such the previous ones changed our world, the technological revolution its already changing it.

CONCLUSION

We observe that as such a state alike process, we have a common law global approach to law creation. Dispute settlements deciding cases apart from the state, autonomy of the will, consent-based rule creation and an autonomous autopoietic process of law created by algorithms once this initially *lex mercatoria* consent is given, quasi-legal sanctions as an addition or punishment for grossly corpoative “rights” violations, and incorporation of new norms by compliance departments. States law is not effective to address and frame all this new reality, therefore the need to conceptualize, accept, and incorporate a coexisting global legal system, trigger by and through technology.

By creating and reinventing itself, the law is a fundamental part of society, framing all the ought to be’s of it, which in the age of technology is considerably more dynamic and fast expanding from what they used to be.

As stated by Aristotle, *At his best, man is the noblest of all animals; separated from law and justice he is the worst.* AI is reformulating the rule of law but regardless of how much or how fast society changes, we humans have coded on our nature the need to adjust and follow the law and justice in the most unlikely contexts.

Perhaps, we may note this as not a legal system or as a random set of rules, in global chaos of norms. Nevertheless, as such in physics and mathematics, even chaos theory has established an order. The system does not need to be linear, but it can be based on chaos, and the framework can be a constitutional alike umbrella, in which, written or not, the principles are already applied and observed. Why not a mathematically organized chaos as a truly global legal system for the new laws emerging on this artificial intelligence ruled and connected “society”?

REFERENCES

Pagallo, Ugo. Lecture at the specialization course Law and Technology, at Stockholm University.
Roman Law - Digest, Dig. 1.1.1.4 and Dig. 1.1.9, found at http://www.thelatinlibrary.com/justinian/digest1.shtml. Accessed 11 Jan. 2023.
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