

The Role Of Digital Technologies In Combating Tax Evasion: A Comparative Legal Analysis

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Abstract: Tax evasion represents one of the most acute challenges confronting contemporary public finance law, with annual revenue losses conservatively estimated at USD 500 billion globally—a figure that, in developing economies, routinely exceeds official aid receipts. The digitalization of the global economy has profoundly transformed this landscape, simultaneously generating sophisticated new avenues for evasion while enabling the emergence of what scholars have termed “Tax Administration 3.0”: a paradigm in which revenue authorities deploy advanced regulatory technologies—encompassing artificial intelligence (AI), machine learning (ML), big data analytics, blockchain architecture, and real-time electronic invoicing—to enforce fiscal compliance with unprecedented precision. This article examines how these digital technologies are reshaping the legal and institutional architecture of international tax enforcement, drawing on doctrinal legal analysis, empirical fiscal data, and institutional case studies from the OECD, European Union, and United States.

Keywords: Tax evasion, digital tax enforcement, artificial intelligence, algorithmic accountability, GDPR, automatic exchange of information, international tax law, taxpayer rights, VAT compliance.

Introduction: The scale of fiscal loss attributable to tax evasion and illicit financial flows is not merely an accounting problem; it is a governance crisis. When sovereign states are systematically deprived of revenues necessary to fund public services, democratic legitimacy is eroded alongside fiscal capacity. Capital mobility has exponentially accelerated under globalization, enabling multinational enterprises and high-net-worth individuals to exploit jurisdictional fragmentation, hybrid legal mismatches, and offshore secrecy structures to obscure assets and artificially depress their global tax liabilities. Simultaneously, the digital transformation of economies has introduced borderless commercial paradigms — decentralized platform economies, remote digital services, and pseudonymous cryptocurrencies — that entirely defy traditional taxation nexuses predicated on physical presence and territoriality.

The rise of the digital economy has created structural

vulnerabilities in traditional tax systems. Cross-border e-commerce, platform-mediated gig work, and the proliferation of crypto-assets have each generated new modalities of income that are either invisible to legacy reporting systems or deliberately exploited to minimize fiscal obligations. At the same time, the very technologies enabling these new forms of economic activity—AI, distributed ledger systems, mass data analytics—are being repurposed by tax administrations as instruments of detection, compliance monitoring, and enforcement.

In response to these entrenched structural challenges, modern tax administrations are deploying sophisticated RegTech to proactively identify non-compliance through real-time data mining, algorithmic risk profiling, and predictive analytics. The central argument of this article is that this technological turn in tax enforcement is both necessary and insufficient. Necessary, because the informational asymmetry

between sophisticated tax evaders and under-resourced revenue authorities demands technological equalisation. Insufficient, because technology without law—without procedural guarantees, international coordination, and equitable access—risks producing a surveillance apparatus that is powerful but unjust. This duality is the organising tension of the analysis that follows.

The article proceeds in five chapters. Section 1 maps the conceptual and empirical landscape of tax evasion in the digital economy. Section 2 analyses the principal digital technologies deployed by tax administrations and evaluates their legal and operational effectiveness. Section 3 examines the international legal frameworks governing digital tax enforcement. Section 4 identifies the human rights and rule-of-law challenges generated by these technologies. Section 5 proposes directions for legal reform toward a coherent global digital tax governance regime. The methodology is comparative-doctrinal: it draws on primary legal sources—treaties, directives, and case law—and contextualises them through fiscal economics and the political economy of international regulation.

1. Tax Evasion in the Digital Economy

1.1 Concept and Forms of Tax Evasion

Precision in terminology in this area is not pedantry — it is a legal and political necessity. Tax evasion means the illegal, deliberate concealment or distortion of taxable income or assets, which is a criminal or administrative offense under national law. Tax avoidance, by contrast, refers to the use of legal gaps or ambiguities to reduce tax obligations without formal illegality, although its moral and political legitimacy is fiercely disputed. Between these poles is aggressive tax planning (ATP): activities that are technically legal but violate the spirit of applicable regulations, usually through artificially created legal structures designed primarily to gain tax advantages.

The Court of Justice of the European Union (CJEU) has clearly formulated this three-pronged difference in the doctrine of abuse of rights, ruling in *Halifax* that transactions made for the primary purpose of obtaining tax benefits have no real economic value. The purpose of obtaining tax benefits that have no real economic content is unacceptable, despite their formal legality. The OECD's BEPS project has similarly applied this distinction internationally, targeting mechanisms that transfer profits to low-tax jurisdictions without creating corresponding value. To systematically identify and quantify the ATP, the OECD has developed comprehensive systems that include "6+2" quantitative indicators that examine phenomena such as significant discrepancies in payment for non-audit services and

specific corporate governance indicators to identify behavior that significantly reduces the tax burden, which is contrary to the spirit of the law. Academic literature, including a comprehensive study by Brandl and others for the European Commission, demonstrates that these models make it possible to systematically classify multinational companies into targeted, lower-tax, and intermediate ones, providing empirical mechanisms for monitoring the decline in the tax base. The use of these data parameters at the macro level and at the company level over long-term periods significantly mitigates the impact of statistical deviations in one year, and the rapid adoption of these indicators at the legislative level reflects the growing attention of the international community to neutralize harmful tax practices.

The digitalization of the global economy has significantly blurred these established legal boundaries. Highly mobile digital capital allows businesses to create complex, decentralized corporate structures that constantly test the limits of legitimate tax evasion, sometimes turning to criminal evasion, before regulators can formulate a coordinated response. Hiding income earned through the platform can be both evasive (if it is not declared) and facilitated by legal loopholes (if they are incorrectly classified). Thus, regulatory technology must be adjusted to take into account both illegality and structural vulnerability. Thus, regulatory technology must be adjusted to take into account both illegality and structural vulnerability.

1.2 Challenges of the Digital Economy

The digital economy does not merely create new categories of taxable transactions; it systematically undermines the informational infrastructure upon which traditional tax compliance depends. Brick-and-mortar commerce generates paper trails, third-party reporting obligations, and physical presence requirements that provide tax authorities with multiple independent verification pathways. Digital commerce routinely eliminates all three.

The most acute structural challenge is the explosive proliferation of cryptocurrencies, digital assets, and decentralised finance (DeFi) protocols, which have collectively created parallel, highly opaque financial ecosystems operating largely outside the purview of regulated financial institutions. In early academic discourse, Marian hypothesised that cryptocurrencies could act as "super tax havens" because they possess traditional tax haven characteristics—anonymity and freedom from taxation—without requiring financial intermediaries. Subsequent scholarship suggests that while cryptocurrencies pose significant enforcement challenges, the immutable nature of blockchain ledgers

means that state-sponsored forensic tracing can effectively de-anonymize illicit flows where governments prioritise enforcement. This more optimistic assessment is nonetheless tempered by the rapid evolution of privacy-enhancing technologies — zero-knowledge proofs, encrypted privacy coins, and cryptocurrency mixers — which continue to challenge legacy tax enforcement concepts in ways that demand ongoing legal adaptation.

Further structural challenges compound the picture. The dematerialisation of economic activity means that significant value — software licences, data streams, algorithmically generated financial products — can be produced and transferred without physical presence in the taxing jurisdiction. The pseudonymity of crypto-asset transactions creates genuine difficulties for beneficial ownership identification, even where exchanges are subject to anti-money laundering obligations. The rise of the platform economy has systematically dismantled the traditional requirement of a physical nexus for economic activity to be taxed: multinational digital conglomerates now generate multi-billion-dollar revenues within market jurisdictions without maintaining any legally recognisable physical presence, rendering permanent establishment rules structurally obsolete. The decentralised nature of digital platforms additionally enables widespread micro-evasion by millions of individual gig economy participants who systematically fail to report income generated through peer-to-peer marketplaces — a challenge that the EU has begun addressing through DAC7's platform reporting obligations.

These challenges are not merely technical; they are structural to the architecture of digital markets. Any effective legal response must engage with that architecture rather than simply imposing legacy frameworks on fundamentally transformed economic realities. The EU's Value Added Tax in the Digital Age (ViDA) initiative and the OECD's Pillar One and Pillar Two proposals represent precisely this kind of structural rethinking, though with varying degrees of legal ambition and political feasibility.

1.3 International Nature of Modern Tax Evasion

Modern large-scale tax evasion is almost by definition transnational. The opacity that enables it — offshore bank accounts, shell company networks, nominee shareholding structures — depends on the exploitation of jurisdictional boundaries and the absence of effective inter-state information exchange. Zucman's landmark empirical work estimated that approximately 10% of global GDP is held in offshore financial centres, with the distribution of beneficial ownership

systematically obscured through layered corporate structures. The Panama Papers, LuxLeaks, and FinCEN Files disclosures confirmed not the failure of individual tax administrations but the systemic failure of global governance to establish binding, universal transparency standards.

The inherently cross-border nature of digital assets further exacerbates this systemic issue. Because proprietary data, intellectual property, and liquid digital capital can be transferred globally with minimal friction, evaders possess the capability to instantaneously shift assets beyond the jurisdictional reach of domestic authorities at the first sign of an impending audit. As Avi-Yonah has persuasively argued, the high mobility of capital in the modern globalised era heavily incentivises tax competition, forcing sovereign states into a race to the bottom that severely undermines both individual and corporate income tax bases unless a coordinated, multilateral legal regime is strictly enforced.

Hellerstein has similarly highlighted that determining which country has substantive or enforcement jurisdiction is no longer straightforward in an economy where value is created across networked interactions rather than through territorially bounded production. What this means for legal analysis is fundamental: no unilateral domestic regime — however technologically sophisticated — can resolve a problem whose architecture is designed to exploit the fragmentation of international law. A legally binding, technologically integrated multilateral response is an absolute necessity.

2. Digital Technologies Used Against Tax Evasion: Effectiveness and Impact

2.1 Artificial Intelligence and Machine Learning

Artificial intelligence has transformed the audit selection and risk assessment functions of leading tax administrations. Rule-based compliance systems, which flag deviations from fixed parameters, have given way to machine learning models that identify anomalous patterns across vast datasets — discrepancies between declared income and consumption behaviour, inconsistencies between corporate filings and sector benchmarks, networks of related-party transactions suggesting artificial profit shifting.

The operational results are demonstrably significant. HMRC in the United Kingdom has deployed AI-assisted risk profiling through its Connect system, which integrates data from over thirty internal and external sources — land registry records, social media activity, Companies House filings, and financial institution reports — to generate risk scores for individual and

corporate taxpayers. The Australian Taxation Office uses predictive analytics methods to prioritize compliance measures, reporting that its data matching programs have identified additional tax liabilities in the amount of 850 million Australian dollars in one financial year. The most striking thing is that the Center of Competence in Predictive Analytics (PACC) at the Austrian Federal Ministry of Finance uses machine learning algorithms to modernize risk management throughout the Austrian tax system.: In 2023 alone, PACC models autonomously analyzed about 6.5 million individual cases related to income tax, corporate tax, VAT and customs procedures of the transaction, identifying cases of false reporting and fraudulent activities and directly receiving additional tax revenues of about 185 million euros. Similarly, the Independent Greek State Revenue Authority has developed an advanced multi-source analysis system that dynamically uses data from multiple integrated sources to compile more than 100 different risk analysis criteria in an unstable domestic fuel market.

The most immediate legal problem concerns algorithmic bias and model explainability. Machine learning models are trained on historical audit data, which reflects the enforcement priorities — and potentially the biases — of previous administrations. If historical data reflects entrenched institutional biases or discriminatory auditing practices, the resulting predictive analytics will inevitably automate and scale those biases, disproportionately targeting specific demographic or socio-economic groups. More fundamentally, the opacity of complex neural networks creates what legal scholars have termed the “black-box problem”: decision-makers cannot explain why a taxpayer has been selected for audit in terms that the taxpayer can meaningfully challenge. Scholars have argued that explainable AI (XAI) is critical to bridge the “subsymbolic gap” between machine learning mathematical classifications and the legal duty to give reasons. This raises thorny issues under article 6 of the ECHR and equivalent remedies — issues that no major jurisdiction has resolved with legislative clarity.

A regulatory framework has been proposed to address this shortcoming. The artificial intelligence-based Tax Audit (ATAM) model is specifically designed to help tax authorities take a responsible approach to implementing artificial intelligence technologies, combining algorithmic efficiency with strict requirements for vertical fairness, transparency, and legal explainability. The appropriate legal response is not to ban the use of artificial intelligence in tax administration — the efficiency gains are too significant to be abandoned — but to impose mandatory requirements for explainability, independent

algorithmic auditing, and thorough staff review before any adverse assessment is made based solely on algorithmic risk assessment Article 22 of the GDPR, which restricts the adoption of exclusively automated decisions with significant legal consequences, is a useful, but currently insufficiently applied model.. Citron’s seminal work on “technological due process” argues that a new level of administrative procedural requirements is required, specifically designed for algorithmic decision-making conditions: mandatory verification by staff before taking adverse action, an assessment of the impact of algorithms, and an independent audit of model accuracy and bias.

2.2 Big Data and Data Mining

The utility of AI is conditioned on the quality and comprehensiveness of the underlying data. Big data analytics enables tax authorities to aggregate information from sources that were previously siloed, incompatible, or inaccessible: customs declarations, social security contributions, real estate transactions, cross-border payment flows, and corporate beneficial ownership registries. By establishing massively integrated central data warehouses, authorities can instantly cross-reference a taxpayer’s declared income against their digital footprint, purchasing habits, lifestyle indicators, and third-party commercial data. If a taxpayer declares an annual income of USD 50,000 while making mortgage payments on a USD 1.2 million property, purchasing a yacht, and travelling internationally in business class, the informational incongruity becomes detectable across integrated datasets where it would be invisible to any single administrative silo.

The empirical evidence for these systems’ effectiveness is considerable. Advanced data mining and predictive analytics have yielded substantially higher returns than traditional random audit methodologies: the integration of intelligent anomaly detection systems led to a 14% increase in audit yield for HMRC, while Mexico reported a 12.5% rise in recovered revenues following comparable RegTech adoption. Across broader international samples, aggregate tax revenues have risen by approximately 21–25% after the introduction of data-driven enforcement tools. These digital systems also simplify administrative costs by reducing the average audit duration from about 30 to 15 days, while increasing the accuracy of goal definition. The IMF noted that improved data analytics, combined with a 50% increase in the introduction of electronic registration, could lead to a dynamic increase in government tax revenues to 1.6% of GDP.

Nevertheless, Cockfield’s analysis reveals a fundamental problem: the transition to mass data

exchange and advanced analytics conceptually transforms taxpayers into “data subjects” whose rights face unprecedented threats from the supervisory capabilities of modern tax authorities. Blank also stressed that historically existing measures to protect tax secrecy were mainly aimed at promoting voluntary compliance and protecting citizens from systematic abuse by the government, and that the modern desire for transparency creates significant risks of accompanying sanctions for compliance. Accordingly, a serious legal problem arises. Data collected for one legitimate purpose — social security management, immigration control, anti-money laundering - can be used for tax control purposes without the knowledge or consent of the data subject. This problem of limiting objectives, central to Article 5(1)(b) GDPR, has not been addressed by existing EU case law, which typically treats interagency data exchange at an abstraction level providing limited operational guidance. What is required by law is a formal framework for interagency data exchange, which specifies acceptable purposes, retention periods, and individual notification rights. In the absence of such a framework, the pooling of personal data in government institutions for tax control purposes will remain legally controversial — and rightly so. The effectiveness of law enforcement cannot be acquired at the price of the right to protection from self-incrimination and the right to confidentiality of information.

2.3 Blockchain Technology

Blockchain is a paradox for tax control. Its fundamental cryptographic architecture — a decentralized, distributed, and immutable digital ledger — has unprecedented potential to combat tax evasion. Every crypto-asset transfer is timestamped, linked to wallet addresses, and permanently verifiable. State-sponsored crypto-tracing technologies, utilising advanced heuristic clustering and forensic blockchain analysis, enable specialised tax authorities to de-anonymize illicit financial flows by tracking digital assets through complex webs of intermediary wallets, dark-net markets, and decentralised exchanges. In practice, however, the pseudonymity of wallet addresses, the proliferation of privacy-enhancing technologies — zero-knowledge proofs, privacy coins, and cryptocurrency mixers — and the cross-jurisdictional character of blockchain networks create significant enforcement obstacles.

The practical impact of these dynamics is highly concerning. A comprehensive 2024 impact assessment analysing cryptocurrency tax evasion in Norway revealed that 88% of cryptocurrency holders failed to declare their digital assets to tax authorities — and this pervasive non-compliance persisted even among

investors utilising domestic exchanges that actively shared identifiable trading data with the Norwegian Tax Administration. This empirically demonstrates that merely subpoenaing exchange data is entirely insufficient without the simultaneous deployment of advanced blockchain analytics capable of tracing transactions across multiple protocols and privacy layers.

The European Court of Auditors’ Special Report on crypto-assets concluded that EU tax authorities lack both the technical capacity and the legal instruments to effectively tax crypto-asset income, estimating that substantial portions of crypto-gains go unreported across member states. The Markets in Crypto-Assets Regulation (MiCA), adopted in 2023, addresses some of these gaps by imposing registration and disclosure requirements on crypto-asset service providers (CASPs), while DAC8 extends automatic exchange of information obligations to crypto-assets. There is, however, a more affirmative dimension to blockchain in tax governance that has received insufficient attention. Smart contract-based tax collection — in which tax obligations are automatically calculated and remitted at the point of transaction, without reliance on voluntary self-declaration — represents a potentially transformative enforcement mechanism. Estonia’s e-tax system and proposals for automated VAT collection in digital marketplaces illustrate this direction. The legal challenge is to design such systems to accommodate dispute resolution and error correction without sacrificing their real-time remittance advantages.

2.4 Electronic Invoicing and Digital Reporting

Electronic invoicing (e-invoicing) and digital reporting requirements represent the most operationally mature digital enforcement tools currently deployed at scale. By requiring businesses to issue and receive invoices through state-approved electronic systems, tax administrations gain real-time visibility into VAT chains—dramatically reducing the scope for invoice fraud and carousel schemes. Missing trader and carousel frauds have historically exploited the non-digital attributes of legacy VAT systems, often orchestrated by sophisticated criminal networks; Ainsworth has long advocated for mandatory continuous transaction controls as the only viable mechanism to effectively neutralise these systemic frauds across jurisdictions.

The most prominent success story is Italy, the European pioneer in mandatory B2B e-invoicing. After the full implementation of the Sistema di Interscambio (SdI) program in 2019, Italy recorded an unprecedented reduction in the VAT compliance deficit, which

decreased by 10.7% to 12.7 billion euros in one year, representing approximately 32% of the total reduction in the VAT deficit across the European Union in 2019. The year is 2021. This significant increase in revenue demonstrates that structured electronic billing in real time is a highly effective means of neutralizing trading card fraud and unintentional non-compliance. Brazil's Nota Fiscal Eletronica (NF-e) system, introduced in 2005 and considered a global benchmark, similarly requires prior authorization of all commercial invoices through a federal server, eliminating the information opacity on which fraud depends rather than imposing more severe penalties. Brazil's Complementary Government Digital Accounting System (SPED) It has further changed the country's tax legislation, forcing companies to switch to a computerized monitoring system that makes it almost impossible to skip or manipulate transaction data.

At the supranational level, the EU VIDA legislative package, officially adopted on March 11, 2025 and published in the Official Journal of the European Union, establishes a comprehensive, legally binding framework for continuous digital VAT monitoring, replacing the retroactive European sales list with a dynamic transaction-based reporting model., which facilitates almost all VAT transactions. The international exchange of VAT data in real time between all Member States significantly reduces the scale of missing persons fraud within the Community (MTIC). The history of ViDA legislation is instructive as an example of the policy of harmonization of digital taxation. Estonia initially vetoed the package, arguing that forcing platforms to charge VAT would disrupt competition and unfairly place a burden on small businesses — a tension that illustrates the difficult task of bringing harmonized digital tax systems in line with different national economic interests. Estonia eventually lifted its veto after securing exemptions for small and medium-sized business structures, which in itself reflects a deliberate legislative choice to sacrifice uniformity in favor of political expediency. The 2025 EU VAT Reduction Report confirms the macroeconomic trajectory, clearly linking the ongoing reduction of the national VAT deficit with the active implementation of continuous transaction control, the expansion of the reverse charge system, and the structured architecture of electronic invoicing.

Special technological solutions applied in a vacuum are unlikely to lead to sustainable financial results if the underlying tax policy remains complex and riddled with loopholes. This understanding is supported by Pakistan's experience in implementing a point-of-sale integration system for the retail sector, which demonstrates that electronic invoicing can enhance

compliance even in cases where enforcement capabilities are limited, provided that the relevant legal framework is well developed. Empirical studies conducted in Latin America — Ecuador, Mexico and Uruguay — once again confirm that digital transparency, provided by constant monitoring of transactions, displaces illegal actors from the shadow economy. The most important legal issue that remains unresolved is whether real-time reporting should be structured as a formalization system in which invoices are pre-approved before being issued, as in Brazil and Italy, or as a post-audit system in which data is submitted after being issued. The verification model provides excellent protection against fraud; the post-audit model is less disruptive to existing business practices. The right choice depends on the level of development of the national digital infrastructure and the severity of existing VAT fraud cases.

3. International Legal Frameworks

3.1 OECD Standards

The OECD has been the main developer of the international tax legal framework for more than six decades, and its BEPS project, launched in 2013 in response to the egregious profit leakage revealed during the global financial crisis, represents the most ambitious reform of international tax regulations since the 1920s. The Fifteen BEPS action plans were aimed at manipulating transfer pricing, violating international treaties, harmful tax practices, and, most importantly for this analysis, the tax problems of the digital economy and reporting requirements for each country.

The Two-Pillar Solution, agreed in about 140 jurisdictions in 2021, represents a qualitative advance in previous OECD work. Pillar One is the fundamental redistribution of tax rights from the traditional link to physical presence in favor of market jurisdictions where the users and consumers of the corporation are actually located, which is a significant departure from the “source-versus-residence” paradigm, which has defined the structure of international tax law for a century. Pillar Two establishes a global minimum corporate income tax rate of 15% for large transnational corporations, aimed at eliminating economic incentives for transferring profits to zero-tax jurisdictions. Scholars including Avi-Yona and Kim, warn that as the technical details of these mechanisms become increasingly confused and blurred by political disagreements, the entire global tax deal risks turning into an extremely complex system devoid of practical meaning, especially when it comes to taxing digital businesses.

The compliance architecture of Pillar Two itself illustrates the digital intensity of the new tax order. The

Global Information Return (GIR) requires multinational enterprises to collect and present more than 100 different data, the vast majority of which are not initially accounted for by standard enterprise resource planning systems, which requires the coordination of up to 480 different data in different jurisdictions. State tax authorities are facing enormous pressure due to the need to create a secure digital infrastructure capable of receiving, processing, verifying and automatically exchanging this array of confidential corporate data through a Multilateral Agreement with the competent authority by the strict deadline for submitting centralized reports - June 30, 2026. The OECD has issued extensive administrative guidance, including “safe harbors” with a permanent simplified effective tax rate and “safe harbors” for country reporting for the transition period, to ease this burden during the initial phase of the transition period.

The Common Reporting Standard (CRS), which provides for the automatic exchange of financial account information between participating jurisdictions, is perhaps the most effective digital compliance mechanism available in the OECD. Over 110 jurisdictions committed to CRS implementation by 2023, and evidence suggests it has produced a marked reduction in the use of traditional offshore bank accounts for evasion. However, CRS has simultaneously stimulated demand for more complex opacity structures — non-financial trusts and crypto-asset holdings—that fall partially outside its scope. This displacement effect demonstrates analytically that information-exchange regimes do not eliminate tax evasion incentives but redirect them. The OECD’s Crypto-Asset Reporting Framework (CARF), introduced in 2023, represents the most targeted response to this next generation of opacity structures, standardising the automatic exchange of information concerning crypto-asset transactions. Both Pillar Two and CARF also face a critical structural gap: the United States Congress has not enacted Pillar One domestic implementing legislation, creating a fundamental weakness in a framework whose effectiveness depends on universal adoption.

3.2 EU Legal Framework

Within the European Union, the Directive on Administrative Cooperation (DAC) and its successive amendments have progressively expanded the scope of mandatory information exchange to encompass financial accounts, tax rulings, country-by-country reports, intermediary disclosure obligations, digital platform data, and crypto-assets. DAC6, which requires mandatory disclosure of cross-border tax arrangements exhibiting specified “hallmarks” of aggressiveness, is particularly significant because it

targets intermediaries — law firms, accountants, and financial institutions — rather than solely taxpayers, reflecting a mature enforcement strategy that recognises the structural role of professional enablers in facilitating sophisticated evasion. DAC7 expanded reporting obligations to digital platform operators by formally introducing platform companies as third-party reporting agents for tax purposes and closing a significant information gap in the gig economy.

The most technologically advanced iteration of DAC8, which was unanimously adopted by the Council of the European Union in October 2023, includes the OECD CARF and is directly aimed at eliminating the potential for tax evasion in the digital economy. DAC8 establishes strict rules obliging all crypto asset Management (CASP) service providers to implement strict, continuous due diligence procedures and automatically provide detailed transaction data to the competent authorities by January 31 of the following calendar year. Member states are legally required to incorporate DAC8 into domestic legislation by December 31, 2025, which will allow for the automatic mandatory electronic exchange of information on crypto assets from 2026. Academic critiques emphasize that DAC8, in particular, applies GDPR notification levels directly to CASP, creating a heavy compliance burden in different jurisdictions, which effectively neutralizes historical financial anonymity in the field of digital assets.

However, the steady legislative expansion of the DAC framework directly contradicts fundamental constitutional rights. The ruling of the European Court of Human Rights in the SIA “SS” case (C-175/20) confirmed that, although the tax authorities have a legitimate interest in processing personal data to combat tax evasion, such actions are not exempt from the strict proportionality requirements provided for by the GDPR, and that massive requests for unspecified data They are systematically illegal without proper legal registration. The European Court of Human Rights (CJEU) further strengthened the inviolability of professional legal secrecy in his landmark September 2024 decision in case C-432/23 (Luxembourg Lawyers’ Barro Order), expanding on his previous decision in the Orde van Vlamse Balis case to definitively block mandates requiring lawyers to disclose confidential client information related to general tax consultations under the DAC framework. The Court ruled unequivocally that such communications enjoy strengthened protection unless there is a clear, imminent risk of criminal prosecution against the client—a ruling that reaffirms lawyer-client confidentiality as an absolute cornerstone of the rule of law. The EU framework’s principal limitation remains its geographic constraint: its mandatory exchange and

disclosure regimes bind member states and a limited number of third countries, leaving significant information asymmetries in the wider global architecture.

3.3 FATCA and US Influence

The United States' Foreign Account Tax Compliance Act (FATCA), enacted in 2010, represented a unilateral assertion of extraterritorial jurisdiction over foreign financial institutions that has profoundly reshaped global banking practice. By requiring non-US financial institutions to report the account information of US persons to the IRS — on pain of a 30% withholding tax on US-sourced payments — FATCA effectively conscripted the global financial system into the service of US tax enforcement. To mitigate the extraterritorial friction and conflicts with domestic bank secrecy laws, the US successfully pressured allied nations into negotiating a vast network of bilateral Intergovernmental Agreements (IGAs), formally institutionalising the automatic bulk transfer of citizen data.

The regulatory significance of FATCA goes beyond its direct operational impact, as it has demonstrated that a sufficiently powerful state can extraterritorially impose disclosure obligations without a formal multilateral agreement, using market access as an effective lever of coercion. Subsequently, this model influenced the development of the OECD CRS. Scholarly opinion about FATCA are strongly divided. Initially, Grinberg described FATCA as an evolutionary step that could eventually benefit developing countries by creating a global model for automatic information exchange. Conversely, Christian convincingly argues that FATCA's extraterritorial "feature search" methods represent an unprecedented mining operation that violates the fundamental human rights of "random Americans" - people who hold U.S. citizenship only because of the geographical location of their place of birth., — in particular, their rights to privacy and to change citizenship without any penalties, and that forcing global banks to act as extraterritorial substitutes essentially deprives taxpayers of their fundamental right to understand their legal obligations.

The underlying legal validity of mass transfers under FATCA is becoming increasingly questionable. The Belgian Data Protection Authority has taken the unprecedented step of officially banning the transfer of tax data related to Belgian "casual Americans" to the US Internal Revenue Service in decision 61/2023, declaring the transfer of Belgian FATCA IGA data definitively illegal in accordance with GDPR. After considering the appeal, the Belgian Arbitration Court sent thirteen preliminary questions to the European

Court of Human Rights, instructing it to definitively determine whether FATCA agreements concluded before the adoption of the GDPR are legally valid in accordance with Article 96 of the GDPR, and, most importantly, whether the massive, indiscriminate transfer of citizens' data without any suspicion is consistent with the fundamental principles of the EU data protection law. If the European Court of Human Rights eventually invalidates these transfers, it will cause a systemic crisis in transatlantic tax cooperation, which will require an immediate review of international tax agreements in order to clearly integrate the strict guarantees of the GDPR. The US's refusal to implement CRS domestically remains a significant weakness in the global transparency architecture, creating a structural inconsistency that undermines the multilateral framework's legitimacy.

4. Legal and Human Rights Challenges

4.1 Privacy and Data Protection

The introduction of digital technologies to ensure compliance with tax laws inevitably entails large-scale processing of personal data — financial records, transaction history, communication metadata, and behavioral patterns - that are protected by international and regional human rights legislation. The GDPR, Articles 7 and 8 of the EU Charter of Fundamental Rights, and article 8 of the ECHR protect the right to privacy and data protection, as well as establish requirements for the proportionality of government interference in these rights. Tax coercion is a legitimate goal capable of justifying interference with privacy rights, but the proportionality of specific measures requires an individual legal analysis. The indiscriminate automated mass data exchange provided for by transparency regimes such as FATCA and CRS may violate the basic principle of GDPR data minimization (Article 5(1)(b)), which legally requires that the processing of personal data be strictly limited to what is absolutely necessary for the specified processing purpose.

The CJEU's rulings on data retention — most notably in Digital Rights Ireland and Schrems II — establish a clear principle: the mere usefulness of data collection does not justify its legal permissibility. Mass surveillance of all financial transactions without individualised suspicion, judicial authorisation, or documented proportionality assessment would almost certainly fail ECHR proportionality scrutiny under the Strasbourg Court's developing case law on bulk data collection.

This legal conflict is the subject of unprecedented litigation in many jurisdictions. In the United Kingdom, Webster v. HMRC [2024] EWHC 530 (KB) directly challenged the legality of FATCA transfers in

accordance with the UK GDPR: the plaintiff argued that the automatic mass processing of her financial data was completely devoid of any consideration of her individual circumstances or the absence of reasonable suspicion of tax evasion. a disproportionate violation of her fundamental rights to privacy. Although the UK High Court dismissed the claim on procedural grounds, recognizing it as an abuse of procedure that should have been appealed in court, the trial clearly revealed the existence of coordinated strategic judicial campaigns deliberately aimed at challenging the system of mass tax transparency in accordance with the Data Privacy Act, and the issues of proportionality remain completely unresolved.

The Belgian DPA's 61/2023 decision officially prohibiting FATCA transfers and the expected preliminary reference by the European Court of Human Rights represent the most important legislative changes in this area. The has also strengthened the doctrine of professional legal privilege in case C-432/23 (Luxembourg Lawyers' Order), ruling that national legislation requiring lawyers to disclose confidential client information in relation to general tax advice under the DAC exchange system is fundamentally invalid, and extending an earlier law on consumer protection. (C-694/20) decision. Taken together, these rulings confirm that the confidentiality of the lawyer-client relationship cannot be violated by the administrative logic of fiscal transparency, and that EU law imposes significant restrictions on how far digital reporting requirements can extend in protected professional relationships.

A proper legal structure requires a documented legal framework for each category of data processed for tax purposes, an assessment of the proportionality of data retention periods, individual rights of access and correction, and independent oversight of tax authorities' data processing activities. Very few jurisdictions have established such a framework specifically in a tax context. This gap is not just a formal legal flaw.; This is a lack of democratic accountability, and the growing jurisprudence of the European Court of Human Rights is beginning, though not fully, to address it.

4.2 Due Process and Algorithmic Decision-Making

Replacing human audit selection with algorithmic risk assessment creates procedural problems that existing administrative law systems are unable to solve. When a taxpayer receives an assessment or audit notification generated using an opaque machine learning model, what procedural rights does he have? Can they challenge the accuracy of the entered data? Can they get an explanation of the importance attached to the

various risk factors? Can they contact a decision-maker who has independently reviewed their case? The answers to these questions, according to most existing national legal systems, are deeply unsatisfactory. Administrative law doctrines of procedural fairness usually require that affected parties be notified of the grounds for making adverse decisions and have the opportunity to respond, but these requirements were developed for human—understandable decision-making processes, rather than for probabilistic models that identify patterns across thousands of variables.

The absolutely catastrophic consequences for humans of uncontrolled, deeply flawed algorithmic decision-making were clearly demonstrated in the Dutch Toeslagenaffaire (child care benefits scandal). Between 2005 and 2019, the Dutch Tax and Customs Administration implemented a self-learning algorithm for offline detection of child benefit fraud. The model was fundamentally compromised: it was developed based on historically biased data and improperly used dual citizenship and migration origin as the main determinants of risk. As a result, about 26,000 innocent families were falsely accused of large-scale fraud, subjected to severe financial sanctions and were in a state of irretrievable financial ruin, many of whom lost their homes and jobs. After a sharp public outcry and the resignation of the Dutch government, the Dutch data protection authority imposed a fine of 2.75 million euros on the tax administration for the gross illegal processing of confidential data of citizens.

The Toeslagenaffaire tragically highlights the absolute legal need for full explainability and transparency in the implementation of artificial intelligence in the public sector. The subsequent invalidation by the Dutch District Court of the SyRI (System Risk Indicator) algorithm, an algorithmic fraud detection system in the field of social security, in its landmark decision of February 5, 2020, confirmed that machine learning algorithms create an inherent risk of discrimination that violates Article 8 of the ECHR if it is not actively mitigated through verifiable transparency and reliable legal guarantees. Zuiderwin Borgesius characterizes this decision as a serious warning that fraud detection systems in the field of social security and taxation cannot legally function in a vacuum devoid of constitutional privacy protection. This analysis was supported by the Constitutional Court of Slovakia in the eKasa case (PL ÚS 25/2019), which abolished the risk assessment algorithm using machine learning of the tax authority, ruling that before the introduction of automated profiling of citizens, the constitution requires an official, transparent legal framework.

Malghieri and Komande argue that the GDPR already provides for the right to intelligibility of an automated

decision-making process, which provides a potentially applicable framework. Nevertheless, Article 22 of the GDPR, which restricts fully automated decisions leading to significant legal consequences, remains controversial in a tax context: a risk assessment that informs but does not formally determine the choice of auditors may fall outside the scope of article 22, but if risk assessments are usually made without careful review by staff — due to operational pressure due to excessive revenue growth. the authorities can encourage — the practical effect is automated decision-making, regardless of the formal structure. Legal reform should eliminate this gap by requiring a person to be genuinely, and not just formally, responsible for making tax decisions based on algorithms. The subsequent integration of mandatory human rights Impact Assessments and Algorithms (IAMA), as required by the Dutch House of Representatives after the Toeslagenaffaire decision, is an essential legal mechanism for ensuring algorithmic accountability, which should be adopted as a universal minimum standard for tax administrations implementing artificial intelligence systems.

4.3 Cybersecurity and State Responsibility

The centralisation of sensitive financial data in government tax databases creates cybersecurity risks with significant implications for state responsibility under international law. Revenue authorities that hold detailed financial information on entire populations become high-value targets for state and non-state cyber actors. The NIS2 Directive imposes cybersecurity risk management and incident reporting obligations on entities providing services in critical sectors, but its application to government tax databases is uneven across member states.

This dangerous dynamic was vividly illustrated by the devastating 2019 cyberattack on the Bulgarian National Revenue Agency (NRA), in which hackers successfully infiltrated central servers, resulting in the theft and public online publication of an 11 GB file containing the highly sensitive personal, financial, and tax data of over 6 million citizens — roughly 70% of the entire Bulgarian population. The Bulgarian DPA imposed a historic fine of BGN 5.1 million on the NRA for catastrophically failing to implement appropriate technical and organisational cybersecurity measures.

De la Feria and Grau Ruiz warn that, in addition to the immediate threat of cyber attacks, the massive centralization of taxpayers' digital profiles creates unprecedented risks of data misuse, especially when autocratic regimes use these technologies to carry out political surveillance or financial extortion under the guise of combating fraud. Appropriate legal responses

combine minimum cybersecurity standards for tax authorities with independent certification and regular penetration testing, mandatory reporting obligations for affected taxpayers, and legally defined liability frameworks for damage caused by government data leaks. These concepts are usually applied to private data controllers; the lack of equivalent standards for government databases indicates an unjustified double standard in data protection legislation, which has now been partially, though not completely, eliminated in the decision of the CJEU in Bulgaria.

4.4 Digital Divide and Developing Countries

The technological potential for ensuring compliance with tax laws in digital form is distributed radically unevenly between countries with advanced economies and developing countries. The global reality remains harsh: about 3.2 billion people are still not fully connected to the Internet, which highlights the serious differences in basic connectivity. Low- and middle-income countries often operate in highly fragmented and underfunded IT environments, lacking basic technological infrastructure, reliable e-government integration, and the specialized institutional capacity needed to implement sophisticated data mining algorithms or ensure the security of two-way AEOI data links. The UNCTAD data confirms that the technological infrastructure necessary for tax administration based on artificial intelligence, real-time electronic billing and complex data analysis is concentrated in the OECD member States.

This asymmetry has two interrelated consequences. First, developing countries are disproportionately victimised by capital flight and base erosion — losing an estimated USD 100 billion annually to profit-shifting alone — while lacking the enforcement tools to address it effectively. The irony is that the states most affected by international tax evasion are the least prepared to use technology that could detect it. Secondly, the global information exchange architecture assumes that the participating jurisdictions have the technical capabilities to receive, process and use the data transmitted under the CRS and other AEOI frameworks. Where such a potential is lacking, formal compliance with transparency standards leads to data that cannot be effectively used.

Without targeted capacity-building programs — through the IMF, the United Nations Tax Committee, and the OECD Development Center - that transfer technological and legal expertise to tax authorities in developing countries, an aggressive international tax transparency regime can lead to the legal entrenchment of a deeply unfair two-tier global system. Developing countries will be forced to comply

with OECD requirements in the field of digital technologies, which will create a huge, unbearable burden on their public services, which are experiencing severe resource shortages, lacking analytical capabilities, software or trained personnel who can use the exchanged data to mobilize vital domestic revenues. The Two-Pillar Solution is a step in the right direction, but its current structure still reflects the distribution preferences of OECD members. A truly inclusive system would provide developing countries with both legal rights and the technical capacity to exercise them.

5. Future Directions and Legal Reform

5.1 Global Standards for Digital Tax Governance

The current trajectory of international tax law is defined by a dangerous fragmentation of unilateral digital reporting requirements and conflicting domestic privacy regulations. To ensure the long-term viability, legal legitimacy, and operational success of digital tax enforcement, the international community must urgently establish truly harmonised, universally accepted global standards for digital tax governance. This endeavour entails moving definitively beyond a patchwork of competing regional directives toward a unified multilateral framework that standardises data schemas, mandates interoperable compliance systems, and utilises secure, unified transmission protocols. It is essential that harmonization also prioritize the rationalization and minimization of reporting obligations. The current excessive accumulation of identical taxpayer data in several competing jurisdictions under highly overlapping regimes — DAC, CRS, FATCA, ViDA, and the second component — significantly increases the scope of cybersecurity threats and actively violates the fundamental principles of data minimization. Future legal reforms should lead to the creation of a functionally compatible one-report technology architecture supported by highly secure decentralized cryptographic standards, which definitively guarantees access to confidential personal and corporate data only to sovereign entities with a legally justified and strictly proportional need.

The initiative of the UN Tax Committee to develop the UN Framework Convention on International Tax Cooperation, launched in 2023, represents the most institutionally inclusive efforts in this direction. Unlike the OECD-led processes, which reflect the interests of developed economies, a UN-based framework would allow developing countries to officially become co-authors of rules governing their fiscal capacity. The legal and political challenges are formidable — securing consensus among the 193 UN member states with radically different interests is qualitatively more

difficult than reaching an agreement among the 38 OECD members — but the benefits of legitimacy will be proportionately significant. In the interim, the gradual progress achieved through the expansion of the OECD/G20 comprehensive Framework, the strengthening of the Global Forum's peer review processes, and the development of model legislative provisions for digital tax administration can provide significant improvements without waiting for negotiations on a comprehensive global convention.

5.2 Ethical AI in Tax Administration

Responsible implementation of artificial intelligence in tax administration requires not only technical standards, but also legally established ethical principles. The OECD Principles on Artificial Intelligence, adopted in 2019 and subsequently approved by the G20, provide a useful regulatory framework that sets out the requirements for transparency, explainability, reliability and accountability. However, these principles remain recommendatory. Turning them into binding legal obligations of tax authorities requires the adoption of domestic legislative measures and international coordination.

To translate these general principles into enforceable safeguards, three legislative measures are particularly important. First, a mandatory algorithmic impact assessment before implementing any artificial intelligence system to enforce tax laws — similar to the data protection impact assessment required by Article 35 GDPR — should identify and mitigate discriminatory or disproportionate impacts before they harm taxpayers. Secondly, an independent audit of deployed artificial intelligence systems by technically competent authorities, rather than self-certification by tax authorities, should continuously verify accuracy, identify bias, and assess compliance with proportionality requirements. Thirdly, strict requirements for the work of staff must be observed: no decision on unfavorable taxation should be made solely on the basis of algorithmic data without a documented independent assessment of staff, which will definitively prevent the systemic automated disaster witnessed by Toeslagenaffaire. These requirements impose costs on the tax authorities, but these are expenses that the rule of law requires.

5.3 International Regulatory Cooperation

Effective protection of highly mobile, borderless digital assets and multinational platform economies requires significantly closer multilateral coordination. Current Mutual Legal Assistance Treaties and the Convention on Mutual Administrative Assistance in Tax Matters are extremely bureaucratic, slow and structurally

insufficient for the flexible realities of the modern digital era. Critical legal reforms should focus on developing universal, binding digital evidence standards, ensuring that blockchain forensics, crypto-tracing outputs, and real-time transaction data collected lawfully in one jurisdiction are admissible and legally defensible in the courts of another. It is also urgently necessary to update the rules for the cross-border application of digital technologies to resolve new jurisdictional disputes arising from decentralized autonomous organizations (DAOs) and offshore digital asset structures, creating clear legal mechanisms for joint inspections in several jurisdictions using securely shared and confidentiality-preserving artificial intelligence models.

Joint audit mechanisms that allow multiple tax administrations to coordinate simultaneous audits of multinational groups are currently available through bilateral agreements and the OECD's International Compliance Program, but participation remains limited and the legal framework for the exchange of audit information between jurisdictions is underdeveloped. Mutual recognition of enforcement decisions in digital form, allowing the tax authority of one jurisdiction to recognize and enforce decisions in another jurisdiction without a full review of the court decision, would significantly reduce the costs for taxpayers working in different jurisdictions to comply with the law while maintaining the effectiveness of law enforcement.

Conclusion

This article has argued that the technological turn in international tax enforcement is both transformative and legally underdetermined. Digital technologies—AI, big data analytics, blockchain, and e-invoicing—have demonstrably enhanced detection capacity, reduced informational asymmetries, and improved voluntary compliance in jurisdictions where they have been systematically deployed. Italy's 10.7% VAT gap reduction following SdI implementation, Austria's EUR 185 million in PACC-driven recoveries, and the rapid shrinkage of VAT gaps across jurisdictions adopting continuous transaction controls demonstrate that these are not marginal gains. In the face of revenue losses that undermine the fiscal foundations of the welfare state, they are necessary.

But necessity does not establish sufficiency. Three structural limitations constrain the effectiveness of digital tax enforcement, each requiring legal—not merely technical—responses. The first is jurisdictional: technologies deployed within national boundaries cannot compel disclosure from non-cooperating jurisdictions, and the global transparency architecture—notwithstanding the progress of CRS,

BEPS, DAC, and CARF—remains incomplete. The second is procedural: the rights of taxpayers subjected to algorithmic audit selection, cross-border data sharing, and automated assessments are inadequately protected by existing legal frameworks, as the Toeslagenaffaire, the Bulgarian NRA cyberattack litigation, and the pending CJEU scrutiny of FATCA agreements collectively and compellingly demonstrate. The third is distributional: the benefits of digital tax enforcement are concentrated in technologically advanced economies, while the costs of tax evasion are disproportionately borne by developing states that lack the capacity to participate in the digital enforcement revolution.

The concrete normative recommendations emerging from this analysis are three-fold. First, a new international convention should explicitly harmonise automatic tax information exchange with the highest global data privacy standards, unequivocally subordinating administrative tax transparency to the paramount principles of data minimisation and strict proportionality. Second, existing AEOI frameworks must be amended to mandate stringent cybersecurity minimums and include strict liability clauses for state-sponsored data breaches, guaranteeing compensation for affected taxpayers. Third, a digital taxpayer bill of rights must be codified at the supranational level, enshrining the prohibition of unexplainable algorithmic tax assessments, the preservation of legal professional privilege, and the establishment of an independent international digital tax ombudsman. Only by binding the immense power of digital enforcement technologies with rigorous, unbreakable ethical and legal constraints can sovereign states legitimately secure their vital revenue bases without fundamentally compromising the democratic rights and freedoms of their citizens. The building blocks—CRS, BEPS, DAC, FATCA, ViDA, CARF—already exist. What remains is the political will to bind them into a coherent, just, and universal whole.

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