

What Would Karl Popper Say about Jurimetrics? Law Theory

Katia Cristina Antunes Silva 

PUC/SP, São Paulo, Brazil
Email: kkacri@yahoo.com.br

How to cite this paper: Silva, K. C. A. (2025). What Would Karl Popper Say about Jurimetrics? Law Theory. *Beijing Law Review*, 16, 107-132.
<https://doi.org/10.4236/blr.2025.161006>

Received: December 23, 2024

Accepted: March 7, 2025

Published: March 10, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

This article investigates whether jurimetrics can be considered science and its impact on the legal world. Jurimetrics, an empiric investigation, refers to the organized study of judged cases, allowing the understanding of the real scenario of some matter, the incidence of a certain practice, as well as the legal and social trends in each period and place. The Internet provoked one of the greatest social transformations even seen by human beings, and jurimetrics emerge in this context as a tool that is rapidly integrating into the legal system. COMPAS (abbreviation of “Correctional Offender Management Profiling for Alternative Sanctions”), a U.S. software used to verify the possibility of criminal recidivism, based on the construction of algorithms that, despite keeping their details confidential, it is known, from the questions asked, that it is based on the analysis of the characteristics most present in convicts, is an example of artificial intelligence and use of jurimetrics already present in the judicial system. Thus, although there are some criticisms, the use of empirical tool of research is already effective in the legal field, which justifies its profound analysis. The article presents the historical context in which jurimetrics is inserted, exploring the evolution of science and law throughout history and exams the relationship between jurimetrics and the scientific methods of research. In addition, it questioned whether jurimetrics could bring a new reality to the legal system and contribute to more effective justice and its limits.

Keywords

Jurimetrics, Real Realism, Legal Empiricism, Judged Studies

1. Introduction

The aim of this article is to reflect if Jurimetrics is a science and how the legal world may be affected by this innovative tool. After the industrial revolution, the

emergence of the internet has been touted as the next great social transformative event. As part of the development of this knowledge, we see the growth of artificial intelligence, what is already a reality. After its development, the use of jurimetrics is growing fast and probably it will be part of our world permanently. The world is already treating artificial intelligence as a path of no return and is no longer concerned with slowing down its development, but rather understanding and regulating its use. A clear example of this is the European Union regulation called “First Draft General-Purpose AI Code of Practice”, whose draft was made available for discussion in November 2024, which reflects the main global concerns on the subject.

Although we perceive the existence of minor groups trying to stop the use of jurimetrics¹, we believe that this will be an inglorious fight. Instead of resisting, we believe that our work must focus on understanding the goals and limits of this innovation. As occurred other times in history, when a revolution begins, we are not sure about its end. But we are certain that, inevitably, it will bring challenges to be faced. And that is what encourages us here.

Jurimetrics, for the purpose of this article, is the study of judged cases in an organized way, that brings information extracted from the Judicial System. It reveals the real scenario object of the study, brings with precision how the courts think about a certain topic. His studies have been used to build the algorithms that are the rationale behind certain artificial intelligence used in the legal system. That said, can jurimetrics be defined as a science or, at least, a scientific method? Is it capable of bringing a new reality to our legal trial? Can jurimetrics contribute to justice? Those are the questions that will be reflected in this article.

To address the subject dealt with here, the deductive method will be used to define the scientific nature of jurimetrics, having as historical method as its relevant complement. For the proper answer, in the first section we will briefly review science in history. The second section will be dedicated to a quick reflection about the evolution of law over time, with a special subsection to discuss legal realism, in which jurimetrics is better inserted. In the third section, practice and definition of jurimetrics from its beginning, in 1950 to nowadays will be exposed. It will also involve discussion about what is sought by jurimetrics, as well as the possibilities and limitations of it. As jurimetrics refers to practical experience, we shall present some concrete cases of jurimetrics appliances. The conclusion will bring our view about whether jurimetrics can be considered science and how it can unveil a hitherto hidden reality to contribute to justice.

2. Science in History

The understanding of what science is has changed from time to time. But a brief

¹For example: in 2019 it was promulgated a law (law 2019-222) in France prohibiting the analysis of judged cases for purposes of comparing, evaluating or predicting judges’ practices. In Brazil, in 2023 uber was investigated to verify if it was using jurimetrics to defraud the judicial system (process no. 0010531-94.2023.5.03.0111, Labor Court in Minas Gerais, Belo Horizonte).

overview of science throughout history will aid us in bringing in the principles that are still current today and are relevant to this article.

Men always was interested in understanding existing questions about human nature and life, world and universe. Thus, he has always been attracted by knowledge. But access to information and methods for these discoveries varied in terms of way, depth and assumptions over time. In the ancient past, human beings had a high degree of belief in mysticism to explain their reality. Although, they have accomplished great feats, such as Egyptian and Mayan constructions, which indicates mathematical, physician, chemical and other knowledges, it was only around 4th to 6th century B.C. that we have registers that Greeks popularized the exercise of understanding phenomena of the earth and life from reason. In such period civilization had relevant progress in scientific discoveries by supplying natural (and not mistic) explanations about world deduction facts from observation and experience. In this period, philosophy progressed exploring answers to the main human questions about life and death using reason as a tool for these searches. However, religion remained present and in a social context it was strongly used for the purpose of deciding what was right or wrong for humans to do. Exercising reason was considered a way to access a kind of innate knowledge owned by all human being called natural law that was believed that governed all things and was above men and world.

Platão (IV century B.C.) defended the idea that truth was not in the everyday world, so, it could not be reached by experience. For him, the truth was part of the idea's world as innate knowledge, in a universal and static way. He proposed that man should use reason instead of sensations to drive away false beliefs and distinguish the truth. Aristoteles (IV century B.C.) also believed in an innate knowledge, however, made objections to the idealist ideas of Platão since he argued that experiences in everyday world that would enable man to achieve such innate knowledge. For Aristoteles, real word matters and only experience could bring virtues² for man. He was responsible for starting the documentation of the so-called deductive method of analysis, which was known, at that time, as the process of reasoning from premises to reach a logically correct conclusion. Such premises were the natural law basis.

Returning to the field of science, the development of the ideas above gave rise to two views for purposes of defining science: rationalism and empiricism, where rationalism believes that knowledge is achieved by reason, and it is a kind of innate knowledge. On the other hand, for empiricism, knowledge is given by experience and matters to the extent that it can be measured and verified.

In Medieval times, Francis Bacon (1561-1626) was the philosopher precursor of the Enlightenment that created the inductive method, which is allied to the

²For Aristoteles, virtue is the characteristic of people who act correctly and constitutes the path to happiness. In his view, the man who acts with balance between the extremes of excess and lack is virtuous, and any man could learn to be virtuous through practice and habit. For Platão, virtue is an innate knowledge of man that is achieved through the balance of the soul, which is the result of the use of reason in the control of the desires of the spirit.

concept of empiricism. He criticized Aristoteles to the extent that, according to Bacon, he lost himself in explaining his beliefs through logical experiments and this last would not serve to prove conclusions. Bacon's work is focused on the systematic observation of an event to reach a conclusion. In this sense, he affirmed:

Our *ratio* (method), however, is as easy to be presented as it is difficult to apply. It consists in establishing the degrees of certainty, determining the exact range of the senses and rejecting, in most cases, the work of the mind, very closely based on them, thus opening and promoting the new and certain way of the mind, which, moreover, comes from the sensible perceptions themselves. This was undoubtedly what those who conceded so much to dialectics also saw (Bacon, 2000).

In the social and legal aspect of medieval times, religious principles were responsible for interpretative abuses and accepted unreasonable and harmful decisions to a huge number of people using religion as a backdrop. The Inquisition, for instance, was accepted at that time using religion as an argument to justify injustice and violence. St. Augustine (354-430) and St. Thomas Aquino (1225-1274) were the relevant medieval philosophers that tried hard to compose religion and reason. The first one was responsible for giving a Christianist view for Platão ideas and the second one did the same for Aristoteles ideas. St. Thomas Aquino's concept, however, prevailed and he was responsible for deep Revolution in catholic religion. While for St. Augustine "love" was the way for man to reach divine truths, St. Thomas Aquino had a more practical view. He defended the naturalism comprehension and recognized that it was given from God to man to govern themselves and the world. Additionally, following Aristoteles work, he argued that man would arrive at natural law by the practice of moral virtues. And went further than Aristoteles as he understood the importance of man's acts towards others.

In response to the exaggeration of the use of religiosity in science and politics, and chances made possible by the cultural and social new understandings brought about as result of a new view of the world and human believes increased which maritime discoveries, came the Enlightenment Period. The intellectual revolution that influenced Europe in the XVII century had as one of its clear goals ensuring the independence of science and politics from religion.

Science was separated from philosophy only in XVII century when science began to make its investigations in a more specialized and criteria way and no longer seeking universal answers. Despite the different way in which the Enlightenment philosophers faced the production of knowledge, whether in a rationalist or empirical way, they all were convinced that faith should never serve as a pillar for science and politics. Some of its major representatives like Voltaire, Kant and Descartes were defenders of rationalism, affirming that science and reason should serve as guides of humanity. In the line of empiricism, Locke and Hume were

exponents of the idea that information must be extracted by experience and organized by reason.

John Locke (1632-1704) stated that man was a “blank sheet” that was filled only with experiences, which represented empirical beliefs.

Suppose then that the mind is, as they say, a blank paper, empty of all characters, without any ideas. How do you get to receive them? Whence does it get this prodigious abundance of ideas, which the active and boundless fancy of man has painted in it, with an almost infinite variety? From where does it get all the materials of reason and knowledge? To this I answer with a single word: from EXPERIENCE (Locke, 1959: p. 106).

Locke was also very important in the construction of the contemporaneous understanding of human rights since during his time, the absolutist monarchy guaranteed unlimited rulers’ powers over people and under his perspective, individuals have unnegotiable rights founded in natural law.

David Hume (1711-1776) is considered empiric; however, its relevance is exactly on the criticism of the empiric since he does not believe that it is guaranteed that experience is able to give all answers. A famous example given by Hume, according to Okasha’s description is the following:

The fact that the sun has risen every day up until now may not prove that it will rise tomorrow, but surely it gives us very good reason to think it will? If you came across someone who professed to be entirely agnostic about whether the sun will rise tomorrow or not, you would regard them as very strange indeed, if not irrational (Okasha, 2002: p. 24).

Hume contributed to the principle of causality that proposes that there is no causal connection but a temporal sequence of events that can be analyzed. He defended that the only certain we have is inquiry. It opened a new understanding of science.

At this time in history, we had the consolidation of empiricism as a scientific method, making experimentation essential to test scientific theories. Besides, rationalist ideas were also strongly developed at this time. Rene Descartes affirmed that only mathematics could demonstrate its affirmation. He proposed a method known as the Cartesian method, based on methodical doubt and reason to achieve safe knowledge. Descartes affirmed that language, geography, history, are acquired without reason, they result from memory, distinguishing rational science and historical one (Descartes, 1962: pp. 39-103).

Immanuel Kant (1724-1804), another enlightenment philosopher, also defended the previous existence of innate truths that would base the existence of human rights; however, he emphasized that it should be a rationalist exercise and not a metaphorical conclusion. Concerning science development, Kant was a key author for purposes of developing the study of knowledge and its methods of research since he dedicated hard work verifying the limits of modern science to substitute metaphysical beliefs. Although he believed in previous knowledge, a

naturalistic concept, Kant scientism tried mixing empiricism and rationalism. According to Kant, the development of science must follow rational orientation, but he acknowledged that its common thread is empirical, as intuition. It can be verified below:

Our recognition arises from two basic sources of the mind, the first being the reception of representations (the receptivity of impressions), and the second the capacity of recognizing an object through these representations (spontaneity of conceptions). Through the first an object is given to us, and through the second this is thought in relationship to that representation (as a mere determination of the mind). Perspective and concepts therefore make up the elements of each of our recognitions and therefore neither concepts without perspective corresponding to them in some way, nor perspective without concepts, can provide recognition. Both are either pure or empirical. Our recognition is empirical if sensation (which presupposes the actual presence of the object) is contained in it; but pure if no sensation is mingled in with the representation. We can term the former the material of sensitive recognition. Hence pure perspective contains solely the form by which something is looked at and pure concepts only the form of the thinking of an object in general. Only pure perspectives or concepts are possible a priori; empirical ones only a posteriori (Kant, 2023: p. 81).

On philosophy's perspective, all this progress brought changes in the form of social and work organization, and this made contemporary philosophers begin to question the extent to which the development of science and industrialization truly contributed to the greater happiness of human beings. As occurred in science, philosophers also started to practice studies in a more realistic way and focused on facts. Contemporary philosophers like Friedrich Hegel (1770-1831), conceived reality as a continuous process of movement, in line with scientist thoughts.

The evolution of the thought about continuous movement and progress of society and science originated the concept known as positivism, brought by August Comte (1798-1857). He argued that scientific knowledge would be the only form of true knowledge and separated as science the disciplines of mathematics, physics, astronomy, chemistry, biology, as well as sociology, all, according to Comte, observable. At that time in science fields, the majority agreed that introspection should be distrustful as a means of attaining knowledge. Unobservable phenomena were understood as inaccessible and, so, should not be the subject of science. Thus, only based theories, proven by valid scientific methods, would produce concrete (positive) data, from the physical or material world.

It was possible to perceive a sense of progress of humanity having science as its major conductor. The Industrial Revolution became possible with the development that science had achieved up to that moment, which was a great milestone in the contemporary era. Scientists were enthusiastic about the transformative

power of science and the studies on the ways of obtaining knowledge were still ongoing fast. But the evolution of scientific techniques was so profound that it started to bring more questions than answers. The breadth of the theories studied by Edwin Hubble (1889-1953) and Albert Einstein (1879-1955), for instance, was so enormous that it was understood that controlled methods of experimentation would not be sufficient to bring answers. From that moment on, the understanding that science has its limitations has become widespread. Science is no longer seen as a deterministic discipline and has become probabilistic.

As defended by Karl Popper (1902-1919), another very important contemporary philosopher, science started to be understood as non-definitive since it must be in continuous evolution. In this way, he developed the hypothetical deductive method, a critical rationalism. According to it, for purposes of making science it is necessary to define a problem or gaps in existing theories, then make conjectures, that is, hypothesis or solution by experiment. And he introduced the concept of falseability, which means doubting the assumptions.

Now in my view there is no such thing as induction. Thus, inference to theories, from singular statements which are “verified by experience” (whatever that may mean), is logically inadmissible. Theories are, therefore, never empirically verifiable. If we wish to avoid the positivist’s mistake of eliminating, by our criterion of demarcation, the theoretical systems of natural science, then we must choose a criterion which allows us to admit to the domain of empirical science even statements which cannot be verified.

But I shall certainly admit a system as empirical or scientific only if it is capable of being tested by experience. These considerations suggest that not the verifiability, but the falsifiability of a system is to be taken as a criterion of demarcation (Popper, 1959: p. 40).

For Popper, the hypotheses or solution must be evaluated until refuted or corroborated. If refuted, it can be disposed of, and if it is corroborated, it keeps being verified. Since science keeps evaluating, sometimes it may be refuted and disposed of as well. He concludes that what can be considered true today may be refuted in the future.

In a historical perspective, world went, then, through two world wars (1914-1918) (1939-1945) and Nazism, which destroyed and damaged world and people in large and very cruel proportions. People were tired, wondering about a better way of living and began to wonder if scientific evolution and industrial development were serving to effectively improve people’s lives. People started to fight for better living conditions. Human Rights became the focus of philosophers’ attention, and the positivist view declined. At first, positivist ideas were not abandoned, but it was quickly understood that they could not be considered without aspects related to the essential rights of the human being.

Science progress has not stopped and the concept of the transformative characteristic of science was consolidated. Thomas Kuhn (1922-1996) made an important

contribution to this. For him, science's evolution depends on paradigm break: "These transformations of the paradigms of physical optics are scientific revolutions, and the successive transition from one paradigm to another via revolution is the usual developmental pattern of mature science" (Kuhn, 1970).

He also made a reflection about science being human, social and historical construction, which brings a new perspective about scientific methods. As affirmed by Kuhn, each period of history brings a set of knowledge that makes possible a couple of interpretations of reality and, so, it changes over time.

As mentioned in the beginning of this section and demonstrated above, science had different meanings through history and its extent also had variations in time. Until contemporary times, science had broader treatment, and an organized and systematized form of knowledge was enough to be considered science. With the achievement of a more complete view of all the completeness of world object of scientific study, there was an awareness that science has its limits and is not any area that can be object of the study of science in the strict sense.

For purposes of this article, and following the development of science, we shall adopt as premises that science seeks to answer a question that is amenable to scientific investigation and must be testable. Besides, scientists are aware that it brings possibilities and not absolute certainties. Moreover, it is transient and falsifiable. The experience must be possible to be reproduced by others. Facing the break of paradigm proposed by Kuhn is another important aspect of science making for purposes of enabling evolution of science.

A scientific chemical experiment can create a new thing, like a new medicine, for instance. However, the first and most important vocation of a scientific experiment is the identification of a fact. It must be clear that it does not mean producing a new fact since such fact can already exist even if the scientist does not describe it (it is common in nature discoveries). Besides, science does not necessarily discover something unknown. It can be the continuation of some thought. But it is important to be a progress of something that has been discussed.

Using a famous example to illustrate this we can say that when Newton (1643-1727) developed the law of gravity and defined it as a force of attraction between masses, it focused on explaining how two different bodies in the universe interact with each other, but he did not explain what gravity is or how it works, in other words, his study at the time had this limitation. Moreover, the fact (force of attraction) and the relationship (between masses) under studies does exist even if science would not have identified them, meaning that these experiments did not seek to create something, but learn about an already existing thing. Another important point is that despite Newton having proven his theory, a complete explanation came only later by scientist's experiments dated XVIII and XIX centuries, showing that science is a constant and not organized progression. Besides, part of the theory (the universal concept of gravity law) was replaced by Einstein (1879-1955) studies two centuries later when Einstein developed the law of relativity and explained what gravity is and how it works. It was discovered that this "force"

gravity is related to time-space curvature, another scientific development. Einstein's theory was not developed from Newton's developed law. But this does not diminish the conclusions reached by Newton. It explains a lot about the provisional character of science.

In the attempt of defining science work, more than defining what science is, Susan Haack, a science philosopher at Miami University, affirmed:

[...] any serious empirical investigator, whatever his object of study, will make an informed guess as to the possible explanation for the event or phenomenon that intrigues him, deduce the consequences of that hunch, see how adequately those consequences outlive the evidence he has and any other evidence he can gather, and then use his judgment whether to stick to the initial guess, modify it, drop it and start over, or just wait until you can find out what other evidence could clarify the situation, and how to get it (Haack, 2012: p. 15).

Defining science is more difficult than it seems. Samir Okasha, professor of philosophy of science at University of Bristol, proposed the reflection of what is not science as a way to better understand science and mentioned some Popper's examples to conclude that if a theory could be made compatible with any experimentation, then, such theory would be unfalsifiable, so not science. Popper was one of the scientists that did not believe in scientific research involving human studies, such as history and psychology under the justification that the results of research in these areas would not be falsifiable and argumentation could bring conclusions to many ways.

Recall the question with which we began: what is science? Karl Popper, an influential 20th century philosopher of science, thought that the fundamental feature of a scientific theory is that it should be falsifiable. [...] capable of being tested against experience. If these predictions turn out to be wrong, then the theory has been falsified, or disproved. Popper thought that some supposedly scientific theories did not satisfy this condition and thus did not deserve to be called science at all; rather they were merely pseudo-science. Freud's psychoanalytic theory was one of Popper's favorite examples of pseudo-science. According to Popper, Freud's theory could be reconciled with any empirical findings whatsoever. Whatever a patient's behavior, Freudians could find an explanation of it in terms of their theory—they would never admit that their theory was wrong. Popper illustrated his point with the following example. Imagine a man who pushes a child into a river with the intention of murdering him, and another man who sacrifices his life to save the child. Freudians can explain both men's behavior with equal ease: the first was repressed, and the second had achieved sublimation. Popper argued that using such concepts as repression, sublimation, and unconscious desires, Freud's theory could be rendered compatible with any clinical data whatever was unfalsifiable (Okasha, 2002: pp. 13-14).

Intention in science is also relevant. Thus, when a scientist aims for a result, such work is excluded from science. A scientist seeks to investigate the scientific validity of an existing theory or even develop new ones, but always without intending to produce a specific result. This differs from informing the direction of a scientific methodology, which seeks to explain the way of coping with the legal phenomenon and not an intention as to the result. It can apply inductive, deductive, dialectic or hypothetical deductive research tools, for example and secondarily, also use methods such as statistics, historical, sociological ways.

Although science has already accepted the impossibility of certainty and a definitive result, it presents a resistance to understanding as science a result that depends on opinions or a subjective interpretation to be concluded. In this sense, the verification of the information described by a scientific experiment is mandatory, as well as the possibility of other scientists replicating the experience. And exact methods, like mathematics and statistics, for instance, are examples of largely accepted methods to explain scientific works.

In scientific research quantitative or qualitative methods can be adopted and it is common research to adopt both combined. Quantitative methods can bring accurate results based on statistics even in the legal field. However, the understanding of such relationship cannot be enough clarified by the study. For example, when comparing time for conclusion of process and the costs of process, the results can have many different reasons. As possibilities we have that people that have more money to expend with lawyers may be less careful to avoid the commission of crimes whose penalty is pecuniary, and it may affect the quantity of process with less time taken for conclusion. Or rich people can contract a lawyer that will be more concentrated in the process, and it will take less time to be concluded.

In qualitative strategies, the focus is not on interpreting numerical magnitudes, but on understanding the meaning of certain events. When a paradigmatic decision is subject to study, it can be asked what the determining arguments of the decision are. In this case, the strategies are aimed at identifying relevant arguments, and this relevance is not measurable in numerical terms. An example of qualitative research is the investigation of how contracts deal with tax obligations. The focus will not be on measuring quantities, but on understanding the various ways in which contracts can address this issue.

Legal concepts are subject to interpretation by legal operators and have interpretation that varies over time. The search for statements that confirm what is meant by each of these concepts may be not enough to define them and could only confirm the investigator's beliefs. If the question investigated is related to the meaning of a concept, this investigation does not have an empirical subject. However, in some cases the meaning of some concepts is linked to empirical elements and in this case, observational experiments can contribute to the research. For instance, the Brazilian law provides for civil liability to indemnify damages,

³Article 927, sole paragraph of the Brazilian civil code.

regardless of guilt, “when the activity normally carried out because the perpetrator of the damage implies, by its nature, a risk to the rights of others”³. As much as the concept normative of “risk” is a construct of legal hermeneutics, there is feasible research that seeks to measure the damage that is caused typically by the practice of certain activities, as this element empirical (damage typically caused) can be understood as an indicator of risk. Thus, doing science (through jurimetrics and the criteria of falsifiability developed by Popper) can be of enormous value to bring objectivity to legal issues, even when related to concepts.

Judicial decisions are often exercises in falsifiability. Each of the parties presents their arguments and evidence and it is up to the judge to verify, according to his best judgment, which evidence is confirmed or not, which argument is applicable or not, discarding those that are not confirmed. The first purpose of the judicial system is the search for the fairest possible decision. In this sense, it is not up to the judge only to mechanically apply existing jurisprudence, but to test hypotheses. The bigger difficult here is the impossibility of making new concrete experiments to test hypotheses.

Another important way of applying Karl Popper’s hypothetical-deductive method in law is when a final decision has been based on a law that is later considered unconstitutional by the Supreme Court. This unconstitutionality can be used as a test of falsifiability sufficient to question the decision that has been based on it. Control of constitutionality is not a simple theme and is not the object of this study, and the present work is limited to highlighting its important role as a scientific practice in the legal field. Besides, in scientific research of any area, the beliefs of the scientist will affect its works, but it must be recognized that such influence is higher in human research. The “new” way of understanding a law is not necessarily more or less certain, it is not the subject of this discussion. The important information here refers to the discovery of the truth, that is, which interpretation of the law came to be used in the concrete case.

3. Law in History

More difficult than defining science, apparently, is to establish what science of law is.

If law was born along with the need of human beings to be able to coexist with others, since then the complexity of this matter has only increased and to this day no consensus has been reached on what law is.

In very far times, it was customary to directly apply orders based on sets of familiar rules. Thus, each clan had ample rights to interpret what worked best for them and apply its own rules and sanctions. Power migrated from the hands of the patriarch, responsible for defining right and wrong within the clans, to the king, a monarch with autocratic power, so, still based on a private right to enforce the laws.

However, in ancient Greece some concepts of society evolved and brought new thought, that the law should be a public thing, made and controlled by the

community. In 508 B.C. Athens implemented democracy as a form of government. One of his actions was the creation of independent institutions responsible for the legislative and judiciary. Its executors were citizens of the city, as a way of ensuring the broad participation of the population. However, the conquest of Greece by the Macedonian Empire of Alexander the Great caused the extinction of democratic institutions in 322 B.C.

The idea of justice was born from there because of the concept of equality between people. For the Greeks, pursue justice was a significant and relevant Ancient Greek ideal. Although women and slaves were excluded from the legal system that time, it was possible to observe some notion of individual rights as well. Indeed, it occurred in a very restrictive way, conflicting with the interests of the State and religion and with the presence, as said, of exclusionary policy of certain groups in society. The judgement, in Ancient Greek, was composed of a lot of rhetoric and argumentation with the main purpose of applying the law in the fairest way possible. Thus, for the Greeks, it was not enough to merely execute the letter of the law, but to interpret it in a profound way. At the time, it was common for this activity to be carried out by philosophers, given the investigative nature of the truth of this activity.

The principles developed by the ancient Greece influenced romans in a very striking way. The great contribution of the Romans was through the organization and systematization of all the laws practiced that time through the elaboration, in 451 B.C., of the “Law of Twelve Tables”. This text was lost in 390 B.C. and today we know only fragments obtained from quotations made by other authors. However, these documents structured all the legal bodies of the West and remained in use long after the fall of the Western Empire.

Roman law was formed by a variety of means, including magisterial decisions. The magistrate had the power to introduce actions not foreseen in law, as well as the right for him to stop applying actions provided for by law. It is discretionary power. From then on, numerous differentiated decisions were created, all recorded in the “edicts” of the magistrates. Such work oversaw filling the gaps left by the laws, enabling the adaptation of legal texts to the changes that have occurred in society. Even during the Roman period and later, laws were not guaranteed for everyone. Initially restricted to the most privileged classes, it was later extended to citizens but maintained restrictions on women, slaves and foreigners. During peace times the government was more democratic, but during war times, authoritarianism prevailed.

During Medieval Times, there was a setback in the application of the law since society was organized into fiefdoms and at that time the feudal lords began to exercise power and make decisions according to their own interests and will. Then came canon law proposing a more rational way of functioning in society and focused on better organizing social rules. However, it had as a background the beliefs and interests of the Catholic Church, culminating in abuses such as the inquisition, which for the time were considered legal practices.

The Age of Enlightenment came in response to all this abuse practiced during the Middle Ages with a focus on guaranteeing individual rights considered essential to human beings. In this sense, universal human rights have gained strength. A special concern of this time was to codify the rules, with the intention of bringing greater transparency and clarity in the application of laws.

On the belief that men would find certainty through science, positivism was born in the contemporary period. In the law field, seeking to guarantee a right that did not admit political and religious influence, the idea of positivism was developed. Positivism had a strong influence on law studies since it influenced the concept of law as a strict interpretation of laws promulgated by the State. Legal positivists defended that as law were human construction, should be detached from morality and religion. Kelsen (1881-1973), one of its biggest exponents, proposed a scientific approach of legal studies, which considers only the hierarchical and formal construction of the laws and eliminates subjective and evaluative concepts from analysis.

In a positive legal sense, the source of Law can only be Law. But the expression is also used in a non-judicial sense when we designate all the representations that, in fact, influence the creative and the enforcing function of the Law, such as, especially, moral and political principles, legal theories, expert opinions and others. These sources must, however, be clearly distinguished from the sources of positive law. The distinction lies in the fact that the latter are legally binding, and the former are not so as long as a positive legal norm does not delegate them to them as a source of law, that is, makes them binding. In this case, however, they assume the character of a higher legal norm that determines the production of a lower legal norm. The equivocity or plurality of meanings of the term “source of law” makes it appear legally useless. It is advisable to use, in place of this image that is easily misleading, an expression that unequivocally designates the legal phenomenon that is in view (Kelsen, 1998: p. 163).

After a new time of abuses, specially constituted by world wars, it was concluded that principles, ethics would also be as so important as the law righten by the legislative order. It started the post positivism time. It was also concluded that the positivist treatment of the application of laws contributed greatly to the application of an unfair and blind law, paving the way for a more human approach, which seeks to rescue human rights. This marked the beginning of post-positivist theory in the field of law, bringing back the relationship between law and ethics.

For post-positivists, like Dworkin, legal principles can give us the legal and moral reasons that justify a decision. He argues that the intention of principles reveals a moral value that must be considered when interpreting law. To better understand the place principles occupy on the legal system, we mention, below, the comparation he made between law and principles:

Sometimes rules or principles can play quite similar roles, and the difference

between them is almost a matter of form. The first section of the Sherman Act states that any contract that implies a prohibition of trade will be void. The Supreme Court had to decide whether this provision should be treated as a rule, in terms of its own wording (nullifying all contracts “prohibiting trade”, which is the case with almost all contracts) or as a principle that provides a reason for voiding a contract, in the absence of contrary policies in place. The Supreme Court interpreted the provision as a rule but treated it as if it contained the phrase “unreasonable” and as if it prohibited only “the prohibition of unreasonable trade”. This allowed such a provision to function, from a logical point of view, as a rule (whenever a court finds that a prohibition is “unreasonable” it is obliged to consider the contract invalid) and, from a substantive point of view, as a principle (the court must take into account various other principles and policies in determining whether a particular prohibition in particular economic circumstance is “unreasonable”). Words like “reasonable”, “negligent”, “unfair”, and “meaningful” often perform this function. When a rule includes one of these terms, it makes its application depend, until a certain time, on principles and policies that go beyond the (own) rule (Dworkin, 2002: p. 44-45).

Post-positivism seems to have rescued important elements of both natural law and positivism. The promotion of the dignity of the human person, one of the pillars on which jus-positivism is based, is like the “common good” which was the main purpose of natural law (at least in the Aristotelian and Thomistic strands). Likewise, the importance of the process of drafting law is noted, providing legal certainty focused on protecting society from arbitrariness of those who occupy power.

It is a remaining discussion even nowadays if law can be a scientific exercise. This discussion has always existed, but it has gained a lot of strength since the emergence of positivist theories, that tried hard to define the science of law that, in objective terms, would have as its object the set of legal norms of a country, autonomous from any ethics or social science and whose interpretation would be restricted to an exercise of reason and logic over legal texts. Today, as mentioned, this concept is outdated and it is known that the legal system encompasses not only textual laws but also principles and its implicit values, as well as is concerned with social justice, without which, it would be precarious and incomplete.

The definition of science is not a consensus, nor is the science of law. This is because knowledge is not unanimous either. There are many types of knowledge that can be achieved. For example, the same theme can be developed within religious, philosophical, historical, political, sociological knowledge, etc. and, thus, it is possible to arrive at different paths for the same theme.

The term science is not univocal, if it is true that with it, we designate a specific type of knowledge; there is, however, no single criterion that determines the extent, nature and character of this knowledge; It has philosophical

foundations that go beyond scientific practice, even when this practice is intended to be used as a criterion itself (Ferraz Jr., 1986: p. 9).

The result of scientific work may change according to the observer since the convictions and beliefs of each observer interfere with their work. It can be harder in the human sciences, and it is one of the reasons that keeps current the discussion about whether law is a science.

From the middle of the XXth Century, legal realism began to have a lot of strength in the USA, a common law-based country. At a time when the country was experiencing rapid economic development and was subject to a customary law of case law, aimed at the application of precedents, which did not satisfactorily meet the new times. It has a very important task, not only applying the existing law but also anticipating the understanding of the courts.

Oliver Wendell Holmes Jr., a U.S. Supreme Court justice, when questioning what constitutes the law, made a provocative affirmation and expressly stated that, for him, (foresee) judicial decisions were what he called as law:

The confusion with which I am dealing besets confessedly legal conceptions. Take the fundamental question, what constitutes the law? You will find some text writers telling you that it is something different from what is decided by the courts of Massachusetts or England, that it is a system of reason, that it is a deduction from principles of ethics, or admitted axioms or what not, which may or may not coincide with the decisions. But if we take the view of our friend the bad man, we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English courts are likely to do in fact. I am much of this mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by law (Holmes, 1897: pp. 460-461).

Legal realism argues that the law is constituted by facts, which are understood, for purposes of this theory, as judicial decisions. This movement understands that the text of law is not enough to solve all problems of society, and its fast development made it harder.

Jerome Frank emphasized the realistic understanding that for the text of law it is impossible to anticipate all social problems. Besides, the importance of the legal system to be in constant development as they appear:

Even in a relatively static society, men have never been able to construct a comprehensive, eternized set of rules anticipating all possible legal disputes and settling them in advance. [...] How much less is such a frozen legal system possible in modern times. New instruments of production, new modes of travel and of dwelling, new credit and ownership devices, new concentrations of capital, new social customs, habits, aims and ideals – all these factors of innovation make vain the hope that definitive legal rules can be drafted that will forever after solving all legal problems. [...] The constant development of unprecedented problems requires a legal system capable of fluidity

and pliancy [...] (Frank, 1949).

In fields other than the law there is today a willingness to accept probabilities and to forego the hope of finding the certain.

It is not known what problems the judicial system will be called to solve in the future, as well as the solutions judges will find for it. Thus, legal realism is in the trail of studying what judges decided and what they may decide in the next cases, which is indefinite. As we can verify, uncertainty is also accepted in law appliance nowadays.

One of its greatest criticisms, however, is the fact that when legal realism disregards the analysis of legal norms, it can be incomplete and dangerous. The biggest gain of legal realism is to have a concrete perspective on the law, however, without reducing it to facts, but combining the facts with laws, principles and the entire legal framework.

While positivism proposed a more rational view of law, legal realism consolidated empiric science in the legal field. Just like explanations about issues of nature, which do not aim to explain, prohibit, authorize, but only describe and try to foresee future consequences, the practice of legal realism has brought practical experience as a source of its knowledge.

As can be seen from above, the emergence of laws had a very useful and important purpose. The enactment of laws was an attempt to give more equal treatment to the citizens, making the rules more predictable. Before, we had the personal decision of a patriarch, then of a king. Laws came with the intention of guiding society, seeking to reduce arbitrariness resulting from random opinions.

Having equal treatment to others is an old ideal of society. And the principle of legal certainty, which presupposes predictability, has its origin in this search for isonomy. It is expected that simple cases should be guaranteed with a certain uniformity of understanding. However, a huge number of cases brought to justice require a more complex application of the law and it is not possible to guarantee law application as exact science. Each case will require an individualized analysis, studied in a contextualized and in-depth way. Modern law understands the need of the judge to create future law based on what he is viewing as a social trend and its consequences, the scope of this function has been widely discussed. Notwithstanding, we are aware that each judgement is unique, trying to find a trend in a line of thought or rationality can help in the application of law.

Being uncertain is different from being aleatory. The application of the law is individual and specific, but it is not decided by a kind of drawing. Thus, jurists started to think in a way of understanding a propensity to follow a certain decision. In this sense, a quantitative method of research can be efficient in many cases (not all), and this is the proposal of jurimetrics.

Legal realism contributed to bringing to law the methodology of empirical research in its investigation processes and some legal applicators are making an effort to apply mathematics and statistics in the legal field for purposes of providing

numerical information, probability data regarding the occurrence of some judgment, or measurement of a consequence as of a judgment, for example, as we will see better below.

In the common law, a system adopted in the USA and others, the legal system is based mostly on costumes and judicial decisions, non-written law. Thus, the study of judged cases is fundamental in the exercise of law. A new court decision may be enough to refute the request of one of the parties and prevail in the best way to be decided by the judge for subsequent cases without further formalities. However, the civil law system, as adopted in Brazil, for instance, is based on laws promulgated by a formal proceeding, which means that the adoption of new ways of interpretation of a law is more limited. Under the civil law system, greater rigor must be maintained in the application of the legislation that, at first, prevails over judicial decisions. Even so, judicial decisions are important to fill gaps in the law and clarify the interpretation of certain concepts, for example.

4. Jurimetrics Discussions

4.1. A Prediction of Decisions

In 1949, Lee Loevinger used, for the first time, the word “Jurimetrics” to describe the quantification of a judicial environment. According to him, this practice is nothing more than a methodology of legal investigation. He argues that true science must be falsifiable, and jurimetrics describes the legal phenomenon in an impartial and comprehensive way, measuring the law within standards of falsifiability.

Loevinger (1976) affirmed that jurimetrics would help legal applicants of predicting judicial decisions. But the idea of predicting a human decision bothers many that argue that the human spirit is free and can always make unexpected presumptions. For them, no science will ever be able to restore this. In this sense, what needs to be clarified is what the expectation is about jurimetrics. It will not guess the judge’s creative and intuitive process. But one of jurimetrics focus can get closer to the usual initial bases of a judge’s analysis.

According to the free decision theories of XX century, judges are free to take their decisions. However, it is supposed to be a responsible act, foreseeing its consequences and not be a mere casual manifestation or an opinion. It is easier understood in theory than in practice since it involves subjective definitions and multiple factors in their decisions. Thus, trying to anticipate a decision will never bring certainty but always be limited to probability.

Even though it is not certainty, combining the law with the concrete case is a very important task in the application of the Law since rules are not made to be theoretically defensible but to fulfill a social function. Marcelo Nunes, a Brazilian professor at PUC SP, explains that:

Knowing the law also means understanding how judges and, in the end, how people react to these commands. As it is the magistrates who first attribute effectiveness to the Law, defining how the norms should be interpreted,

removing inopportune norms and filling gaps, it is not possible to understand what Law is without investigating the relationship of abstract norms with the behavior of the courts. [...] Jurimetrics sees the improvement of social life as the main function of law (Nunes, 2016).

For the public administration, jurimetrics can bring countless gains since it makes it possible to confirm the effectiveness of a law and anticipate a law functioning.

Moreover, lawyers can see jurimetrics as a guide to better understanding judges' moves and be better prepared to advise their clients.

4.2. A Look into the Future

The concept of worrying about possible consequences, whether from judicial decisions or effects on society, is also not well regarded by many legal operators. It will be said that it would be an attempt at divination, which is not a law matter. However, jurimetrics does not try to guess something. It seeks to understand the complete environment in which law is inserted and look at the trends that are to come. Understanding the now may be only part of the job. Its primary complement is to exercise the reading of what is to come, in terms of legislation and interpretation of social needs, through judicial decisions and the behavior of society itself. This occupation brings law closer to the function given to science. In this sense, Nunes said:

One of the characteristics of scientific knowledge is the ability to anticipate the future state of an object. A scientist describes the functioning of something not only to know it in the present, but also to be able to predict its behavior in the future. It is predictability that science will make a tool for controlling the external environment and thus enable the development of technologies capable of improving our living conditions (Nunes, 2016).

4.3. Mathematical Investigative Component

Jurimetrics has a mathematical investigative component, unlike what happens with argumentation. While the latter can be easily manipulated according to the results desired by the investigator since we can choose the way to move the discussion of some subject, jurimetrics is factual data, quantified information, whose intentional result is more difficult. And such characteristics give jurimetrics a more scientific scope.

Even being more mathematical, jurimetrics does not avoid completely the beliefs of the researchers. It is common for the studies to be not neutral, since it's possible to choose the kind of data that will be analyzed. In this sense, Rachlinkski said the following:

The empirical legal studies movement stands in stark contrast to the growing skepticism about scientific research. Just as the general public seems to be losing faith in science, legal scholars have embraced empirical approaches as

never before. [...] Empirical legal research holds out the promise of advancing understanding of legal systems in a nonpartisan fashion.

Although empirical work has proliferated within the legal academy, it remains encumbered by the same skepticism that science faces more broadly. Rarely does empirical work in law provide a definitive resolution to any important question. Typically one can find research cutting in opposite directions (see [Rachlinski, 2018](#)). [...]

Frustrating though biased assimilation can be for researchers, is it truly irrational? Empirical research might not be as neutral as scholars hope. The political views of those who conduct empirical research might affect several steps in the research agenda. First, political views might influence scholars' choice of topics. [...]

Secondly, choice of a data set can be influenced by political views. Liberal scholars might well be more inclined to trust (at least some) government statistics. [...]

Third, a researcher might analyze the data in a way that tends to support their prior beliefs. [...]

A previous study by Adam Chilton and Eric Posner revealed that political orientation correlates with conclusions in legal scholarship (Chilton and Posner, 2015) ([Rachlinski, 2018: pp. 3-4](#)).

On the other hand, jurimetrics has its own challenges, since its quality depends on the data collection and rigor, transparency and analytical methods chosen. But any scientific investigation using mathematical method will have the same potential problem.

Besides, jurimetrics will not give a result applicable to all cases in general. It will refer to a specific situation, limited by a particular problem, a defined period, a geographic region. And in this point, jurimetrics shares the same difficulty as any empirical experiment. The good news is that jurimetrics will not substitute the work of lawyers, judges and others. It is complementary and makes up the complete context that needs to be the object of study.

The USA is already testing the use of artificial intelligence in its legal system. The program called COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) is used to set bail in cases of conditional release. COMPAS asks several questions that assess how much you may be able to commit a crime again in the future.⁴ And it does not indicate how the scoring of these questions is carried out. The most serious criticism of this system refers to the fact that it is not clear what criteria the system uses. There are even those who argue that the

⁴It reminds another US case. In the past, the U.S. has faced a similar problem. In the intent to make the judgments more homogeneous, the "Sentencing Guidelines" came into force in the USA. From then on, it was up to the judges to fill out a kind of checklist to determine the penalty to be applied to a particular defendant. In 2004, twenty years later, the case named *United States v. Booker* was taken to the Court of Justice, which understood that the guidelines violated the 6th Constitutional Amendment, which guaranteed freedom of trial. At that time, USA choose freedom instead of certainty. Source: <https://www.oyez.org/cases/2004/04-104>

system allows a certain degree of racism to the extent that, according to these critics, studies indicate that black defendants are pointed out as higher risk, which, if true, is very serious.

It is essential to explain how algorithms are formed. This is because replicating past results in a mechanical way can lead to the maintenance of mistaken concepts, such as racism, sexism, a political orientation, among others. It is essential that jurimetrics be used to test the possibilities in a critical and in-depth way, to verify whether the parameters used will be refuted or confirmed. In this sense, legislation has been discussed in several places around the world that seeks to regulate these activities, with the main objectives of ensuring transparency in the way data will be used, as has been done by European Union, through the “First Draft General-Purpose AI Code of Practice” available for discussion since November 2024. In general terms, there are two types of systems being developed by artificial intelligence. The knowledge-based system, in which references are inputted, and the learning-based system, where the expected behavior is programmed. Both continue to have the man as the driver of the tool. In the first case, studies (jurimetrics, for example) are used to understand the behavior of the judiciary and later “teach” it to the machine. And the second, also using studies (jurimetrics, for example) seek to understand how we want that the machine works and program it. But none of them has yet found a way to replace man in human evaluation.

In any case, this attempt has been studied all over the world and sooner or later artificial intelligence will possibly be used in some way, perhaps for simpler cases, to assist in decisions that are now exclusively human. We will not go into the merits of whether the decision to use artificial intelligence to replace man in this type of matter is right or not. The fact is that it has a huge possibility of happening for certain situations, given that it has already been tested all over the world. But then, if it is inevitable, what care to take?

The concern needs to start in relation to the collection and processing of data, which will invariably be used for programming in artificial intelligence. And this involves jurimetrics. It must be guaranteed the transparency of the data, as well as it must be clear how such information is used to construct the algorithms. Only man can evaluate if it is being used ethically.

The whole world has already started studies to understand how artificial intelligence needs to be regulated and it has already been understood that at least this needs to be guaranteed: transparency, data protection (how the information will be used and who can access it), copyright and systemic risks. But the truth is that we are still at the beginning of this transformation and possibly we still see very little of this world in transformation.

4.4. Practical Cases

Jurimetrics works on practice and experience. Thus, it shall be discussed below some concrete cases to better verify if jurimetrics can be able to produce scientific evidence in the law field.

4.4.1. Usitecno and Coprin Cases

They refer to Brazilian cases in which it was discussed the limitation period in tax legislation applied by the courts of that country and to construct evidence about the change of the way courts were deciding about it, jurimetrics was used.

Although the Usitecno case has set a precedent, it directly conflicts with another case that was ruled upon a few months later.

The First Section (an ordinary panel) of the STJ adjudicated in the Usitecno case in May 2010. Just 10 months later, the Special Body of the STJ, a higher panel than the First Section, decided the Coprin case. In this case, the STJ decided that the National Tax Code (CTN) must be applied to interrupt the period for the statute of limitations in tax enforcement matters.

In other words, the rule of law on which the judicial decision in the Coprin case was decided upon stated that a supplementary law must determine the period for the statute of limitations in tax law. In the Usitecno case, the STJ applied only half of an article of the CPC⁵, an ordinary law. Therefore, the Coprin case overruled Usitecno—a case in which the STJ had departed from the CTN (a supplementary law) in the same situation.

In light of the Coprin case, it would be assumed that the Usitecno case would no longer be followed. However, analyzing the websites of the STJ, the Federal Court in São Paulo and the State Court in the same capital shows the opposite (see **Table 1**) (Becho, 2020: p. 274).

Table 1. How many times the Coprin and Usitecno cases have been used as a precedent in São Paulo courts since 2010.

	Coprin case	Usitecno case
STJ	Applied eight times	Applied 37 times
Tribunal Regional Federal da 3a Região (Federal Regional Court of the 3rd Region, or TRF/3R)	Applied 172 times	Applied 1,478 times
Court of Justice of São Paulo (TJ/SP)	Applied 472 times	Applied more than 10.000 times

Jurimetrics was responsible for clarifying the rules considered valid by the Court to decide about limitation period in tax acts in Brazil nowadays. It is a legal question, for sure. However, it has limits since it does not discuss the concept and other material questions about limitation periods. This will be part of argumentative work using additional sources such as other legislation, theories of law, logic, for example. Jurimetrics exercise answered a legal question: *Which legislation is used by the Court in Brazil nowadays to decide about limitation period in tax legislation?* Such an answer could also be more provocative: *What is the law considered valid for purposes of limitation period in Brazilian tax legislation?* It is noticeable that even Brazil being a country which jurisdiction is governed by civil

⁵CPC refers to the Code of Civil Processes in Brazil.

law (and not common-law), judicial decisions, in practice, can define right.

It is an important opportunity to identify jurimetrics goals. It does not substitute the analysis of legislation, theory of law, concept of limitation period and the argumentative production of the author. The jurimetrics approach complements do not replace other aspects of the work. But as seen in this case, it constituted fundamental demonstration of the occurrence of the change in the behavior of the Brazilian Courts, and may serve as a guide in such matter, for legal applicants.

4.4.2. Termination of Real State Contracts Cases

There was an old discussion about the percentage that real estate developers were required to return to the acquirors when the termination of a contract regarding acquisition of a real estate propriety under construction was the acquiror's fault has taken on enormous proportions in Brazil due to the significant increase in the sale of real estate properties under construction from year 2000⁶.

Relation between them was regulated in Brazil by the consumer protection code (law no. 8.078/1990) and there was no specific composition to deal with this specific issue. So, the solution for the lawyers was to investigate what the understanding of the courts was at that time, and it was concluded by jurimetrics that courts understood that developers should return between 70% to 90% of the values already paid by the acquirors of a propriety under construction, when the termination of the agreement was caused by the acquiror.

As can be verified, there is an element of creation and discovery in the judicial process of applying and interpreting the law and there is no science that could give certainty about this judge's decision. However, jurimetrics can reveal a trend and give a probability to guide legal operators. In this case, jurimetrics was used to understand the rules that were created by the judges in concrete cases since it was clarified by a formal law only in 2018, by the promulgation, by the Brazilian legislative power, of the Law 13.786. It is stated that when the termination of a real state agreement for the acquisition of a property in construction is caused by the acquiror, the real estate developer must return 75% of the amount already paid. Exception is made by the cases when the real estate developer obtained a Brazilian special tax treatment⁷ directed to the real estate developer, when return is reduced to 50% of the amount paid.

Jurimetrics answered a legal question consisting of the definition of *what amount must be returned in the above cases*. In another interpretation of the solution gave by the Court, it would answer *what is the punishment given to a buyer who gives up on the purchase of an apartment under construction*. Until 2018, we already had direction about it but only through jurimetrics.

4.4.3. Power Generator Cases

With the evolution of labor laws regarding worker's protection, the Brazilian Code

⁶According to ABRAINC (a Brazilian association of real estate developers) in Brazil, the volume of termination agreements brought serious consequences to the sector, such as the loss of 1 million jobs, bankruptcy of 395 real estate's developers, which failed to deliver 25.530 real estate units, as seen in <http://www.abrainc.org.br/uploads/2021/05/Distrato-nos-empreendimentos-em-regime-de-Patrimonio-de-Afetacao.pdf>.

⁷"patrimônio de afetação".

for Labor Relationship (CLT), established in its article 193 that workers submitted to a dangerous work should have a higher remuneration. As defined by CLT, the understanding about what would be dangerous should be defined by the Ministry of Labor Department (MTE). In this sense, MTE promulgated two resolutions about it: NR16, dated 1978, which deals with the transport of flammable liquids and NR 20, dated 1978, that regulates care and training for the use of flammables.

Using analogy to decide in which situations the storage, inside commercial buildings, of flammable liquid used to supply generators, would generate greater danger to the workers in that place, the Labor Superior Court (TRT) applied rules NR20 or NR16 and sometimes both, depending on the court involved in the case. Thus, for a long time, in each labor lawsuit regarding such matter a different rule was used (NR20, or NR16, or both) for judgment, so that there was no consensus on what should be followed to ensure the regularity of these storages. At that time, we understood that NR20 would fit better the analogy intended by the judges. However, not all judges understood it the same way. Explaining that regularity of equipment using the technical terms brought by NR20 did not work to communicate with those judges who relied on NR16 to judge. So, for a better understanding between the parties, we decided to explore better the concepts brought in NR16 when it came to judges who used to choose this legislation in the intended analogy. For purposes of identifying the preferences of each judge, jurimetrics work was made. Lawyers that presented their arguments using the technical rules as defined in the preference regulation of the judge, achieved better communication with him and were successful in their actions. Only twenty years later, NR16 was revoked and NR20 was modified to provide for storage of flammable liquid inside commercial buildings⁸. Jurimetrics made it possible to solve such complex cases during the period of legislative uncertainty, diving deep into judicial decisions and based on the same work undissipated the path that would be chosen for legislative reviewed, twenty years earlier, the path that would be chosen in the legislative power.

The intention of this jurimetrics work was equivalent to understanding the language spoken by each judge, since, at that time, for the matter mentioned above, it was as if each judge had its own language, and speaking the same language was essential for efficient and constructive communication.

5. Conclusion

Legal realism brought law closer to science and opened space for the growth of Jurimetrics since under its perspective, it moves law from the ideal world of laws to the reality of the courts. Besides, they are aware of the uncertainty of a human decision and consider that judicial decisions are not mere analytical applications

⁸It affected the entire market of commercial real estate of the city of SP, Brazil, that, in 2024, represents about US\$ 63,67 billion. Source:

<https://www.mordorintelligence.com/pt/industry-reports/commercial-real-estate-market-in-brazil>.

of the law, but higher studies of the laws, it understood as law texts and principles but affected by multiple factors, such as social, economic, political, ideological and even personal considerations.

Regarding the limitations of jurimetrics, it does not disclose or define concepts, principles, logic, ethic, does not replace them nor is it able to question the internal understanding of the legal applicator. Also, it is not possible to use jurimetrics to produce judgements or obligate anything. It refers to an instrument to enrich the context, demonstrating reality by proving facts and the legal operator may use such information to complement his argument. Its studies are regarding the understanding of what law is being applied. Moreover, it comes along with the increase in complexity of the entire context that involves law, being a possibility to increase the point of view of the law enforcer, since it seeks to identify the consequences of a law application in society and may reveal a trend.

Jurimetrics is identified with scientific empiricism, a knowledge sought through experience. Besides, making an analogy between science and Jurimetrics fields, the primary intent of this last is not to discover or invent law or a theory, as a scientist does not invent a planet or a relation between two planets under investigation. Moreover, the subject of study does exist even if the scientist or the lawyer does not describe or explain it. However, jurimetrics, as a scientific experiment, may reveal a fact (a rule, an existence of a subject) that was hidden of the man knowledge.

The limitation of jurimetrics has a positive consequence since it is a factual study, based on numbers. It is more accurate than argumentation, what is traditionally used in the law field, but even jurimetrics is subject to the vision of the law applicator, who chooses the type of data he will use. Scientific discoveries that reveal facts, bringing numbers and statistical (or mathematical) conclusions may be more protected from the own view of the scientist, which is an advantage and jurimetrics have such characteristics.

An important difficulty in making science is delimiting the object correctly, such as the specific problem to be investigated, as well as time and geographic space involved. Wrong work in this way can compromise the results of any scientific exercise. Even in jurimetrics fields, it is important to make clear the methods used for the investigation, like statistics, the sources of the data used, for instance data from the judiciary system, and anything else that may be necessary to enable others to replicate the experience and to make it possible to test the experience and see constantly if it becomes outdated. As we said, after a while, as with any empirical scientific experience, the view on a certain subject may evolve, the picture of a specific moment can change, and then the conclusions of the study will no longer represent the truth and will be replaced. Nowadays we are aware that universal truths, definitive discoveries and answers that solve everything are not the scope of science anymore. In all scientific studies its limitations are openly regarded and do not diminish the work done there.

Although jurimetrics deals with information from law, a human science, as its

object is restricted to the quantification of information and not to discussing its subject, and jurimetrics work can be tested and possibly refuted (falsifiable), there is a chance that Karl Popper would recognize it as a practice at least close to a scientific work. The scientific exercise of jurimetrics will depend more on a proper definition of the object, the quality of the data obtained, and methods chosen for the work than on jurimetrics concept itself, but this is a challenge faced by all of scientists in any field.

Jurimetrics, today, consists of a concrete practice of empirical investigation that has brought satisfactory and important results for the performance and progress of law both in the private and public spheres. But cannot survive without human interference. Besides, even artificial intelligence that has been developed in the legal field with the intention of replacing some human functions cannot survive without man. Being behind artificial intelligence programming, man is still indispensable and is the only one capable of guaranteeing the humanization of the relationships.

Possibly the progress of jurimetrics lies in the growing integration with artificial intelligence, which will allow, among others, an increase in the complexity of analyses, increase in scale with possible cost reduction, faster identification of systemic risks and greater legal certainty. The great challenge lies in building greater transparency in the collection and use of data, essential for the verification and reliability of the information used, as well as in the constant evaluation and improvement of the criteria for use.

The introduction of ethical and human concerns in this area are still pending development and will be the great key to allowing jurimetrics to contribute to the evolution of society.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- Bacon, F. (2000) *Novum Organum*. Virtual Books.
http://edisciplinas.usp.br/pluginfile.php/4702162/mod_resource/content/1/francis_bacon_novum_organum.pdf
- Becho, R. L. (2020). Ativismo Jurídico em Processo Tributário. *Revista dos Tribunais*, 11, 729-739.
- Descartes, R. (1962). *Discurso do Método Para Bem Conduzir a Própria Razão e Procurar a Verdade nas Ciências* (2nd ed.). Difel—Difusão Europeia do Livro.
- Dworkin, R. (2002). *Levando os Direitos a Sério*. Martins Fontes.
- Ferraz Jr., T. S. (1986). *A ciência do Direito* (2nd ed.). Atlas.
- Frank, J. (1949). *Law and the Modern Mind*. Stevens & Sons Limited.
- Haack, S. (2012). *Seis Sinais de Cientificismo*. Liga Humanista Secular do Brasil.
- Holmes, O. W. (1897). The Path of the Law. *Harvard Law Review*, 10, 457.
- Kant, I. (2023) *The Critique of Pure Reason*.

<https://kantwesley.com/Kant/CritiqueOfPureReason.pdf>

- Kelsen, H. (1998). *Teoria Pura do Direito* (6th ed.). Martins Fontes.
- Kuhn, T. S. (1970). *The Structure of Scientific Revolutions*. University of Chicago Press.
- Locke, J. (1959). *Ensaio sobre o Entendimento Humano* (5th ed.). Fundação Calouste Gulbenkian.
- Loevinger, L. (1976). *Jurimetrics—The Next Step Forward*. Minnesota Law Review.
- Nunes, M. G. (2016). *Jurimetria—Como a estatística pode reinventar o direito*. Editora Revista dos Tribunais.
- Okasha, S. (2002). *Philosophy of Science—A Very Short Introduction*. Oxford University Press. <https://doi.org/10.1093/actrade/9780198745587.001.0001>
- Popper, K. R. (1959). *The Logic of Scientific Discovery*. Basic Books.
- Rachlinski, J. (2018). The Politics of Legal Empirics: Do Political Attitudes Predict the Results of Empirical Legal Scholarship. *Journal of Institutional and Theoretical Economics*, 174, 3-4.