

# Algorithmic Tax Power and Constitutional Safeguards: Global Perspectives on AI, Bias, and Digital Tax Justice

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## Abstract

The growing use of algorithms and artificial intelligence (AI) systems in tax administration poses significant challenges to constitutional principles that have historically constrained the state's power to levy taxes. This paper analyses how the automated exercise of taxing authority—here referred to as the “artificial taxing power”—can reproduce biases, obscure decision-making processes, and undermine fundamental rights such as legality, equality, ability to pay, and due process. Based on doctrinal, constitutional, and empirical analysis, the study argues that the Brazilian Constitution, from 1946 to the present, provides a solid foundation for the creation of a Digital Taxpayer Bill of Rights. Comparative experiences (EU, US, China and Latin America) are examined, the risks of generative models (LLMs) are discussed, and a governance agenda is proposed for digital tax justice, including legal, institutional, and technical safeguards to ensure transparency, explainability, and human oversight.

## Keywords

Artificial Intelligence, Taxation, Constitutional Law, Digital Rights, Algorithmic Governance

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## 1. Introduction

The defence of taxpayers' fundamental rights in the digital environment represents a coherent extension of the constitutional project initiated in 1946 and consolidated in 1988. The current Constitution, particularly Title II (Fundamental Rights and Guarantees) and Articles 5, 150, and 37, already offers a solid legal basis for the infra-constitutional development of a Digital Charter of Taxpayers' Rights, without the immediate need for a constitutional reform.

However, given the increasing complexity of state action mediated by algorithms and AI systems, it is legitimate to propose a debate on a possible constitutional update. Such a proposal would include the explicit inscription of the principles of algorithmic governance, explainability and the right to human review as permanent citizen protection clauses. In this way, two possible paths coexist: 1) the path of infra-constitutional regulation, which is fully viable in the current scenario; and 2) the ambition of a constitutional reform aimed at digital tax justice and the protection of citizens from the artificial power to tax. By limiting the taxing power, the Constitution also limits the artificial power to tax<sup>1</sup>.

The term “*artificial power to tax*” may refer to the capacity of automated systems, such as machine learning models and algorithmic engines, to autonomously interpret, apply, and enforce tax rules without full human deliberation. Unlike traditional taxing power, which is exercised by state agents subject to constitutional scrutiny and procedural safeguards, the artificial taxing power operates through embedded rules, data-driven profiling, and opaque logic, raising distinct accountability challenges.

This study investigates in what extent can constitutional safeguards be effectively extended to constrain the algorithmic exercise of taxing power. It aims to contribute by proposing a conceptual and normative framework, namely the Digital Taxpayer Bill of Rights, grounded in Brazilian constitutional law, enriched by comparative analysis (US, EU, China and Latin America), and oriented toward digital fairness, transparency, public interests and due process.

## 2. Algorithms, Semantics, Ontologies, and Expert Systems

The increasing use of artificial intelligence in surveillance, administrative and judicial proceedings is a growing and impactful development in law. The exponential use of artificial intelligence (AI) in the economy, society and law has consequences that are not yet fully understood. To what extent will society be transformed by the intensive use of AI in all social spheres? Is AI more of a technical innovation that evolves existing models or an alteration of patterns that are not yet fully understood?

Scholars are grappling with by the increasingly astonishing news about the possibilities of using these new technologies. What are their repercussions on the world of work, business, private life and taxation? Human beings are tormented by the doubt of existential obsolescence and their overtaking by machines in a world that no longer needs them as productive agents. The aim of this paper is more modest. It is not to investigate the impacts of strong AI, but those resulting from weak AI.

The use of legal language with algorithms has become widespread in courts, including higher courts, drawing attention to the study of an area little known to

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<sup>1</sup>*Methodological Note:* This paper uses a hybrid method combining constitutional theory, legal-computational theory, and comparative legal analysis, with emphasis on normative risks and institutional design.

jurists: computer science theory. Important new questions are being raised about the limits and possibilities of the use of legal expert systems, in a frantic attempt to keep up with the latest findings and applications. After all, to what extent are the standards of rationality and operability of the law in line with the system of protection of fundamental rights, including those of taxpayers?

The problem of this work is to investigate how the biases present in artificial language lead to incoherence, inconsistencies and, what is worse, results that are contrary to the legal system. Basic concepts of computational theory that can be related to tax law will be studied in order to investigate, analyse and, ultimately, understand the challenges of algorithms applied to the field of taxation.

The concept of algorithm was a new revolution in 20th century thinking, as it aimed to define the limits of mathematical thinking. After all, could there be a method that would determine which problems could be solved and which would remain unsolved? This was Hilbert's problem, which was later answered by the genius of Turing in the form of the famous Turing Machine (1936). In reality, it was not a real machine, but an ideal model capable of modelling any digital computer. Its importance was unparalleled for the theory of computation, as it allowed the emergence of general models that would lead the computer revolution of this century.

The *current* meaning of algorithm is *a repeatable sequence of steps that solves a problem* (Soffner, 2013: p. 2). This broader meaning can be reduced to a narrower one, such as a set of *automated routines that follow a pre-established procedure*. Algorithms have assumed a prominent position in computer science, since their main purpose is the possibility of solving a problem and being able to repeat this operation indefinitely.

The algorithm can only be well-structured if it follows a *certain logic*, i.e. it must consist of *sentences* that are expressed according to a certain *syntax*. This, in turn, ensures that the sentences are well formed. The syntax used will ensure the production of logical reasoning with coherent sentences. A logic must also have semantics, i.e. a meaning for the sentences. These must have a certain truth value in relation to each *possible world*. In classical logic, truth values are mutually exclusive, i.e. the sentence is either true or false, and cannot be both at the same time. Computer science has come to use the term *model* to designate a possible world. Thus, the statement "*m is a model for the sentence  $\alpha$* ".

The development of legal ontologies is essential to the construction of legal algorithms, serving as a method for abstractly conceptualising normative phenomena. However, there is no agreement on the best way to construct a given ontology, so the results are different depending on how it is constructed. An example is the construction of the legal ontology for the Spanish E-Gov project (EGO Model). Eleven ontologies have been developed: person, civil personality, organisation, lease, taxation, contractual model, jurisprudence, verification of real estate transactions, real estate, legislation and real estate transactions.

Each ontology class can be divided into subclasses; for example, the class "*person*" can be classified into "*natural person*" and "*legal person*". Each ontological

class has “*relations*”. Thus, “person” has six binary relations: “*has legal person data*”, “*has residence*”, “*is a buyer*”, “*is a seller*”, “*contracts*”, “*has natural person data*”.

The possibilities of structured Artificial Intelligence reasoning for the legal field became immediately apparent. The legal language is structured in a legal logic suitable for formalisation in algorithms (Benjamins et al., 2005). Various fields have been studied, such as: legal terms, deontic logic, legal application, judicial application, procedural reasoning and agent coordination. The great interest in this area has led to the emergence of a new research field called Artificial Intelligence and Law (AI-Law).

*Alan Turing* is rightly credited with the first formulations of what could be understood as an intelligent machine. He proposed what became known as the *Turing Test*. In it, a machine could be considered to be “*thinking*” if a human speaker could not distinguish it from a conversation with another human being. His analysis was based on the question: “*Can machines think?*” By machines he meant *digital computers as discrete state machines*, i.e. machines that move from one defined state to another. His position differed from that of the pioneers of computer science, such as *Lady Lovelace*, who claimed that an *analytical machine* could not originate anything, only perform tasks (Turing, 1950: pp. 433-460). *Turing* went far beyond the studies of his time and suggested the possibility of *machine learning*.

A definition of *artificial intelligence* can be expressed as follows: “*artificial intelligence is the activity of making machines intelligent, and intelligence is the quality that enables an entity to function properly and predictably in its environment*” (Nilsson, 2010: p. 13).

Several governments have started to define AI for research and regulatory purposes, such as Japan<sup>2</sup>, the United States<sup>3</sup>, the United Kingdom<sup>4</sup> and the European Union<sup>5</sup>. *The EU-Japan Industrial Cooperation Centre* defines AI as “*the development of software capable of performing tasks that normally require human intelligence (mimic human behaviour)*”<sup>6</sup>.

The first article on the subject by MINSKY, Marvin coined the name AI and identified it with five areas: *search, pattern recognition, learning, planning* and *induction* (Minsky, 1961: pp. 8-30).

AI is generally divided into the following areas: *machine learning (ML)*, *natural language processing (NLP)*, *image processing* and *speech processing*. Some sub-areas have become increasingly prominent, such as *deep learning (DL)*, which is

<sup>2</sup>[https://www.eubusinessinjapan.eu/sites/default/files/artificial\\_intelligence\\_in\\_japan.pdf](https://www.eubusinessinjapan.eu/sites/default/files/artificial_intelligence_in_japan.pdf)

<sup>3</sup>[https://www.whitehouse.gov/sites/default/files/whitehouse\\_files/microsites/ostp/NSTC/national\\_ai\\_rd\\_strategy\\_plan.pdf](https://www.whitehouse.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/national_ai_rd_strategy_plan.pdf)

<sup>4</sup>[http://www.publications.parliament.uk/pa/cm201617/cmselect/cmsctech/145/14502.htm?utm\\_source=145&utm\\_medium=full-bullet&utm\\_campaign=modulereports](http://www.publications.parliament.uk/pa/cm201617/cmselect/cmsctech/145/14502.htm?utm_source=145&utm_medium=full-bullet&utm_campaign=modulereports)

<sup>5</sup><http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-582.443+01+DOC+PDF+V0//EN&language=EN>

<sup>6</sup><http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-582.443+01+DOC+PDF+V0//EN&language=EN>

part of the area called *machine learning (ML)*.

*Machine learning* is the process of inducing a hypothesis from an experiment. The ability to improve, to learn, to optimise the performance of a task is fundamental to the notion of intelligence (Faceli et al., 2011: pp. 2-3). Induction is the logical mechanism that starts from a finite set of examples to arrive at more general conclusions. ML algorithms attempt to solve problems from a bounded set of data. Examples of ML applications are varied and range from cancer research to the use of autonomous vehicles, credit card fraud and could very well be applied to the detection of tax evasion.

*Machine learning* is subdivided into several specialised sub-areas, such as *decision tree learning, association rule learning, artificial neural networks, deep learning, inductive logic programming, support vector machines, clustering, Bayesian networks, reinforcement learning, representation learning, similarity and metric learning, parsing dictionary learning, genetic algorithms, rule-based machine learning* and *learning classifier systems*. *Deep learning* has been notable for the fruitfulness of its studies, becoming a much researched and cited area in Computer Science, to the point of being considered almost an autonomous line of research.

*Natural language processing (NLP)* is the branch of AI that deals with the interface between natural (human) language and computer language. For decades, one of the main goals of machine learning has been to achieve massive real-time translation from one language to another. The same effort has been devoted to achieving better results in *image processing* and *speech processing*.

*Machine Learning* stands out among the different areas of AI when it comes to analysing its potential applications to law, especially in the face of questions about the breadth of its possible uses.

One of the most prominent applications of AI is to provide us with a *legal expert system*. We consider an expert system to be a model designed to use the same rules that an agent in a domain would use to reach the same conclusions. The domain of knowledge and the rules used to derive conclusions from facts must be the same as those that a subject in an area would use (Faceli et al., 2011: pp. 2-3). We consider a rule to be the logical process that compares an object with a possible value, using an operator, and generates a conclusion. A classic example of a rule is the conditional “if p, then q”.

Since the 1980s, several legal expert systems have been built. Among them are: CHIRON (*tax planning*), JUDGE (*criminal*), Split-Up (*family law*), TAXMAN (*business reorganisation*). Several research centres have studied the architecture of legal expert systems (*legal expert system design*), with varying results. Over-reliance on technology and high expectations meant that the models presented were initially discredited, which reduced the vigour of research for a few decades<sup>7</sup>. New developments in computing power and innovations in software engineering

<sup>7</sup>LEITH, Philip. THE RISE AND FALL OF THE LEGAL EXPERT SYSTEM. *European Journal of Law and Technology*, [S.l.], v. 1, n. 1, Mar. 2010. ISSN 2042-115X. Available at: <<http://ejlt.org/article/view/14/1>>. Access date: 21 Apr. 2019.

have stimulated an upsurge of research in the area, with expectations of new disruptive and exponential solutions for the legal market (Susskind, 2008).

Advances in AI have made it possible to build “*knowledge systems*”, i.e. systems with the ability to answer specific questions in a given domain, but without the capacity to actually act as a subject matter expert. An example would be a system to check the taxation of a subsidiary under a given legal system. *Knowledge systems* are less ambitious or sophisticated models than legal expert systems, and support experts (Gruner, 1986: pp. 261-262).

Several areas have shown strong development in the recent period: *decision tree learning, association rule learning, artificial neural networks, deep learning, inductive logic programming, support vector machines, clustering, Bayesian networks, reinforcement learning, representation learning, similarity and metric learning, sparse dictionary learning, genetic algorithms, rule-based machine learning and learning classifier systems*.

Models using a mixture of symbolic and connectionist AI are now being worked on.

### 3. Argumentation Methods in Artificial Intelligence Applied to Law

The method of formalisation has been employed with relative success in general legal theory, particularly through the use of deductive reasoning and deontic logic in normative applications. It is also true that any theory of legal order necessitates a formal model. *Robert Alexy* draws attention to the essential feature of the “*open texture*” of legal rules. Often, the legal system does not contain written rules that allow a deduction to be made that directly resolves a given case. At other times, in extreme cases, the system may authorise decisions contrary to the legal text. This does not prevent deductivism and formalisation from playing an important role in law.

As important as the deductive reasons for a decision are the non-deductive reasons, called “*hermeneutic reasoning*” by *Alexy*, but which we will refer to as “*argumentative reasons*”. Two main theoretical currents have diverged on the subject. On the one hand, *Herbert Hart* argued that, faced with open-textured norms, judges can decide freely, according to their moral and personal convictions. *Ronald Dworkin* took the view that law is made up of rules and principles and that there will always be a correct way of deciding an open-textured case, by applying the legal principles of the law. Between these two extreme views, national systems have adopted reasonable responses.

The use of algorithms has become widespread to help lawyers and judges make decisions, so that they can be used to search for case law, suggest the wording of initial motions, draft votes and automate forms.<sup>8</sup>

<sup>8</sup>BORAN, Marie. Artificial Intelligence judges court cases with 79% accuracy. Irish Times. Available at <http://www.irishtimes.com/business/technology/artificial-intelligence-judges-court-cases-with-79-accuracy-1.2842492>, 2016. Accessed 30.04.2019, at 9:01. Boston Consulting Group and Bucerius. How Legal Technology Will Change the Business of Law. <http://www.bcg.de/documents/file204646.pdf>, 2016, Accessed 30.04.2019, at 9:30.

A more sensitive case is the use of automated mechanisms to deliver legal opinions, such as automated analysis of contracts and contractual clauses, automated analysis of fines, corporate reorganisations and tax planning.

Another promising field has been the use of elaborate algorithms for decision-making. In this case, artificial intelligence not only assists the legal operator, but also makes decisions on concrete cases. This possibility is usually associated with cases of low complexity, such as the resolution of traffic fines or lost airline tickets.

The use of mechanisms to automate arguments has shown great promise in resolving time-consuming procedures for lawyers and judges. Repetitive, tedious and boring tasks can be performed by machines, freeing lawyers for more relevant activities. A good example is the automated completion of procedures and formalities without human intervention in tax enforcement. In this case, idle times in the process, understood as the time in which the progress of the case depends on some activity to move it forward, can be significantly reduced with the use of algorithms.

A good example of the use of artificial intelligence is its use to assist in tax enforcement proceedings. The experience of the Court of Justice of Rio de Janeiro illustrates the potential of using automated procedures as a means of administrative efficiency. The development of new modes of judicial management has progressed through a coordinated set of measures. On the one hand, management development measures were refined by exploring new developments in the management of resources, procedures and people. The constraints imposed by the Fiscal Responsibility Law posed significant challenges, as on the one hand, society demanded greater access to judicial services, with increased speed and quality, and on the other hand, there was a significant budgetary constraint on staff costs.

An alternative was the intensive use of mechanisation of routines, with the help of the increasing supply of new machines, computers and equipment to facilitate judicial routines. Administrative rationalisation measures were implemented, with re-engineering of personnel and processes, simplification of routines and digitalisation of processes, with the implementation of an electronic process to replace physical processes.

The limits of the increasing use of mechanisation soon became apparent and a new approach through the use of automated mechanisms became necessary. The difference between mechanisation and automation is that mechanisation requires the presence of humans to carry out the mechanical procedures, whereas automation is an autonomous mechanical process, i.e. without the necessary presence of a human operator. The key to automation lies in the use of a computer program as the driver of the automated routines. The program will coordinate the steps of the machine routine until the expected result is achieved.

The software that performs the tasks automatically, eliminating the need for human operators, is called an automated agent. The advantages are obvious, making manual and tedious work in registry offices unnecessary, such as attaching and verifying documents, storing files, generally in piles; sewing, numbering, sta-

pling and removing staples, verifying and registering in a physical book, among many and innumerable acts that made up the so-called “*dead time*” of the process. From then on, lawyers and judges were able to devote more attention to the case and not to the innumerable and difficult procedural acts. Time management became more efficient and more demanding. The control of deadlines became clearer, leaving behind the manual control in the court offices. Equally important has been the control and management of the productivity of officials and employees. Decision-making has become the new judicial bottleneck. All new technologies are intended to assist decision-making or even allow for its automation.

The use of automation has been seen as an effective solution to budgetary, staffing and resource constraints in the face of a growing and anxious demand for fast and quality judicial results.

The TJRJ has found in the automation of procedures a viable alternative to the serious problem of tax executions. These represent 75% (seventy-five percent) of the stock of enforcement proceedings in the country. They account for the largest share of the judiciary’s congestion rate, representing 38% (thirty-eight percent) of all pending cases. The case of Rio de Janeiro is even more striking, with a congestion rate of 66 per cent (sixty-six per cent) in the knowledge phase and 94 per cent (ninety-four per cent) in enforcement. In state courts, this represents 86% (eighty-six percent) of cases.

The results of the implementation of AI at the TJRJ were striking. The pilot test on 7,000 tax enforcement cases yielded million-dollar results, collecting R\$32 million and saving the public coffers another R\$12 million in just 3 days. The speed was spectacular: 1400% faster than server. The PoC (*proof of concept*) conducted at the TJRJ for the use of artificial intelligence in the Tax Executive obtained largely favourable results. The logic used demonstrates the broad scope of the steps taken: a) identify the cases with a valid and positive summons; b) determine the updated value of the debt, cross-referencing with the Rio de Janeiro municipal database; c) identify the nature of the tax and the appropriate course of action; d) perform the seizure using the BACENJUD system; e) wait for the deadline for the outcome of the seizure; f) know the outcome and proceed in one of two ways: f.1) if the amount of the debt is not paid; f.2) if the amount of the debt is not paid; f.3) if the amount of the debt is not paid; f.4) if the amount of the debt is not paid; and f.5) if the amount of the debt is not paid. f.1) if the amount of the attachment is total, transfer the amount to the judicial account and unblock the surplus, suggesting the draft of the respective judicial decision; f.2) if it is negative or partial, restrict the assets available in RenaJud and consult InfoJud, informing whether or not there are attachable assets and suggesting the draft of the respective decision.

The results were surprising. The proof-of-concept AI system took a measly 25 (twenty-five) seconds to perform all of the above, whereas a well-prepared server could have taken just over half an hour. Bearing in mind that the machine takes no breaks and achieved 99.95% accuracy of the procedures adopted. A margin of error of 0.05% compared to an average of 15% in human error.

Another very promising area is the use of sorting algorithms, which has been used by several courts, the most significant being the STF. The problem was to rank cases according to issues of general impact.

The STF is faced with 350 new cases a day, with an average of 60 pages of text and images. In total, Victor has to deal with a mass of 14,000 cases, out of a total of 200,000 historical cases.

The task required solving several practical problems. In a first step, it was necessary to extract, transform and recognise the data of a case. In this first phase, five types of documents were selected: judgement, extraordinary appeal (ER), interlocutory appeal (ARE), order and judgment. The results achieved an astonishing assertiveness rate of 93%. The SCJ has applied AI in case classification, with an accuracy rate of 86% for case classification.

The possibilities for using AI in support of judicial decisions could occur in a multitude of cases that have not yet been fully explored or disseminated, such as: 1) in the performance of acts of constriction automatically (online attachment, Renajud and others); 2) identification of cases of dismissal and suspension by the regime of repetitive appeals, general repercussion, IRDR and complaints; 3) de-recording of hearings or recorded evidence; 4) classification of cases according to STF and STJ themes; 5) elaboration of case reports; and 6) classification of cases according to STF and STJ themes; 7) case reporting; 8) fraud and abuse detection; 9) more careful decision-making in mass claims; 10) assessment of risk and consequences of the decision; and 11) case law research.

A more serious problem is to consider the use of algorithms for decisions in more complex cases. In this case, would the use of algorithms for judicial decisions on the merits offer any constitutional principle, would the principles of the natural judge, contradiction, full defence, due process, among others, be protected?

Would the use of algorithms for automated decision-making violate the requirement that judgments be reasoned, as one of the pillars of a comprehensive defence? Such considerations will still require reflection by doctrine and jurisprudence.

Algorithms do not act independently. Someone has to establish their architecture, parameters, damage domain, objects and relations. Thus, in a courtroom, it will access documents, petitions, decisions, case law and begin to understand patterns, infer groupings and correlations, and finally propose judicial decisions based on the parameters informed by the magistrate (PORTO, 2018, p. 37). In this case, the judge retains the power of decision and receives a draft decision, which he or she may or may not accept.

#### **4. The Problem of Bias and Discriminatory Algorithms**

It has been shown that brain activity exhibits cognitive biases that alter the perception or judgement of facts and context. Thus, legal interpretation cannot be considered a purely rational activity. There are clearly deviant elements that affect the act of interpreting and affect the fairness of the judgement. Decision theory

must take into account the biases and heuristics that influence the decision-making process.

Several biases have been studied in depth, such as confirmation bias, status quo bias, loss aversion, framing bias, unrealistic optimism and temporal myopia (Freitas, 2013: p. 243).

The problem of biased or discriminatory algorithms is real and troubling, making the analysis of the structuring of *well-designed* algorithms an imperative for the legal analysis of AI.

Cass Sunstein believes, on the contrary, that AI helps to reduce human error and cognitive bias through objective decision-making mechanisms (Sunstein, 2018a). In his view, the use of automatic decision-making mechanisms would be a protection against the mental automatism of judges and their subjectivism. While this view is thought-provoking, it should be borne in mind that a judge decides on the basis of broader elements, which often go beyond the rigid format of algorithms, so this initial enthusiasm should be greeted with great caution.

A notable case illustrating this concern is the Dutch childcare benefits scandal (2013-2019), where a tax algorithm flagged thousands of families, many with dual citizenship or immigrant backgrounds, as fraudsters. The algorithm misclassified minor administrative errors as intentional fraud, resulting in harsh consequences, as child custody removals, and financial penalties. This episode alerts how algorithmic opacity can provide an institutional mass discrimination, without proper limits (Berends, 2021).

## 5. Constitutional Foundations: From the 1946 Constitution to the Artificial Taxing Power

The constitutional construction of the taxing power in Brazil has been consolidated since the 1946 Constitution, in an environment of democratic reconstruction and affirmation of fundamental rights. By limiting the taxing power, the Constitution also limits the artificial power to tax. Aliomar Baleeiro's classic study on the constitutional limits to the taxing power emphasised that taxes, because of their compulsory nature, must be contained by rigid legal guidelines: legality, non-retroactivity, anteriority, equality and capacity to pay.

These fundamentals were reaffirmed in subsequent Constitutions and acquired normative density in the 1988 Charter, especially in Art. 150, which establishes limitations to the taxing power. These limitations are intended to ensure that taxation is an instrument of justice and not of state arbitrariness.

With the emergence of intelligent systems in tax administration, operating on the basis of data, historical patterns and algorithmic models, a new type of technical authority has been established: the Artificial Power to Tax. It is not the result of a decision of the legislator, but of a functional delegation to systems that process, interpret and apply tax rules autonomously or without full human mediation.

This new power requires updating constitutional guarantees in light of the risks

posed by artificial intelligence. The notion of strict legality must be complemented by the requirement of algorithmic transparency, explainability and logical traceability of automated decisions. Proportionality now depends on the ability of AI systems to recognise the contexts and singularities of taxpayers.

It is therefore proposed that a Digital Taxpayer's Bill of Rights be drawn up, based on the constitutional limitations to the artificial power to tax, but adapted to the new risks of the automated environment. This charter should guarantee:

- The right to human review of automated tax decisions;
- The right to an explanation of the algorithmic logic used;
- Right to an assisted hearing in digital format;
- Prohibition of tax rulings based solely on automated profiling - The right to well-designed and curated algorithms, with taxpayers' participation e;
- the right to well-designed and curated algorithms, with the involvement of taxpayers.

The defence of taxpayers' fundamental rights in the digital environment is today a coherent extension of the constitutional project initiated in 1946 and consolidated in 1988. By limiting the power to tax, the Constitution also limits, and must continue to limit the artificial power to tax.

However, given the increasing complexity of state action mediated by algorithms and AI systems, it is legitimate to propose a debate on a possible constitutional update. Such a proposal would include the explicit inscription of the principles of algorithmic governance, explainability and the right to human review as permanent clauses of citizen protection. In this way, two possible paths coexist:

- 1) the path of infra-constitutional standardisation, fully feasible in the current scenario, and;
- 2) the ambition of a constitutional reform aimed at digital tax justice and protecting citizens from the artificial power to tax.

The analysis of foreign constitutions shows that this is not only a Brazilian problem. The 1993 Political Constitution of Peru<sup>9</sup> also establishes fundamental principles related to taxation, such as legality, equality and respect for fundamental rights (Art. 74). Although it does not explicitly mention AI, these principles provide a basis for regulating the use of digital technologies in tax administration.

In 2022, the Peruvian government launched the Peruvian Charter of Digital Rights, an official non-binding document that reaffirms existing rights in the digital environment, including privacy, data protection and access to information. This charter serves as a reference for public policies related to digital transformation and the protection of citizens' rights in the virtual environment.

Argentina's 1994 Constitution does not directly address AI or automated taxation. However, infra-constitutional laws, such as Law 25.326 on Personal Data Protection, establish guidelines for the processing of personal data, which is relevant in the context of fiscal digitalisation.

Recently, the province of Cordoba has implemented ground-breaking legisla-

<sup>9</sup>Constitución Política del Perú de 1993, Art. 74. Available at: <https://www.congreso.gob.pe/>.

tion regulating the use of AI in tax administration. This legislation requires that any AI-based tax debt assessment be validated by a human official and that taxpayers be informed about the use of such technologies in inspection processes.

Chile's 1980 Constitution establishes principles such as legality and equality in taxation (Art. 19, No. 20). Although it does not mention AI, these principles are applicable to digital tax administration.

The Chilean Tax Code includes Article 8 bis, which guarantees taxpayers the right to know the reasons behind the actions of the Internal Revenue Service (SII). This means that even when algorithms are used in auditing, taxpayers have the right to know the criteria and processes involved.

In addition, recent debates have highlighted the need to regulate the use of AI in tax audits to ensure due process and protect taxpayers' rights.

The rapid evolution of artificial intelligence requires a constant updating of conceptual, regulatory, legal and constitutional frameworks. Since this article was first written, there have been significant advances in international regulation and in the development of technologies applied to law and taxation. Three elements stand out in the 2025 horizon:

The adoption of the AI Law by the European Union in 2024 constitutes the first comprehensive legal framework for regulating artificial intelligence in the Western world. The Act adopts a risk-based approach, classifying AI applications as unacceptable, high risk, limited risk or minimal risk. Systems used in public administration and fiscal decisions are classified as high risk, requiring:

- Algorithmic impact assessment;
- Explanability assurances;
- Effective human oversight, and;
- Recording and traceability of automated decisions.

For Brazil, although the AI Law has no direct application, it represents an important regulatory paradigm and can guide the formulation of specific rules on automated taxation and taxpayer protection from AI.

The exponential growth of generative language models (LLMs), such as GPT-4, Claude, Gemini and Deepseek, introduces new legal challenges. Unlike symbolic and connectionist systems, LLMs operate by statistical prediction of language, without an explicit formal ontology, which makes them difficult to audit. Their use in tax environments (e.g. taxpayer screening, predictive fraud analysis, automated issuance of notices) should be analysed with extreme caution.

The risks of using LLM require special attention. Lack of formal and traceable logic, hallucinated responses and strong biases in training data have been reported;

- Difficulty in ensuring decisional isonomy.

These factors make it urgent to develop regulatory criteria for the use of LLMs in the tax field, especially with regard to decision motivation, auditability and protection of sensitive data.

The challenge of *algorithmic explainability* (XAI - Explainable Artificial Intel-

ligence) becomes central when it comes to tax decisions. Several international initiatives have tried to build models that can be interpreted by humans. Authors such as Sandra Wachter (Wachter et al., 2017: pp. 76-99) propose the “right to explanation” as an extension of due process in digital environments. The OECD, in its report Tax Administration 3.0 (OECD, 2020)<sup>10</sup>, also recommends the implementation of algorithmic monitoring mechanisms and the use of transparent and auditable AI in tax administration.

For the Brazilian context, this requires the formulation of:

- Explainability protocols for tax algorithms;
- Mandatory human review of decisions with significant impact;
- Public tools for accessing the justification for automated decisions.

The next stage of digital tax justice thus depends on constitutionally oriented, technologically up-to-date and socially just algorithmic governance.

## 6. Artificial Tax Justice and Algorithmic Discrimination

The intensive use of algorithms in tax administration does not impact all taxpayers in the same way. The promise of efficiency can mask a regressive redistributive effect if automated systems reinforce historical structures of tax inequality. It is therefore essential to introduce a digital tax justice perspective as a guiding criterion for the algorithmic tax architecture.

In this context, the debate on *positive and negative algorithmic discrimination* becomes particularly relevant. *Positive algorithmic discrimination occurs* when a tax system automatically reduces audit intensity or grants extended payment terms to taxpayers in socially vulnerable conditions. *Negative algorithmic discrimination*, on the other hand, may involve disproportionately harsh treatment taxpayers, demanding excessive compliance measures. These cases exemplify how algorithmic behavior may realize or not the principles of proportionality and due process. compliance measures.

Positive *algorithmic discrimination* refers to the favourable and proportional treatment of taxpayers in a situation of economic vulnerability or low income. The Brazilian Constitution, especially in its articles 170 and 179, requires a differentiated legal treatment for micro-enterprises, small enterprises, cooperatives and enterprises that perform a relevant social function. In a digital environment, this means that algorithms must be designed to recognise these conditions and apply parameters compatible with substantial tax equality.

A smart tax system that does not include variables to protect these groups may inadvertently become a source of injustice. The absence of contextual calibration leads to the uniform application of criteria that, in practice, penalise unequally.

*Negative algorithmic discrimination*, on the other hand, smart targeting may also be legitimate and necessary in relation to abusive behaviour. The figure of the

<sup>10</sup>OECD. *Tax Administration 3.0: The Digital Transformation of Tax Administration*. Paris: OECD Publishing, 2020. Available at: <https://www.oecd.org/tax/forum-on-tax-administration/publications-and-products/tax-administration-3-0.pdf>. Accessed on: 4 July 2025.

persistent debtor, who repeatedly defrauds the system with illegal planning, may justify a higher degree of algorithmic monitoring. However, even in this case, it is essential to ensure due process: contradiction, full defence and audit of automated decisions.

The line between legitimate and unfair tax discrimination is blurred when it is mediated by algorithms. Automated tax systems must therefore incorporate principles of digital tax justice, recognising the different contexts of taxpayers and operating according to parameters of fairness, reasonableness and transparency.

Let's look at an algorithm that does not differentiate legitimate tax savings from taxes and labels it as outright tax evasion. This type of bias should be eliminated and avoided.

Cass Sunstein argues that algorithms, by eliminating cognitive biases, could improve the quality of public decisions, including fiscal ones (Sunstein, 2018b). However, this view does not address the possibility that algorithmic biases may reproduce and amplify biases resulting from the reproduction of discriminatory historical patterns. Critics such as Frank Pasquale (The Black Box Society), Sandra Wachter and Virginia Eubanks charge that opaque algorithms tend to amplify existing inequalities, especially when applied to vulnerable populations (Pasquale, 2015).

Eubanks, for example, shows how automated benefit systems have disproportionately penalised the poorest, with no real channels for challenge. In taxation, automated inspection systems can intensify surveillance of micro-entrepreneurs, immune entities and cooperatives, while protecting large groups with the resources to manipulate data and legal structures. AI is therefore not neutral: it translates the values, and possibly the biases, of those who program it and the data that feeds it. It is essential that the use of AI in taxation is permanently confronted with the principle of the dignity of the human person and the postulates of due process of law. In this sense, a Curator of the institutional design of tax algorithms is essential.

## 7. Comparative Constitutional Frameworks: International Approaches to AI in Taxation

The relevance of this topic demands a thorough examination of foreign experiences in order to extract analytical insights for the Brazilian proposal on AI regulation. An analysis of the regulatory frameworks in the United States, the United Kingdom, and China allows for a more precise understanding of existing pathways and their potential contributions to Brazil<sup>11</sup>.

A comparative review of constitutional and regulatory frameworks across selected jurisdictions reveals important variations in how countries are approaching

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<sup>11</sup> *Methodological Note*: the jurisdictions selected—the United States, the United Kingdom, Latin America's countries and China—were chosen due to their representative diversity in constitutional traditions, AI regulatory maturity, and the presence of digital tax innovations. The comparative analysis follows three criteria: 1) existence of constitutional or legislative provisions concerning AI or data governance; 2) documented application of AI in tax administration; and 3) the presence or proposal of digital rights frameworks applicable to taxpayers.

the intersection of artificial intelligence and taxation.

First of all, in **Brazil** we constitutionalize principles and rules in the Federal Constitution (Articles 5 and 150), that provides strong fundamental rights guarantees, and legislative debates are underway regarding the Artificial Intelligence Bill (PL 2338/2023). That not happens in other jurisdictions, neither in US, UK or China.

Although no formal framework exists yet, scholars have proposed a Brazilian Digital Taxpayer Bill of Rights aimed at consolidating safeguards in the age of algorithmic taxation. In different jurisdictions we have already some legal framework. In the United States, the Due Process Clause of the Fourteenth Amendment underpins constitutional protections, while the AI Bill of Rights issued by the White House Office of Science and Technology Policy (2022) establishes non-binding principles for automated systems. The Internal Revenue Service (IRS) has also published its AI Strategy (2020), signalling an intention to incorporate intelligent systems while preserving transparency. In the United Kingdom, constitutional guarantees stem from the Human Rights Act 1998, particularly Articles 8 and 14, while the Centre for Data Ethics and Innovation (CDEI) has produced influential reports on data and algorithmic governance. An implicit right to explanation is derived from GDPR interpretations, although its precise legal contours remain debated. Finally, China anchors rights protection in Articles 33 and 38 of its Constitution, further reinforced by the Personal Information Protection Law (PIPL). The AI Governance Principles (2021) offer ethical guidelines, and both the PIPL and the Data Security Law contribute to a growing but state-centric framework of digital oversight, including in fiscal contexts.

All these experiences illustrate the importance for a Brazilian future regulation consider international standards.

## 8. Conclusion: Constitutional Boundaries and the Future of Algorithmic Tax Justice

The rise of Artificial Tax Power, exercised by intelligent tax systems, opens a new chapter in the history of taxation. While increasing the efficiency of the state, it jeopardises constitutional pillars such as legality, the motivation of decisions and isonomy. The risks are not only technical, but also normative and ethical: opacity, reproduction of injustices, denial of defence.

The main risks identified are the reduced space for adversarial proceedings and full defence; automated profiling that reinforces inequalities and abuses (*profiling*); execution and decisions without significant human intervention and the difficulty to review unexplained decisions.

Some proposals should be carefully studied and analysed:

- *Digital Charter of Taxpayers' Rights*, with the precise establishment of principles, rights, duties applicable to the protection of taxpayers and limitations to the artificial power to tax.
- *Guidelines for the use of automated decisions* with the use of rules to ensure a due tax administrative process intensive in the use of artificial intelligence.

Country	Relevant Constitutional Guarantees	AI Regulation in Taxation	Digital Taxpayer Rights
Brazil	Articles 5 and 150 of the 1988 Constitution <sup>12</sup>	Artificial Intelligence Bill (PL 2338/2023) <sup>13</sup>	Proposed Brazilian Digital Taxpayer Bill of Rights <sup>14</sup>
USA	Due Process Clause (14th Amendment) <sup>15</sup>	AI Bill of Rights (OSTP, 2022) <sup>16</sup>	IRS Artificial Intelligence Strategy (2020) <sup>17</sup>
United Kingdom	Human Rights Act (Articles 8 and 14) <sup>18</sup>	Centre for Data Ethics & Innovation Reports <sup>19</sup>	Implicit right to explanation <sup>20</sup>
China	Articles 33 and 38 of the Constitution; PIPL <sup>21</sup>	AI Governance Principles (2021) <sup>22</sup>	PIPL and Data Security Law <sup>23</sup>

- *Mandatory audit and curatorship of tax algorithms*, analysing the algorithmic and regulatory impact of new systems on the fundamental rights of taxpayers.
- *Assurance of Curatorship* and periodic review reports on the Tax Administration's policies on the use of AI.
- *Discussions on a necessary constitutional amendment*, capable of updating the constitutional text and providing the country with a sound regulatory framework.
- *Search for international agreements and guidelines* to enable effective international cooperation (EU, US, UK and China).

These proposals should be rigorously examined and assessed, as they collec-

<sup>12</sup>Constitution of the Federative Republic of Brazil of 1988 (CF/88), Articles 5 and 150. Available at: [https://www.planalto.gov.br/ccivil\\_03/constituicao/constituicao.htm](https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm).

<sup>13</sup>Artificial Intelligence Bill (PL 2338/2023), Brazilian Federal Senate. Available at: <https://www25.senado.leg.br/web/atividade/materias/-/materia/157931>.

<sup>14</sup>Proposed Digital Taxpayer Bill of Rights, academic proposal (Caliendo, 2025), not yet enacted.

<sup>15</sup>U.S. Const. amend. XIV, § 1. Due Process Clause. Available at: <https://www.archives.gov/milestone-documents/14th-amendment>.

<sup>16</sup>White House Office of Science and Technology Policy (OSTP). Blueprint for an AI Bill of Rights. October 2022. Available at: <https://www.whitehouse.gov/ostp/ai-bill-of-rights/>.

<sup>17</sup>**IRS Artificial Intelligence Strategy (2020)**, Internal Revenue Service (IRS), USA. Available at: <https://www.irs.gov/pub/irs-pdf/p5316.pdf>.

<sup>18</sup>**Human Rights Act 1998 (UK)**, Articles 8 and 14. Available at: <https://www.legislation.gov.uk/ukpga/1998/42/contents>.

<sup>19</sup>**Centre for Data Ethics and Innovation (CDEI), Reports and Guidance on Algorithmic Bias**, UK Government. Available at: <https://www.gov.uk/government/organisations/centre-for-data-ethics-and-innovation>.

<sup>20</sup>**Implicit Right to Explanation**, derived from GDPR Article 22 and interpreted by UK Information Commissioner's Office (ICO). Available at: <https://ico.org.uk/for-organisations/uk-gdpr-guidance-and-resources/artificial-intelligence/>.

<sup>21</sup>**Constitution of the People's Republic of China**, Articles 33 and 38; and **Personal Information Protection Law (PIPL, 2021)**. English translation available at: <https://digichina.stanford.edu/work/translation-personal-information-protection-law-of-the-peoples-republic-of-china-effective-nov-1-2021/>.

<sup>22</sup>AI Governance Principles, National New Generation AI Governance Expert Committee (China, 2021). English translation by DigiChina. Available at: <https://digichina.stanford.edu/work/translation-chinas-new-generation-artificial-intelligence-governance-principles/>.

<sup>23</sup>**Data Security Law of the People's Republic of China (DSL, 2021)**. English translation by DigiChina. Available at: <https://digichina.stanford.edu/work/translation-data-security-law-of-the-peoples-republic-of-china/>.

tively signal the emergence of a new constitutional and regulatory architecture for tax governance. In this emerging framework, the exercise of algorithmic power by tax authorities must be constrained by principles of transparency and accountability, with clear legal boundaries to prevent abuse and arbitrariness. Crucially, this architecture must also reaffirm the fundamental rights of taxpayers in the digital age, ensuring that technological innovation does not erode constitutional guarantees, but rather strengthens democratic oversight and procedural fairness.

The emergence of the so-called artificial power to tax imposes, acutely, the need to review the constitutional frameworks of taxation and the constitutional limits to the artificial power to tax. The logic of statistical prediction, artificial agents and generative artificial intelligence is progressively impacting the logic of tax administration, legal interpretation and argumentation, as well as the classic principles of legality, proportionality, equality and motivation. The fundamental rights of the taxpayer face a new type of challenge: algorithmic opacity and depersonalisation of decisions.

It is not a question of resisting artificial intelligence as a technical phenomenon. On the contrary: it is about rescuing the centrality of the human being, and, more specifically, of the taxpaying citizen, within a system that tends towards a broad, diffuse and integral automation. The 1988 Constitution, far from being an obstacle to innovation, can and should be read as a normative anchor for the construction of a digital tax justice, in which the use of emerging technologies is subject to the logic of due process, the dignity of the human person and real contributive capacity.

In this context, a constitutional hermeneutic is required that interprets the traditional limits of taxation as limits equally applicable to the artificial power to tax. Legality demands explicability. Equality demands algorithmic curatorship. Motivation imposes auditability and human review. Proportionality requires contextual sensitivity and fairness in the distribution of tax risks and duties.

The intensive application of machine learning techniques requires a legal architecture capable of discerning between positive algorithmic discrimination, as in the case of favourable treatment of micro-enterprises, cooperatives and socially relevant entities, and negative discrimination, as in the tax treatment of persistent debtors. The challenge is to ensure that such a distinction does not become a mechanism for reinforcing inequalities or abuses of power, but a concrete expression of tax fairness.

Finally, the formulation of a Taxpayer's Digital Bill of Rights is not only legally possible: it is politically necessary and democratically legitimate. Its content must consolidate fundamental guarantees in the face of the advance of autonomous technologies in the field of taxation, making possible: mandatory human review of automated acts; access to the decision-making code; accountability for algorithmic failures; and citizen participation in the definition of digital tax parameters.

Taxation is not a technical end. It is a public function subject to the rule of law. Artificial intelligence can be an ally of tax justice, as long as its limits are defined

by the Constitution and not by opaque algorithms. The construction of constitutional limitations to the artificial power to tax is the challenge of our generation and of our time.

The advance of artificial intelligence in tax administration is not merely a matter of technological innovation—it represents a profound transformation in the exercise of public power. As algorithmic systems begin to influence or even determine fiscal obligations, the need for robust constitutional safeguards becomes imperative. This paper has demonstrated that while Brazil begins to shape its regulatory response, comparative experiences from the United States, United Kingdom, and China offer valuable—yet incomplete—models. In all cases, the absence of a specific constitutional framework to regulate AI in taxation exposes taxpayers to risks of opacity, bias, and abuse of discretionary power.

It is therefore urgent that Brazil and other democratic states take decisive steps toward a Digital Charter of Taxpayers' Rights, binding algorithmic transparency, and institutional accountability. These are not aspirational goals—they are constitutional necessities. The legitimacy of the digital tax state will depend not only on efficiency but also on the reaffirmation of due process, equality, and proportionality in algorithmic environments.

If left unregulated, artificial taxing power risks subverting the very principles it was intended to serve. A new constitutional and legal architecture must emerge—one that places human dignity and democratic control at the centre of technological governance. The future of tax justice in the algorithmic era depends on our willingness to act now.

Accordingly, identifying a tangible legislative route is no longer optional—it is a necessary step toward safeguarding oversight in digital tax governance. A practical route to operationalise the proposed Digital Taxpayer Bill of Rights could involve the incorporation of a specific chapter within Brazil's forthcoming Artificial Intelligence Law (PL 2338/2023). This chapter should define taxpayer-specific digital rights and require algorithmic impact assessments, human review mandates, and procedural transparency in fiscal systems.

## Conflicts of Interest

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

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