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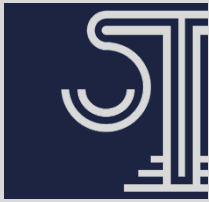
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# Studia

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# THE LEGAL DOCTRINE OF FORGERY AND FRAUD IN ROMAN CRIMINAL LAW WITH PARTICULAR EMPHASIS ON COUNTERFEITING

HOTTÓ, ISTVÁN<sup>1</sup> 

## ABSTRACT

This study examines the legal doctrine and historical development of forgery and fraud in Roman criminal law, with special emphasis on counterfeiting. It explores how *falsum*, initially a broad concept of deceit, gained clearer legal contours through the *Lex Cornelia de falsis* and later imperial legislation.

Using doctrinal, historical, and comparative methods, the paper analyses offences such as testamentary falsification, forgery of official documents, and monetary counterfeiting. Particular attention is given to the transformation of counterfeiting from a property-related offence in the Republic into a crime of *laesa maiestas* under the Empire, reflecting the growing centralization of monetary sovereignty and imperial authority.

The study argues that Roman criminal law treated falsification not only as a punishable act but also as a threat to public trust in legal and economic institutions. By examining classical sources, including the *Digesta*, the *Collatio Legum Mosaicarum et Romanarum*, and the writings of Ulpian and Paulus, the paper shows how Roman jurisprudence anticipated later European doctrines on state symbols, financial instruments, and deceit.

**KEYWORDS** Roman law; forgery; fraud; falsum; counterfeiting; legal history

## 1. Introduction

In several countries of the world, judicial practice no longer applies Roman law in any direct or formal sense. Nevertheless, in many jurisdictions Roman legal traditions continue to exert influence in various forms. This influence is particularly evident in those states whose legal systems, though grounded in the principles of Common Law – that is, uncodified customary law – retain elements derived, in whole or in part, from the Roman legal heritage. The Republic of South Africa and the Republic of San Marino exemplify this

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phenomenon: in both, the *ius commune* still plays a significant role, and neither possesses a unified Civil Code.

There is, moreover, another group of countries – such as Spain and several nations of Latin America – where Roman law remains subsidiarily applicable. In these systems, although codified civil legislation exists, courts may, in cases of legislative lacunae, rely on Roman legal principles to reach their judgments.

Finally, there are states – including Hungary – where Roman law has no formal subsidiary authority, yet judicial decisions occasionally invoke it not merely for interpretative or confirmatory purposes, but with decisive effect in the resolution of cases (Földi & Hamza, 2025).

One of the most remarkable cases of this kind was decided in 1998 by the Metropolitan Court of Budapest, acting as a court of second instance. The case concerned the theft of a car that had been loaned under a contract of *commodatum* (gratuitous use). The lender sought to hold the borrower liable for the loss, while the latter argued that he had carefully and diligently locked the vehicle and could not be blamed for its disappearance overnight. The Metropolitan Court incorporated almost verbatim into its reasoning the Roman-law-based argument presented in the statement of claim and held that the borrower was subject to *custodia* liability. Since theft constituted a *casus minor*, the court ruled that the borrower was responsible for the loss and therefore obliged to compensate the owner.

This decision illustrates a rare instance where a Hungarian court expressly applied Roman legal reasoning in a modern contractual dispute, invoking the classical doctrine of *custodia* liability derived from Roman law (Földi & Hamza, 2025).

From its earliest origins up to the Justinianic codification, Roman law did not recognize criminal law as an autonomous branch of jurisprudence. In the modern sense, therefore, a distinct category of Roman criminal law did not exist. During the formative period of the Roman legal system, the decisive distinction lay between the *ius civile* – the law applicable to Roman citizens – and other legal orders, as well as between the *ius publicum* and the *ius privatum*. The *ius publicum* comprised legal norms serving the interests of the community and regulating matters of public concern, whereas the *ius privatum* consisted of those rules established for the benefit and protection of private individuals (Pólay, 1957).

Domitius Ulpianus, one of the most eminent Roman jurists, held similar views, maintaining that Roman jurisprudence was divided into two fundamental branches. The first, *ius publicum*, regulated the operation of the state and

safeguarded the interests of the community, while the second, *ius privatum*, concerned itself primarily with individual legal relations and private interests.

Ulpian, born in Tyre (Phoenicia), rose to prominence under Emperor Septimius Severus and later served as *praefectus praetorio* during the reign of Caracalla. He subsequently became head of the imperial council during the minority of Emperor Alexander Severus, under the influence of Julia Mamaea. His strict integrity and opposition to the Praetorian Guard ultimately led to his death in A.D. 228, reportedly in the emperor's presence. Approximately one-third of the *Digest* (Pandects) of the *Corpus Iuris Civilis* consists of passages derived from Ulpian's legal writings ([A Pallas nagy lexikona, n.d.](#)).

The Roman legal system attached special importance to the prosecution of offences affecting the public interest, since such acts were regarded as threats to communal order and social stability ([Dudás, 2021](#)).

The present study, within the framework of the special part of Roman law, examines the legal aspects of forgery and fraud, with particular emphasis on the offence of counterfeiting. In addressing this topic, the analysis relies primarily on the work of János Zlinszky, *Római büntetőjog* (Roman Criminal Law), as well as on additional Hungarian and international scholarship, with the aim of providing a comprehensive overview of the Roman legal regulation of counterfeiting, its historical development, and its legal consequences ([Zlinszky, 1997](#)).

## 2. The Concept and Development of Forgery and Fraud in Roman Criminal Law

According to Julius Paulus, one of the most eminent Roman jurists of the late second and early third centuries, an act constituted *falsum* – that is, forgery or falsification – whenever it misrepresented reality but was nevertheless presented as true ([Collatio, 8.6.1](#)). However, Roman law did not punish every form of deceit in a general sense; only those acts that the *magistratus*, on the basis of existing legal provisions, considered punishable. The assessment of cases involving fraud or falsification was therefore subject to the discretion of the *magistratus*, who decided whether the matter should proceed to adjudication. Roman law contained no general or abstract definition of fraud; instead, the scope of punishable conduct was shaped by concrete cases brought before the courts.

The Twelve Tables prescribed penalties in four specific situations that would later fall under the categories of fraud and forgery. These included the rendering of a false judgment, perjury, the deliberate deception of a client, and – according to

Polybius – the purchase of electoral votes, although the latter’s classification as a defined offence remains disputed.

This early stage of Roman law was also characterized by the principle of *compensatio*, under which material compensation could replace private revenge. The concept is important because it demonstrates that the Twelve Tables still reflected a mixed model of legal response, combining civil reparation with punitive elements and thereby anticipating the gradual emergence of state criminal law (Czebe, 2024).

Paulus himself was a prolific author, credited with over three hundred legal treatises, including the monumental *Ad Edictum* (in eighty books) and *Ad Sabinum* (in fifty books), which became fundamental to classical Roman jurisprudence. He studied under Cervidius Scaevola, served as legal adviser to Papinianus, and later joined the imperial council under Emperor Septimius Severus. Many of his writings were incorporated into the *Digesta* of Justinian, making him one of the most frequently cited authorities in that compilation (Honoré, n.d.).

The *Collatio Legum Mosaicarum et Romanarum*, from which the cited passage originates, is a late Roman comparative compilation juxtaposing Roman and Mosaic law. Although not authored by Paulus himself, the *Collatio* preserves authentic fragments of his work and provides valuable insight into his interpretation of Roman legal doctrine. The text also held significance for late Roman Christian jurists, as it sought to harmonize Roman legal principles with biblical law (Hyamson, 1913).

The later *Lex Cornelia testamentaria nummaria*, also known as the *Lex Cornelia de falsis*, became a foundational statute in the regulation of forgery and falsification. This law remained authoritative in the Roman legal tradition for an extended period and played a decisive role in shaping the jurisprudence concerning falsification. Over time, however, its scope of application expanded significantly in judicial practice, eventually encompassing a wide range of additional offences related to deceit and counterfeiting (Zlinszky, 1997).

## 2.1. Testamentary Forgery under the *Lex Cornelia de falsis*

The first category of offences covered by the *Lex Cornelia de falsis* concerned acts of falsification and destruction related to wills and legal documents.

- a. Unlawful destruction of a will. The *Digesta* refers to this offence in several passages using different expressions and notes that the same penalty applies when a will is unlawfully opened during the testator’s lifetime, against his expressed will.

- b. Forgery or falsification of a will. This included signing, validating, or using a forged testament, as well as sealing, witnessing, or removing the seals of a genuine will. All such acts fell within the concept of *falsum* as defined by the *Lex Cornelia testamentaria nummaria*.
- c. The *Senatusconsultum Libonianum*. Under this special senatorial decree, anyone who inserted dispositions in a will for their own benefit or that of a relative was subject to criminal punishment. Exceptions were recognized only when the scribe (*scriba*) acted under the authority of the testator or when the testamentary disposition was personally confirmed by the testator. In other circumstances, the penalty could be remitted solely through an act of imperial clemency.
- d. Early *senatusconsulta* of the Principate. An early imperial senatorial decree extended the protective measures originally enacted for wills to other legal instruments, including the falsification or destruction of official documents and the forging of witness attestations. A more lenient penalty was, however, imposed when such falsification involved the subsequent alteration of an official record (*acta*) by a public officer, as compared to the stricter sanctions for testamentary forgery (Zlinszky, 1997).

## 2.2. Counterfeiting and Precious Metal Offenses (*Crimina Falsi in Nummis et Metallis*)

The phenomenon of coin counterfeiting emerged in ancient Rome as early as the fifth century B.C., coinciding with the introduction of coins bearing images on both sides. One face typically displayed the emblem of Rome, while the reverse depicted a deity such as Jupiter or Minerva. At that time, the value of money was not determined by counting individual coins but by weighing the metal content, reflecting the intrinsic value of the currency.

The earliest written record of coin counterfeiting as a distinct criminal offence dates from the praetorship of Marius Gratidianus, under whose authority legal action could be brought against offenders through a *quaestio* or penal complaint. This precedent marked the beginning of the independent legal treatment of monetary forgery in Roman criminal law, foreshadowing the later comprehensive regulation established by the *Lex Cornelia de falsis* (Angyal, 1940).

Counterfeiting of money was by no means a modern crime; it was treated with gravity already in ancient Rome. During the Republican period, it was initially classified merely as an offence against property, and counterfeiters could expect monetary fines or exile.

A decisive shift occurred in 81 B.C., when Lucius Cornelius Sulla enacted the *Lex Cornelia de falsis*, elevating counterfeiting to a serious public offence punishable even by death. In the Imperial era, legislation imposed progressively harsher sanctions on offenders.

A crucial turning point came with Emperor Constantine's edict of A.D. 326, which reclassified counterfeiting as *crimen laesae maiestatis* – high treason against the emperor and the state. The prescribed punishments were exceptionally severe, including complete confiscation of property and execution by burning alive.

Later, under Emperor Theodosius II in A.D. 438, the law was further reinforced. His decrees prohibited the melting down of coins, criminalized the possession of minting instruments, and extended liability to accomplices and accessories (Zlinszky, 1997).

In A.D. 529, Emperor Justinian further refined the legal definition of counterfeiting in his *Codex Iustinianus*. The imperial legislation expanded criminal liability to include not only those who produced counterfeit coins but also those who traded or circulated them. Moreover, the punishments were differentiated according to the nature and gravity of the offence, establishing a more precise system of sanctions.

The purpose of these measures was unequivocal: to protect imperial authority, to safeguard the stability of the economy, and to preserve public order within the empire. From a modern constitutional criminal law perspective, such an expansion of criminal liability also raises the broader question of the legitimacy of punitive power. Criminal law cannot be regarded merely as an instrument of state policy; rather, its use must be justified by the protection of fundamental legal values and by the principles of necessity and proportionality (Lévay & Czebe, 2024). The codification thus represents the culmination of a long legal evolution that began with the *Lex Cornelia de falsis* and continued through successive imperial reforms (Hermann, 2021).

In Rome, preventive measures were also introduced to combat coin counterfeiting. Specialized offices known as monetary inspection bureaus (*officia ad probandam monetam*) were established, whose primary function was to examine and verify the authenticity of coins in circulation. Their task was to determine whether a particular coin was genuine or counterfeit, thereby safeguarding the integrity of the Roman currency system and maintaining public confidence in the monetary economy (Mommesen, 1899).

During the rule of Lucius Cornelius Sulla, a period of comprehensive criminal law reform took place. Among these reforms, the statute enacted in 81 B.C. provided a detailed regulation of the *delict* of *falsum*, specifically addressing the offence of coin counterfeiting.

Under this law, the following acts were declared punishable:

- the mixing of base or inferior metals into coin casts,
- the reduction of the weight or substance of minted coins,
- the imitation or reproduction of coins in circulation, and
- the intentional distribution or circulation of counterfeit money.

These provisions reflected the Roman state's growing concern with the protection of monetary integrity and public trust in the currency system.

The perpetrators of this delict were subjected to *relegatio* – a form of exile or banishment imposed as a penal sanction under Roman law (Tóth, 2020).

In the Roman Imperial period, the reverse side of coins began to bear the image of the emperor, which fundamentally changed the criminal law perception of counterfeiting. From that time onward, coin forgery was no longer treated merely as *falsum* – an act of falsification – but rather as *crimen laesae maiestatis*, an offence against the majesty of the emperor (Balogh, 1988).

From this period onward, coin counterfeiting came to be regarded as a *delictum infidelitatis* – an offence of disloyalty or treason. It was also punishable to refuse acceptance of coins bearing the emperor's image as legal tender, since such an act was interpreted as a denial of imperial authority (Angyal, 1940).

High treason was punishable by death. During the reign of Emperor Constantine, penalties for coin counterfeiting were determined according to the offender's social status. Members of the *honestiores* class were punished by exile, while *plebeians* (*humiliores*) faced deportation and confiscation of property. Slaves (*servi*) convicted of the same offence were sentenced to death.

An acquittal could only be granted in cases of *voluntaria regressio*, which was considered a form of repentance acknowledged by imperial clemency (Rein, 1944).

The severity of the regulations continued to increase in the later Imperial period. The *Codex Theodosianus* also prescribed the death penalty for coin counterfeiting, while Emperor Justinian went even further by excluding the possibility of imperial pardon or public clemency for the offenders (Zlinszky, 1997).

The principal offences relating to coin counterfeiting and precious metals under Roman law included the following:

- the adulteration of gold bars by mixing them with other metals,
- the mutilation or reduction of coins,

- the counterfeiting of money, which also encompassed imitation by private individuals even when the counterfeit coins were of the same precious metal content and value as official currency,
- the deliberate use or circulation of counterfeit coins,
- the conscious refusal to accept genuine state-issued currency, and
- the withdrawal of small denominations (*nummus minutus*) from circulation (Zlinszky, 1997).

From the reign of Emperor Constantine onward, these offences – and coin counterfeiting in general – were frequently classified under *crimen laesae maiestatis* and were subject to aggravated capital punishment. Several passages of the *Codex Theodosianus* bear witness to this development. Even Emperor Justinian explicitly excluded counterfeiters from eligibility for imperial pardon (Zlinszky, 1997).

The punishment for coin counterfeiting varied considerably over time, depending on the historical period and the perceived gravity of the offence. Among the mildest sanctions were monetary fines and exile. In more severe cases, counterfeiters were sentenced to forced labour, often being sent to work in mines.

The offender's social status also played a decisive role in the determination of punishment. While free citizens typically faced severe but not necessarily capital penalties, slaves convicted of counterfeiting could be subjected to the ultimate punishment – crucifixion (Gruszka, 2021).

Beginning with the reign of Emperor Constantine, coin counterfeiting was treated as a crime of high treason punishable by the most severe sanctions, including execution by burning alive.

These draconian penalties were justified on several grounds.

First, they served to protect imperial authority, since the right of minting coins belonged exclusively to the emperor, and any infringement of this prerogative undermined the dignity and legitimacy of the state. Second, the aim was to preserve economic stability, as the circulation of counterfeit money could destabilize the monetary system and disrupt commercial exchange.

Finally, strict repression was also deemed necessary for the maintenance of public order, as counterfeiting generated social tension and eroded public trust in the currency.

### 2.3. *Judicial and Advocacy Offenses*

According to Roman criminal law, several offences were associated with the administration of justice and legal representation:

- the deliberate rendering of an unlawful judgment (*iniusta sententia consulto lata*),
- the active or passive bribery of judges in exchange for the delivery or omission of a judgment,
- under the *Edictum Theodorici*, such bribery in capital cases was punishable by death, while in other types of proceedings it was sanctioned by a fine amounting to four times the bribe,
- participation, mediation, or facilitation in acts of judicial bribery.

These provisions aimed to preserve the integrity of the judiciary and the fairness of the trial process, reflecting the Roman state's strong stance against corruption within its legal institutions (Zlinszky, 1997).

Further offences related to the administration of justice included:

- active or passive bribery for initiating or abandoning a prosecution, or for the giving or withholding of testimony,
- active or passive bribery aimed at inducing false testimony or concealing true evidence; the latter form was later generally subsumed under the *Lex Cornelia de falsis*,
- collusion between a party and jurors with the intent to secure the conviction of an innocent person,
- the disclosure by an advocate of documents received from the client to the opposing party, constituting a violation of professional secrecy,
- settlement or collusion with the prosecutor in cases of adultery or other non-capital criminal proceedings, and
- the delivery of a deposited document to one party without the consent of the other.

These acts were regarded as serious breaches of judicial integrity and professional ethics, reflecting the Roman state's determination to protect the sanctity of legal proceedings (Zlinszky, 1997).

#### 2.4. Simulation of Kinship or Rank (*Simulatio Cognationis aut Dignitatis*)

Roman criminal law also addressed cases involving the false assumption of personal or social identity. Such offences included:

- substitution of a child (*commutatio liberorum*): in such cases, only the directly affected parties were entitled to bring an accusation, and the offence was not subject to any statute of limitation,
- feigning of family relationships for the purpose of obtaining unlawful benefits or inheritance, and
- fraudulent assumption of rank or office (*simulatio dignitatis vel officii*): this did not, however, extend to the pretended claim of free birth (*ingenuitas*)

or civil status, since during the Republican era these were not covered by the Lex Cornelia de falsis.

These provisions reflected the Roman concern with the protection of social order, personal status, and the legitimacy of public authority (Zlinszky, 1997).

### 2.5. *Use of False Weights and Measures (Falsum in Ponderibus et Mensuris)*

During the Republican period, agents and public officials found guilty of using false weights or measures were subject to fines amounting to half of their property. Later, under Emperor Trajan, this offence was expressly punishable under the Lex Cornelia de falsis. The same penalty applied to those who falsified officially standardized weights and measures used in public trade. However, the mere use of such instruments – without falsification – was not criminally sanctioned by law.

Under Sulla, these offences were punishable by relegatio (exile). In subsequent periods, members of the higher classes could face deportatio (banishment with confiscation of property). In milder cases, penalties included the loss of half of one's estate, relegatio, and various dishonourable punishments.

For ordinary citizens, forced labour or the death penalty could be imposed, while for slaves, capital punishment was invariably applied (Zlinszky, 1997).

### 2.6. *Calumnia (Malicious or False Litigation)*

Under this name, Roman law recognized a praetorian delict introduced to prohibit the acceptance of money in exchange for the initiation of a lawsuit or for influencing proceedings already in progress.

While the Lex Cornelia de falsis specifically sanctioned the deliberate rendering of false judgments, the praetorian delict of calumnia punished all forms of dishonest or malicious litigation.

Any amount unlawfully received for such purposes could be recovered by an action for fourfold restitution within the first year, and for single restitution thereafter, irrespective of whether the payer had himself participated in the act of bribery (Zlinszky, 1997).

### 2.7. *Dolus and Stellationatus*

In connection with violent or fraudulent acts, dolus and stellationatus were regarded as general offences (*crimina generalia*) punishable even without a precise statutory definition.

It is probable that Aquilius Gallus had already introduced an action in delict (*actio doli*) to provide a remedy in cases where the deceived party had no other legal recourse. Judgments in such cases entailed *infamia* (loss of civil honour), although the main consequence was restitution equivalent to the damage caused by the fraudulent act.

The category of *stellionatus* covered acts such as false oaths and other deceitful conduct arising during litigation, provided that no specific criminal provision could be applied to them. Typical sanctions included exile or forced labour, and in all cases the conviction carried the penalty of *infamia* (Zlinszky, 1997).

### 3. Conclusion

This study has presented the development of the Roman legal regulation of coin counterfeiting, which in the early Republic was regarded primarily as an offense against property, but during the Imperial era came to be treated as a crime against the emperor's authority.

Legal sanctions were initially moderate, yet in later periods the Roman state sought to curb counterfeiting through increasingly severe punishments. A particularly draconian tightening of the law can be observed under the reigns of Constantine and Justinian.

It is evident that Roman criminal law concerning forgery and fraud – especially in relation to coinage – formed a complex and continuously evolving system that took into account not only legal but also economic and social considerations. The severity of the legislation reflects the central role played by the integrity of the monetary system in the Roman Empire.

Roman legal principles on counterfeiting exerted a lasting influence: many medieval statutes adopted these Roman doctrines, and even today, owing to the enduring impact of Roman jurisprudence, counterfeiting is treated as a serious criminal offence in most modern legal systems.

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# GREEN, SAFE, AND MISLEADING? ESG INVESTMENT PRODUCTS, GREENWASHING, AND THE PROTECTION OF VULNERABLE RETAIL INVESTORS IN THE EUROPEAN UNION

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## ABSTRACT

The rapid expansion of ESG-labelled investment products in the European Union has transformed sustainable finance into a mainstream retail market offering. Through digital platforms such as banking applications and robo-advisors, “green” investments are increasingly presented as both ethically desirable and financially responsible. While EU regulation has significantly strengthened sustainability-related disclosure through instruments such as MiFID II, the Sustainable Finance Disclosure Regulation (SFDR), the EU Taxonomy Regulation, and the Unfair Commercial Practices Directive (UCPD), sustainability classification does not imply reduced financial risk. Nevertheless, simplified ESG labels, fund names, and digital interface design may influence investor perception, particularly among vulnerable retail investors with limited financial literacy.

This paper examines whether the current EU legal framework adequately protects retail investors from misleading sustainability framing in digital environments. It argues that EU sustainable finance law remains predominantly disclosure-based and insufficiently attentive to behavioural and perceptual effects. The paper proposes a more integrated interpretation of financial and consumer protection rules, emphasising vulnerability and the need to distinguish clearly between environmental alignment and financial safety.

**KEYWORDS** Consumer protection; ESG labelling; greenwashing; retail investor vulnerability; sustainable finance regulation

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## 1. Introduction

The rapid expansion of ESG/sustainability-labelled financial products in the European Union is often presented as a regulatory success. Sustainable finance is framed as a solution to climate change and as an ethical investment opportunity. However, this narrative raises a fundamental concern: does the “green” label unintentionally create a perception of safety that EU law does not actually guarantee?

Retail investors frequently associate sustainability with responsibility and lower risk. In digital investment platforms, ESG labels are displayed in simplified formats, often more visible than risk disclosures. Yet EU sustainable finance regulation does not equate sustainability with capital protection. The legal framework focuses primarily on transparency, not on correcting behavioural bias.

Historical financial scandals demonstrate how symbolic legitimacy can mask underlying risk. Before its collapse in 2020, Wirecard was celebrated as a European fintech champion and an innovative success story ([Economic Governance Support Unit, 2020](#)). Its technological reputation contributed to investor confidence, despite internal governance failures and accounting manipulation. Reputation functioned as a substitute for scrutiny. In the ESG context, sustainability framing may perform a similar function: instead of “innovation,” the moral language of “green” and “sustainable” can create an aura of good judgement.

The OneCoin scandal provides a more extreme illustration of misleading digital investment. Marketed as a revolutionary cryptocurrency, OneCoin attracted over 3.5 million investors and caused losses exceeding USD 4 billion ([U.S. Attorney’s Office, Southern District of New York, 2023](#)). The project lacked a genuine blockchain and was designed as a fraudulent scheme. What made the fraud effective was not only false statements, but also the persuasive narrative of technological transformation. Investors relied on branding and social proof rather than verifiable safeguards. The lesson is not that ESG products are fraudulent, but that narrative legitimacy can significantly distort investor risk perception.

Empirical evidence suggests that retail investors expect stronger safeguards in the sustainable finance market. A 2025 consumer survey published by BEUC (The European Consumer Organisation), based on more than 11,000 respondents across 11 European countries, found that 34% of consumers cite misleading or unreliable green claims as a reason not to invest in sustainable finance products. Moreover, 52% of respondents wrongly believe that sustainable products comply with strict legal standards, and 49% assume that

such products are verified by a market supervisor, which is not necessarily the case (BEUC, 2025).

These findings indicate that while consumers show interest in sustainable investments, significant confusion and misplaced trust persist. Awareness of greenwashing risks does not eliminate vulnerability, particularly in digitalised markets where simplified ESG labels and visual indicators may function as heuristic shortcuts rather than as informed assessments of financial risk.

This paper therefore challenges the assumption that disclosure-based regulation is sufficient. It argues that the EU sustainable finance framework, while ambitious in terms of transparency, may inadequately address the perceptual and behavioural dimensions of investor protection. The central question is not whether ESG products are environmentally beneficial, but whether EU law sufficiently protects vulnerable retail investors from the misleading implication that “green” may signal “safe.”

## 2. Methodology

This paper adopts a qualitative doctrinal legal research approach combined with analytical policy evaluation. The primary objective is to examine how European Union financial and consumer protection law regulates ESG-labelled investment products and whether the existing framework adequately protects vulnerable retail investors from misleading sustainability framing.

The analysis focuses on the interpretation of key legal instruments, including Directive 2014/65/EU (MiFID II), Regulation (EU) 2019/2088 (SFDR), Regulation (EU) 2020/852 (Taxonomy Regulation), and Directive 2005/29/EC (Unfair Commercial Practices Directive). Through systematic doctrinal interpretation, the study examines the structure, objectives, and internal logic of these instruments, particularly regarding suitability requirements, sustainability disclosures, classification mechanisms, and misleading commercial practices. Special attention is given to the relationship between sustainability alignment and financial risk neutrality within the regulatory framework.

In addition to doctrinal analysis, the paper integrates selected empirical and behavioural insights to contextualise legal interpretation. Studies on sustainability assurance (Simnett et al., 2009), greenwashing and market reactions (Xu et al., 2025), and behavioural decision-making under risk (Kahneman & Tversky, 1979) are used illustratively to explain how disclosure-based regulation may interact with investor perception in practice. These empirical references do not constitute independent quantitative research but serve to support the analytical evaluation of regulatory effectiveness.

By combining doctrinal interpretation with behavioural and market-context analysis, the methodology aims to assess whether the EU framework meaningfully addresses the perceptual and vulnerability dimensions of ESG-labelled financial products, or whether a structural gap persists between formal compliance and investor understanding (Hutchinson & Duncan, 2012).

### 3. Why Greenwashing Happens

Greenwashing does not happen randomly. It is often driven by strong financial incentives. Empirical research shows that firms engaging in symbolic sustainability communication may enjoy short-term improvements in reputation and market value, even when their actual environmental practices do not change (Xu et al., 2025). In this context, sustainability disclosure can function as a strategic signal rather than as a reflection of real reform.

Using signalling theory, Xu et al. (2025) argue that companies send positive ESG signals to reduce investor uncertainty and attract capital. However, these signals do not always correspond to substantive environmental improvements. By selectively presenting ESG information or overstating commitments, firms can reduce perceived information asymmetry and increase investor confidence. This may create short-term reputational capital and improve access to responsible investment portfolios (Xu et al., 2025). When verification mechanisms are weak, greenwashing may become an economically rational strategy.

The cost–benefit structure reinforces this behaviour. Substantive environmental reforms often require high operational costs and long-term investment. In contrast, polished sustainability reporting is relatively inexpensive. As a result, managers may choose symbolic compliance over real transformation (Naseer et al., 2025). This phenomenon reflects what organisational scholars describe as “decoupling”, where corporate communication diverges from actual operational practice. What is reported in ESG disclosures does not necessarily match what is implemented internally.

Investor pressure also plays a significant role. Firms with higher ESG scores often enjoy easier access to capital and potentially lower financing costs (Xu et al., 2025). Earlier studies show that voluntary non-financial disclosure can reduce the cost of equity by lowering information asymmetry between managers and investors (Dhaliwal et al., 2011). Other research suggests that strong ESG performance may contribute to financial value and long-term competitiveness (Wang & Sarkis, 2017; Zhou et al., 2022). These findings create incentives for firms to communicate positively about sustainability in order to attract institutional investors and benefit from sustainable finance flows.

However, signalling theory reminds us that not all signals are credible. As [Connelly et al. \(2011\)](#) explain, disclosure can function as a reputational signal even when it does not reflect underlying quality. Media amplification may further shape investor reactions to ESG information ([Wong & Zhang, 2022](#)). In the short term, high ESG ratings and positive sustainability narratives may generate reputational benefits, including stronger valuations and improved financing conditions.

Therefore, regulation alone does not automatically eliminate greenwashing. While EU rules reduce the space for explicit false statements, they also create a technical framework that may be strategically navigated. Firms can comply formally through selective classification, boundary setting, and estimation techniques, while maintaining a “green” image without substantive change. Greenwashing, in this sense, emerges not only from dishonesty, but from structural incentives embedded within capital markets.

Xu et al.’s event study of 121 global greenwashing cases shows that the reputational premium associated with ESG claims is fragile. When regulators or the media expose inconsistencies between sustainability claims and actual corporate practices, stock markets react negatively, producing significant abnormal returns. Interestingly, companies with stronger ESG reputations often suffer greater losses. Investors expect higher standards from these firms, so the gap between narrative and reality creates greater disappointment and a deeper loss of credibility ([Xu et al., 2025](#)). In this sense, the same investor pressure that initially motivates companies to enhance ESG communication may later result in valuation penalties when greenwashing is revealed.

The multidimensional nature of greenwashing has also been highlighted in prior bibliometric research. Based on a keyword co-occurrence analysis using VOSviewer, [Forlano et al. \(2023\)](#) identified four thematic clusters in greenwashing research. The first cluster focuses on symbolic management and CSR communication, showing how companies use narratives and transparency claims to build legitimacy without substantial environmental change. The second cluster examines environmental regulation and institutional complexity, highlighting how fragmented regulatory frameworks may allow selective disclosure. The third cluster relates to operational performance and sustainable business strategies, while the fourth addresses marketing, perception, and trust, emphasising how green branding influences stakeholder attitudes. Taken together, these findings suggest that greenwashing is not a marginal issue, but a structural phenomenon linked to organisational strategy, stakeholder perception, and regulatory gaps.

Another important driver of greenwashing is information asymmetry. Investors, consumers, and regulators often lack the technical capacity to verify complex ESG disclosures, especially Scope 3 emissions. Scope 3 emissions include indirect emissions across the supply chain, product use, and end-of-life processes. These emissions are difficult to measure because they depend on data from external actors. As a result, many companies rely on estimates, modelling techniques, or assumptions rather than direct measurement (Oliveira et al., 2025). This creates room for discretion and selective reporting.

The opacity of Scope 3 reporting places stakeholders at a structural disadvantage. They must rely on corporate self-reporting without independent verification mechanisms. Companies may strategically emphasise lower-emission segments while downplaying carbon-intensive activities, thereby creating a positive signal without meaningful emission reductions. According to Oliveira et al. (2025), vague carbon disclosure weakens accountability and reduces comparability across firms and sectors. Scope 3 reporting, although essential for understanding climate responsibility, may therefore function as a reputational tool rather than as a reliable accountability mechanism.

This problem reflects a broader governance gap. Current ESG frameworks, including the CSRD and voluntary standards such as the GHG Protocol, require Scope 3 disclosure but do not always ensure strict verification. Without independent audits or harmonised methodologies, information asymmetry persists. Greenwashing in this context is not merely a matter of dishonest communication; it is structurally enabled by weak verification and complex reporting requirements. As long as disclosure remains difficult to verify, firms may capture reputational benefits while externalising the costs of unverifiable claims onto investors, society, and the environment (Oliveira et al., 2025).

## 4. Major European Financial Scandals and Their Advertising and Framing

Several major European financial scandals show a similar pattern in which misleading framing played an important role in shaping public perception and investor confidence.

The Wirecard collapse in 2020 is one of the largest financial scandals in modern German history. Before its insolvency, Wirecard was promoted as a successful and innovative fintech company, symbolising the digital transformation of Germany's financial sector. Its market value once exceeded that of Deutsche Bank. However, investigations later revealed accounting manipulation and approximately €1.9 billion in missing funds. The strong innovation narrative created an aura of credibility that overshadowed underlying risks and weaknesses in financial supervision (Comfort & Jennen, 2020).

Furthermore, the OneCoin case represents a global cryptocurrency fraud with strong links to Europe. Marketed as a revolutionary cryptocurrency and a “Bitcoin killer,” OneCoin attracted millions of investors and generated more than USD 4 billion in losses. In reality, it had no genuine blockchain and no real mining operations. The founders deliberately used technological language and branding to create legitimacy and trust, while the underlying product had no real value ([U.S. Attorney’s Office, Southern District of New York, 2023](#)). This case illustrates how innovation narratives can replace factual transparency.

Moreover, the collapse of Greensill Capital in 2021 also demonstrates the power of framing. Greensill presented its business as secure supply chain finance backed by real invoices. However, later analysis showed that risk exposures were far more complex and fragile than had been presented. The technical and structured nature of the product created a perception of safety, even though significant governance weaknesses existed ([Huang & Xu, 2025](#)). Complexity itself functioned as a legitimacy tool.

In the Volkswagen Dieselgate scandal, the company promoted its vehicles as “clean diesel,” emphasising environmental performance in its marketing. Subsequent investigations revealed that emission tests had been manipulated, leading to more than €30 billion in fines and settlements. This case is often cited as a classic example of greenwashing, where environmental claims were inconsistent with actual performance ([Ewing, 2015](#)).

Finally, the Cum-Ex tax trading scheme involved complex dividend arbitrage transactions that led to estimated fiscal losses of around €55 billion across Europe. Although structured as legal financial engineering, the scheme exploited regulatory loopholes and weaknesses in oversight. The [European Banking Authority \(2020\)](#) later highlighted governance and supervisory failures in addressing these practices. The technical and legal complexity of the transactions contributed to their perceived legitimacy. The Cum-Ex case illustrates how financial complexity itself can generate an appearance of legitimacy. As [Huang and Xu \(2025\)](#) demonstrate in their analysis of the Greensill collapse, interconnected financial actors, securitisation techniques, and fragmented oversight structures can create systemic vulnerabilities that remain undetected until a crisis occurs. Similar dynamics were present in Cum-Ex: intricate legal structures and technical financial engineering masked underlying risks and accountability gaps. In this sense, complexity did not merely describe the transactions; it functioned as a shield against effective scrutiny.

Table 1: Major European Financial Scandals and Their Advertising or Framing Dynamics<sup>2</sup>

No.	Case	Jurisdiction	Estimated Financial Damage	Advertising / Framing Strategy	Regulatory and Investor Protection Relevance
1	Wirecard (2020)	Germany / EU	~€1.9 billion in missing funds; >€20 billion market capitalisation loss	Promoted as an innovative fintech company with a strong growth narrative	Reputation creation overshadowed substantive risk; oversight failures despite disclosure duties; relevant to ESG label perceptions
2	OneCoin (2014–2017)	Bulgaria (global impact)	billion in investor losses	Marketed as the “next Bitcoin” and a revolutionary blockchain	Technological legitimacy replaced factual transparency; parallels ESG sustainability narrative effects
3	Greensill Capital (2021)	UK / Germany	~USD 10 billion in exposures	Framed as secure supply chain finance backed by invoices	Technical framing created a perception of safety despite risk; similar to complexity-based trustworthy ESG cues
4	Volkswagen Dieselgate (2015)	Germany / EU	>€30 billion in fines and settlements	“Clean diesel” and environmental performance advertising	Classic greenwashing; sustainability claims contradicted actual emissions performance
5	Cum-Ex Tax Trading Scheme	Germany and the EU	~€55 billion in fiscal losses	Structured as complex arbitrage but presented as a legitimate tax strategy	Legal and financial complexity created an illusion of legitimacy; highlights the risk of perceived safety through complexity

This pattern is highly relevant for ESG-related financial products, where sophisticated structuring and technical classification may similarly create an impression of compliance while concealing substantive risks.

## 5. Regulatory Framework Within the EU

There are several regulatory frameworks within the European Union that restrict companies from advertising their products as “sustainable,” “green,” “low-risk,” or “safe” without proper justification. EU law requires that marketing claims, especially in financial services, must be clear, accurate, and not misleading.

<sup>2</sup> The cases are selected to illustrate how symbolic narratives can overshadow actual risk, a dynamic comparable to concerns about how ESG labels may be interpreted by vulnerable retail investors. „Estimated Financial Damages” are drawn from investigative journalism, official reports, and academic estimates. These figures can vary slightly depending on the source; the table uses widely cited mid-range estimates. “Framing Strategy” describes how each scandal was marketed to the public or investors, focusing on reputation cues that generated a perception of innovation, safety, or sustainability.

Companies cannot simply use attractive sustainability language to attract investors without supporting evidence.

### 5.1. *Markets in Financial Instruments Directive (MiFID II)*

The investor suitability regime under MiFID II constitutes the cornerstone of retail investor protection within EU financial markets law. Article 25(2) MiFID II provides that:

*“When providing investment advice or portfolio management, the investment firm shall obtain the necessary information regarding the client’s knowledge and experience in the investment field relevant to the specific type of product or service, that person’s financial situation including his or her ability to bear losses, and his or her investment objectives including his or her risk tolerance so as to enable the firm to recommend to the client the investment services and financial instruments that are suitable for him or her.” (MiFID II, art. 25(2))*

This wording makes clear that suitability is structurally anchored in financial risk. The legal emphasis lies on “ability to bear losses” and “risk tolerance.” Sustainability, at least in the original architecture of MiFID II, was absent from this triad.

The integration of sustainability preferences was introduced through Commission Delegated Regulation (EU) 2021/1253. The amendment requires that firms ask clients about sustainability preferences and incorporate them into suitability assessments. Article 1(7) of the Delegated Regulation modifies Article 54 of Delegated Regulation 2017/565 by requiring that:

*“Investment firms shall include the client’s or potential client’s sustainability preferences in the suitability assessment.” (MiFID II Delegated Regulation, art. 1(7))*

Sustainability preferences are defined by reference to Article 2(17) of the SFDR, which provides that a “sustainable investment” means:

*“[...] an investment in an economic activity that contributes to an environmental objective [...] provided that such investments do not significantly harm any of those objectives and that the investee companies follow good governance practices.” (SFDR, art. 2(17))*

While these provisions formally integrate sustainability into advisory processes, they do not alter the primacy of financial risk assessment. ESMA’s Guidelines on the MiFID II suitability requirements clarify that sustainability preferences must be considered only after the client’s financial suitability has been determined (ESMA, 2022b). In effect, sustainability remains supplementary rather than transformative.

This legal structure creates a crucial limitation. MiFID II does not state anywhere that sustainability implies lower volatility, greater capital protection, or reduced downside exposure. The Directive speaks repeatedly of “risk tolerance” and “ability to bear losses,” but never links ESG characteristics to financial stability (MiFID II, art. 25(2)). Legally speaking, “green” is not synonymous with “low risk.”

The importance of this distinction becomes evident when viewed in light of financial scandals such as Wirecard. Prior to its collapse, Wirecard was widely perceived as a technologically advanced and reputable fintech company. Yet investigations revealed massive accounting manipulation and fictitious assets (ESMA, 2022c). Investors relied on symbolic legitimacy, innovation, and digital leadership rather than underlying financial fundamentals. Similarly, in the OneCoin case, investors were persuaded by the narrative of a “cryptocurrency revolution,” despite the absence of a verifiable blockchain (U.S. Attorney’s Office, Southern District of New York, 2023). In both instances, formal disclosure frameworks existed, yet reputational framing distorted risk perception.

The integration of sustainability preferences into MiFID II risks creating a comparable dynamic. ESG labelling may function as a reputational signal. While MiFID II ensures procedural alignment between the product and declared risk tolerance, it does not regulate how sustainability framing may influence the formation of that tolerance. The Directive presumes a rational investor who independently evaluates risk, but behavioural research demonstrates that framing effects can significantly alter decision-making under uncertainty (Kahneman & Tversky, 1979).

Moreover, neither Article 25(2) nor Delegated Regulation 2021/1253 requires firms to warn clients explicitly that sustainability characteristics do not imply reduced financial risk. The obligation is to recommend instruments that are “suitable,” not to neutralise possible cognitive biases created by ESG branding. This omission is particularly significant in digital environments where ESG badges, green icons, and simplified classifications are visually prominent, while volatility metrics remain technical and less accessible.

From a doctrinal perspective, MiFID II remains coherent. It preserves a clear hierarchy: financial risk first, sustainability preferences second. However, from a systemic perspective, this architecture may be insufficient to address what can be described as perceptual greenwashing, namely situations in which sustainability characteristics influence investor behaviour not through false statements, but through implicit associations between “green” and “safe.”

The lessons of Wirecard and OneCoin demonstrate that investor harm often arises from misplaced trust in symbolic signals. If ESG labels acquire similar symbolic authority, MiFID II’s suitability regime may be formally compliant, yet

behaviourally incomplete. The law ensures procedural matching; it does not guarantee perceptual neutrality. Without explicit clarification that sustainability does not equal financial safety, the integration of ESG into MiFID II may unintentionally reinforce the moral aura of green investments without adequately safeguarding vulnerable retail investors. The EU framework thus structurally separates sustainability alignment from financial risk assessment. ESG classification does not alter the financial risk profile of the product under MiFID II suitability rules.

## 5.2. SFDR (*Sustainable Finance Disclosure Regulation*)

The SFDR constitutes a central pillar of the EU sustainable finance framework. Its core objective is transparency. Article 1 provides that the Regulation lays down *“harmonised rules for financial market participants and financial advisers on transparency with regard to the integration of sustainability risks and the consideration of adverse sustainability impacts”* (SFDR, art. 1). The emphasis is explicit: the SFDR regulates transparency, not financial risk.

At the product level, the SFDR establishes a three-tier categorisation under Articles 6, 8, and 9. Article 6 requires financial market participants to disclose *“the manner in which sustainability risks are integrated into their investment decisions”* or explain why such risks are not relevant. Article 8 applies where a product *“promotes, among other characteristics, environmental or social characteristics”* if investee companies follow good governance practices. Article 9 applies where a product *“has sustainable investment as its objective”*. The definition of *“sustainable investment”* in Article 2(17) requires that the investment contributes to an environmental or social objective and *“does not significantly harm”* other objectives.

From a formal legal standpoint, this classification is descriptive rather than prudential. Nowhere does the SFDR state that Article 8 or Article 9 products are less volatile, less exposed to market risk, or safer than Article 6 products. The Regulation speaks of sustainability characteristics and transparency obligations, not of capital protection or financial stability. In fact, Recital 12 clarifies that the aim is to ensure *“transparency on sustainability risks and impacts”*, not to guarantee financial outcomes.

Yet market practice has transformed Articles 6, 8, and 9 into informal quality labels: Article 6 as *“non-ESG”*, Article 8 as *“light green”*, and Article 9 as *“dark green”*. This semantic hierarchy risks producing what may be termed a regulatory semiotics problem. Although legally neutral, the classification system may function symbolically. The higher the *“green category”*, the stronger the implied moral authority.

This dynamic becomes particularly problematic when considered alongside historical cases such as Wirecard and OneCoin. In the Wirecard scandal, investors relied heavily on reputational signals associated with technological innovation and digital leadership. These signals created a perception of legitimacy and modernity, even as financial irregularities accumulated (ESMA, 2022c). Similarly, in the OneCoin fraud, the narrative of a revolutionary cryptocurrency masked the absence of substantive technological infrastructure (U.S. Attorney's Office, Southern District of New York, 2023). In both cases, the issue was not the absence of information per se, but the dominance of symbolic framing over substantive evaluation.

The SFDR, by design, assumes that enhanced disclosure enables rational investor choice. Articles 3 to 5 impose entity-level transparency obligations, while Articles 6 to 11 require detailed pre-contractual and periodic product disclosures. Article 4 further obliges large financial market participants to disclose principal adverse impacts (PAIs) on sustainability factors. The underlying regulatory philosophy is informational: more data produces better decisions.

However, this model presupposes that retail investors read and understand lengthy prospectuses and sustainability annexes. Empirical behavioural research suggests otherwise. Retail investors frequently rely on heuristics and simplified signals when making complex financial decisions (Kahneman & Tversky, 1979). In digital investment platforms, ESG labels are often visually prominent, while risk disclosures appear in technical documentation. In such contexts, the Article 8 or Article 9 designation may operate as a cognitive shortcut, implicitly associated with responsibility, prudence, or long-term resilience.

Crucially, the SFDR does not require financial market participants to clarify that sustainability classification does not imply reduced financial risk. There is no provision stating that Article 9 products may be as volatile as non-ESG products. The Regulation combats technical greenwashing, namely false or unsubstantiated sustainability claims, but does not address perceptual greenwashing, where sustainability framing influences risk perception without containing false information.

The structural limitation of the SFDR thus mirrors the perceptual dynamics observed in Wirecard and OneCoin. In those cases, the regulatory system focused on formal compliance and disclosure, yet failed to counteract the persuasive power of narrative framing. Likewise, the SFDR enhances transparency but does not regulate the semiotic impact of ESG categorisation in retail markets.

For vulnerable retail investors, particularly those with limited financial literacy or those strongly motivated by moral considerations, the distinction between sustainability quality and financial safety may not be self-evident. The law treats these dimensions as separate. Investor perception may not.

From a doctrinal perspective, the SFDR achieves coherence within its mandate: it standardises sustainability disclosures. From a systemic perspective, however, it leaves a regulatory gap. Transparency is necessary, but not sufficient. If ESG labels are perceived as implicit risk indicators, the classification system may inadvertently replicate the very reputational dynamics that contributed to past investor harm in non-ESG contexts.

In this sense, the SFDR illustrates the central tension of this paper. ESG investment products may be “green” in classification, yet the regulatory framework does not guarantee that they are understood in financially neutral terms. The challenge for EU law is therefore not only to prevent false sustainability claims, but also to ensure that ESG labelling does not become misleading through omission, framing, or behavioural effect.

### 5.3. European Union (EU) Taxonomy

Regulation (EU) 2020/852 (Taxonomy Regulation) represents the most ambitious attempt by the European Union to define what is environmentally sustainable in legally binding terms. Unlike SFDR, which focuses on disclosure categories, the Taxonomy aims to establish substantive criteria for sustainability classification. Article 1 states that the Regulation establishes “*the criteria for determining whether an economic activity qualifies as environmentally sustainable*” (Taxonomy Regulation, art. 1). The ambition is as much epistemic as regulatory: to create a common language of sustainability across EU financial markets.

Article 3 sets out the cumulative conditions under which an economic activity shall qualify as environmentally sustainable. It must:

- a. contribute substantially to one or more of the environmental objectives;
- b. not significantly harm any of the environmental objectives;
- c. be carried out in compliance with minimum safeguards; and
- d. comply with technical screening criteria.

The Regulation thereby embeds the “Do No Significant Harm” (DNSH) principle into EU financial law. Article 9 further enumerates six environmental objectives, including climate change mitigation and climate change adaptation (Taxonomy Regulation, art. 9). From a doctrinal perspective, the Taxonomy is more normatively structured than SFDR. It does not merely require transparency; it defines sustainability thresholds. However, crucially, the Regulation does not

attach any financial risk presumption to Taxonomy alignment. An activity that “contributes substantially” to climate mitigation may still be capital-intensive, volatile, or exposed to market fluctuation. Sustainability qualification under the Taxonomy is environmental in nature, not prudential.

Yet in market practice, Taxonomy alignment has become a strong signalling device. Under SFDR, financial products must disclose the extent of their Taxonomy alignment (SFDR, art. 5; Taxonomy Regulation, arts. 5–6). This creates a measurable sustainability percentage, often communicated in simplified marketing language: “X% Taxonomy-aligned.” The numerical precision may enhance credibility, but it also risks generating an implicit association between environmental compliance and financial soundness.

This semiotic dynamic is structurally comparable to the reputational effects observed in the Wirecard and OneCoin scandals. In Wirecard, technological modernity functioned as a reputational shield that masked underlying risk (ESMA, 2022c). In OneCoin, the symbolic invocation of blockchain innovation substituted for genuine economic substance (U.S. Attorney’s Office, Southern District of New York, 2023). In both cases, investors were influenced not only by false statements but by narrative legitimacy.

The Taxonomy Regulation, although technically rigorous, may inadvertently produce a similar legitimacy effect in a different register. Taxonomy alignment is a scientific and regulatory designation. However, retail investors may interpret it as a proxy for resilience, future-proofing, or structural stability. The Regulation itself does not support this inference. Indeed, Recital 19 clarifies that the Taxonomy “*should not require Member States or the Union to invest public money only in environmentally sustainable economic activities.*” The Regulation does not declare Taxonomy-aligned activities economically superior or less risky. It provides classification criteria, not performance guarantees.

From a behavioural perspective, this distinction is critical. Research in behavioural finance demonstrates that framing and moral cues influence investor judgment under uncertainty (Kahneman & Tversky, 1979). In digital advisory platforms, a product described as “100% Taxonomy-aligned” may be perceived as future-oriented and transition-resilient. Yet the Taxonomy does not assess revenue stability, liquidity exposure, or downside volatility.

The regulatory architecture therefore creates a layered interaction: the Taxonomy defines environmental sustainability criteria, SFDR requires disclosure of Taxonomy alignment, and MiFID II requires the integration of sustainability preferences into suitability assessments. However, none of these instruments establish a legal link between environmental alignment and reduced financial risk.

This creates what may be termed a structural neutrality gap. Legally, sustainability and risk remain distinct categories. Behaviourally, they may converge in investor perception. If retail investors implicitly equate Taxonomy alignment with prudence or safety, the classification system may contribute to what this paper conceptualises as perceptual greenwashing – not through false statements, but through the unregulated semiotic power of sustainability labels.

The Taxonomy is scientifically technical. Its application depends on delegated acts and complex screening criteria. Retail investors are unlikely to examine these criteria in detail. Instead, they encounter simplified percentages and ESG summaries. In this context, the mere existence of a harmonised EU sustainability framework may produce a halo effect: if it is EU-certified, it must be safe. Yet EU certification of environmental sustainability does not equate to certification of financial stability. The Regulation does not amend capital requirements, volatility thresholds, or loss-bearing capacity assessments under MiFID II. It operates in a parallel normative domain.

Within the broader objective of protecting vulnerable retail investors, this distinction is decisive. The EU Taxonomy enhances definitional clarity and combats arbitrary sustainability claims. However, it does not address the cognitive interpretation of Taxonomy alignment in retail markets. As with SFDR, transparency and classification are necessary conditions for reducing greenwashing. They are not sufficient conditions for preventing misleading perceptions regarding financial safety.

Thus, while the Taxonomy Regulation represents a milestone in sustainable finance law, it also illustrates the core tension underlying this paper: ESG frameworks may be scientifically robust and environmentally meaningful, yet they remain financially neutral. When neutrality is not clearly communicated, sustainability alignment risks being interpreted as an implicit risk signal. The challenge for EU law is therefore not only to define what is green, but to ensure that green is not misunderstood as safe.

#### **5.4. *Unfair Commercial Practices Directive (UCPD)***

While MiFID II governs suitability and SFDR and the Taxonomy regulate sustainability disclosure, the Directive 2005/29/EC (Unfair Commercial Practices Directive, UCPD) provides the horizontal consumer protection framework applicable to misleading ESG marketing. Unlike these sector-specific financial instruments, the UCPD addresses commercial conduct more broadly. Its relevance lies in its potential to regulate greenwashing where sustainability claims distort consumer decision-making.

Article 5(2) of the UCPD establishes the general prohibition of unfair commercial practices. A practice is unfair if it is “*contrary to the requirements of professional diligence*” and “*materially distorts or is likely to materially distort the economic behaviour of the average consumer*” (UCPD, art. 5(2)). The Directive thus introduces a behavioural standard: distortion of economic behaviour.

More specifically, Article 6(1) provides that a commercial practice shall be regarded as misleading if it contains false information or “*in any way, including in its overall presentation, deceives or is likely to deceive the average consumer*” even if the information is factually correct, where it causes or is likely to cause the consumer to take a transactional decision that he would not otherwise have taken (UCPD, art. 6(1)). This formulation is particularly significant for ESG contexts. The provision explicitly recognises that deception may arise through “overall presentation”, not merely through explicit falsehoods.

In addition, Article 7 addresses misleading omissions. A commercial practice is misleading if it omits “*material information that the average consumer needs, according to the context, to take an informed transactional decision*” (UCPD, art. 7(1)). In the ESG investment context, the omission of a clarification that sustainability characteristics do not imply reduced financial risk may fall within this logic if such an omission materially affects investor behaviour.

The UCPD therefore differs structurally from SFDR. SFDR focuses on sustainability disclosure obligations for financial market participants. The UCPD focuses on the impact of marketing practices on consumer decision-making. The test is not whether sustainability information is disclosed, but whether the overall presentation is misleading.

This distinction becomes crucial in the context of ESG-labelled financial products. As discussed in earlier sections, SFDR and the Taxonomy create legally neutral sustainability classifications. However, if ESG labelling is presented in a manner that implicitly associates “green” with “safe”, the question arises whether such framing may constitute a misleading commercial practice under Article 6 of the UCPD.

The relevance of “overall presentation” echoes the dynamics observed in the Wirecard and OneCoin scandals. In the Wirecard case, the company’s reputation as a fintech innovator created a halo effect that overshadowed financial irregularities (ESMA, 2022c). In OneCoin, the narrative of blockchain innovation misled investors even where explicit claims were difficult to verify (U.S. Attorney’s Office, Southern District of New York, 2023). In both cases, distortion arose not only from false statements but from persuasive framing.

The UCPD’s concept of material distortion focuses on the “average consumer”. Yet Article 5(3) introduces a heightened standard for vulnerable consumers.

Where a commercial practice is directed to a “*clearly identifiable group of consumers who are particularly vulnerable*” due to mental or physical infirmity, age, or credulity, the assessment must be made from the perspective of the average member of that group (UCPD, art. 5(3)). This provision is especially relevant for vulnerable retail investors with limited financial literacy or strong moral motivation towards sustainability.

In the ESG context, vulnerability may not arise from physical infirmity, but from informational asymmetry and behavioural bias. Retail investors motivated by climate concerns may be particularly receptive to sustainability framing. If ESG labels function as moral cues that influence perceived risk, the interaction between the UCPD and sustainable finance law becomes critical.

Importantly, the UCPD does not require proof that a statement is objectively false. Article 6 covers practices that “deceive or are likely to deceive”, including through presentation. This opens the possibility that ESG marketing which emphasises sustainability credentials while downplaying volatility exposure may be problematic even if it is technically compliant with SFDR disclosure obligations.

However, enforcement challenges remain. The Directive is implemented at Member State level, leading to fragmented application. Moreover, proving that sustainability framing “materially distorted” investor behaviour requires demonstrating a causal influence on transactional decisions, which is a high evidentiary threshold.

From a systemic perspective, the UCPD fills part of the regulatory gap left by SFDR and the Taxonomy. Whereas those instruments regulate what sustainability information must be disclosed, the UCPD regulates how that information is presented and perceived. Yet the Directive was not designed specifically for complex financial instruments. Its consumer-protection logic may be strained when applied to sophisticated investment products marketed through digital platforms.

Within the broader argument of this paper, the UCPD illustrates the final layer of the EU investor protection architecture. MiFID II ensures suitability. SFDR ensures sustainability transparency. The Taxonomy defines environmental criteria. The UCPD addresses misleading marketing. However, none of these instruments explicitly confront the behavioural convergence between “green” and “safe”. If ESG labelling influences investor perception of risk without containing false information, the regulatory system may technically comply with all four instruments while still permitting perceptual greenwashing. The law distinguishes sustainability from financial safety. Market perception may not.

Thus, the central tension persists: EU law provides multiple safeguards against explicit deception, but it does not yet fully regulate the semiotic power of ESG branding in retail financial markets. Where “green” becomes a proxy for prudence in the eyes of vulnerable investors, the boundaries between lawful sustainability marketing and misleading commercial practice become increasingly blurred.

## 6. What Should Be Done?

The analysis above shows that the core regulatory challenge is not the absence of rules, but the structural limits of disclosure-based protection. EU sustainable finance law has significantly improved transparency through the SFDR, the Taxonomy Regulation, and related instruments. However, transparency alone does not eliminate behavioural vulnerability.

If ESG labelling shapes investor perception in a way that suggests prudence, safety, or lower risk, then formal legal compliance may still coexist with substantive misunderstanding. In other words, a product may comply with disclosure requirements, yet still create misleading impressions about its actual risk profile.

Therefore, the real question is not whether regulation exists, but whether current regulation effectively protects investors from future harm. To prevent future losses for investors, especially in cases where investment products present themselves as “sustainable,” “green,” or implicitly “safe,” several reforms should be considered. Based on the research conducted in this study, the following measures are necessary.

### 6.1. Clarifying the Legal Meaning of ESG Labels

The first step in reducing greenwashing is clarifying the legal meaning of ESG labels. Today, terms such as “sustainable,” “green,” “impact,” or “ESG-compliant” are widely used in fund names, marketing materials, and corporate communication. However, in practice, these terms are often vague, inconsistently applied, or poorly understood by retail investors.

ESMA (2024), in its Final Report on guidelines for funds’ names using ESG or sustainability-related terms, recognises that fund names can strongly influence investor decisions. For this reason, ESMA introduced quantitative thresholds and exclusion criteria to ensure that funds using ESG-related terms genuinely reflect sustainability characteristics in their investment strategy. For example, where ESG terms are used, at least 80% of investments must align with the promoted sustainability characteristics. This approach attempts to move ESG terminology from marketing language toward legally measurable standards.

In addition, ESMA's 2025 Thematic Notes on sustainability-related claims emphasise that ESG claims must be "clear, fair and not misleading". According to ESMA, sustainability claims should be accurate, accessible, substantiated, and up to date. This means that ESG labels cannot be used as symbolic branding tools without proper explanation of their methodology, scope, limitations, and verification. Misleading practices may include exaggeration, cherry-picking favourable data, omitting negative aspects, or relying on outdated credentials (ESMA, 2025).

However, clarifying ESG labels in today's complex financial system is not simple. Sustainability reporting frameworks (such as the CSRD and SFDR), voluntary standards, ratings agencies, and industry initiatives operate simultaneously. As highlighted in the regulatory outlook by HSF Kramer (2024), firms face overlapping disclosure regimes and increasing anti-greenwashing scrutiny across jurisdictions. While regulation is expanding, fragmentation remains a challenge.

Therefore, clarifying the legal meaning of ESG labels requires more than adding new disclosure rules. It requires:

- clear definitions linked to measurable criteria (as ESMA (2024) attempts to provide);
- consistent supervisory interpretation across Member States;
- stronger enforcement when misleading labels are used; and
- alignment between marketing language and underlying regulatory classifications.

In a highly complex financial environment, the key is legal precision. ESG labels should not function as reputational shortcuts but as legally defined categories with objective thresholds, transparent methodology, and verifiable substance. Only then can investor trust be protected and greenwashing risks effectively reduced.

## 6.2. *Strengthening Sustainability Assurance Standards*

One important way to reduce greenwashing and improve the credibility of ESG disclosures is to strengthen sustainability assurance standards. In 2025, the International Auditing and Assurance Standards Board (IAASB) and the International Ethics Standards Board for Accountants (IESBA) introduced two new global standards: ISSA 5000 and IESSA. These standards aim to enhance transparency, independence, and consistency in sustainability reporting assurance (London Reporting Academy, 2025).

ISSA 5000 establishes a unified global framework for the assurance of sustainability reports. It applies to both limited and reasonable assurance

engagements and is designed to align with international reporting frameworks such as GRI, ESRS, and IFRS sustainability standards ([London Reporting Academy, 2025](#)). By embedding sustainability assurance within firms' quality management systems, ISSA 5000 seeks to improve the reliability and comparability of ESG data across jurisdictions. This is particularly important as investors increasingly rely on sustainability disclosures when making financial decisions.

In parallel, IESSA strengthens ethical requirements and independence rules for professionals involved in sustainability assurance. It introduces stricter safeguards against conflicts of interest and expands the application of ethical standards beyond traditional auditors to all professionals involved in sustainability reporting ([London Reporting Academy, 2025](#)). The standard also sets requirements regarding the involvement of external experts, ensuring that third-party consultants comply with independence and integrity principles.

These standards are expected to apply to reporting periods beginning on 15 December 2026, with early adoption permitted ([London Reporting Academy, 2025](#)). Their implementation represents a significant step towards the global harmonisation of sustainability assurance practices. By increasing audit quality and reinforcing ethical safeguards, ISSA 5000 and IESSA help mitigate greenwashing risks and strengthen investor trust. In the EU context, stronger assurance standards can complement disclosure frameworks such as the CSRD by ensuring that sustainability claims are not only reported, but also independently verified.

### **6.3. Behaviourally Informed Investor Protection**

Behaviourally informed investor protection recognises that retail investors do not always make fully rational decisions. Investment choices are often influenced by complexity, digital design, marketing techniques, and emotional triggers. The ESMA Final Report on Retail Investor Protection highlights that current disclosure rules must better reflect how investors actually process information in practice ([ESMA, 2022a](#)).

First, ESMA stresses that information should not only be legally complete, but also easy to understand and easy to navigate. When disclosures are too long, too technical, or presented in large blocks of text, investors may ignore them or misunderstand key risks ([ESMA, 2022a](#)). Therefore, firms should present vital information in a clear, structured, and visually accessible way. Important risk elements should be prominent rather than hidden in detailed annexes.

Second, digital environments can influence behaviour. ESMA notes that online interfaces, gamification techniques, social media promotion, and "choice

architecture” can nudge investors towards higher risk-taking (ESMA, 2022a). Gamification that encourages frequent trading or addictive behaviour is considered inconsistent with the investor’s best interest. Behaviourally informed protection therefore requires supervision not only of product content, but also of digital design and marketing strategies.

Third, risk warnings must be effective. ESMA recommends that authorities should have the power to require standardised risk warnings for complex or risky products targeted at retail investors (ESMA, 2022a). Risk warnings should be visible, understandable, and proportionate to the level of risk involved.

Finally, ESMA emphasises that investor education and empowerment are important complements to regulation (ESMA, 2022a). However, education alone is not sufficient. Firms remain responsible for ensuring that their communication is fair, clear, and not misleading, regardless of whether it is delivered through paper-based disclosures, websites, apps, or social media channels.

In sum, behaviourally informed investor protection shifts the focus from formal disclosure compliance to practical investor understanding. It requires regulators and firms to consider how information is framed, delivered, and experienced by retail investors in real-world digital environments (ESMA, 2022a).

#### **6.4. Enhancing Verification of ESG-Labelled Products**

The rapid expansion of ESG-labelled investment products has exposed a structural weakness in current verification systems. Although sustainability disclosures have become more sophisticated, the credibility of ESG claims still depends heavily on third-party assurance mechanisms that are vulnerable to conflicts of interest and procedural inconsistencies. Strengthening verification is therefore not merely a technical matter, but a structural governance imperative.

A recent model proposed by Liu et al. (2024) introduces a blockchain-based verification architecture called “Veri-Green” that integrates artificial intelligence and incentive-compatible mechanisms to improve the integrity of ESG reporting. While primarily developed from a technological perspective, the framework has clear regulatory implications: verification must be designed to resist manipulation structurally, rather than relying solely on ex post compliance checks.

First, verifier selection should be depersonalised and competence-based. Liu et al. (2024) demonstrate that AI-driven clustering and predictive matching can allocate verification tasks to groups of qualified verifiers based on historical performance data. This reduces the risk of issuer–verifier capture and enhances objectivity in the assurance process. Second, verification systems must incentivise truthfulness. By embedding a Vickrey–Clarke–Groves (VCG) auction

mechanism, the model ensures that verifiers are encouraged to disclose their true costs and capabilities. Such an incentive-compatible structure aligns economic motivation with verification accuracy, thereby reducing the risk of superficial or strategically biased ESG validation. Third, verification outcomes should be tamper-resistant and auditable. [Liu et al. \(2024\)](#) propose storing verified ESG certifications on a blockchain infrastructure, ensuring immutability, traceability, and transparency. From a regulatory standpoint, immutable certification logs strengthen evidentiary reliability and reduce the possibility of post-verification data alteration.

However, [Liu et al. \(2024\)](#) also acknowledge that technological innovation alone cannot resolve all verification challenges. Algorithmic bias, scalability limitations, and governance oversight remain critical considerations. Therefore, enhanced verification of ESG-labelled products requires not only technological reform, but also institutional safeguards to ensure accountability and supervisory coherence. In sum, improving ESG-labelled product verification requires a structural shift from issuer-controlled assurance towards system-governed verification ecosystems. As [Liu et al. \(2024\)](#) suggest, integrating AI-based selection, incentive-compatible mechanisms, and blockchain-based certification may significantly enhance trust in ESG reporting, thereby reducing greenwashing risks and strengthening investor protection.

Finally, preventing future financial scandals does not require overregulation, but regulatory refinement. The lesson from past European financial failures is that reputational framing can substitute for substantive scrutiny. ESG products are not inherently fraudulent, yet the symbolic power of sustainability narratives can distort perception in ways that law must anticipate. EU sustainable finance law has made important progress in transparency. The next step is to ensure that “green” does not implicitly mean “safe,” and that vulnerable retail investors are protected not only against false statements, but also against misleading impressions.

## 7. Conclusion

This paper asked whether ESG and “green” labels in EU financial markets may unintentionally create a perception of safety that the law does not actually guarantee. The analysis shows that the problem is not a lack of regulation. The EU has developed a detailed framework through MiFID II, the SFDR, the EU Taxonomy, and the UCPD. These rules improve transparency, define sustainability criteria, and prohibit misleading practices. However, sustainability and financial risk remain legally separate. None of these instruments state that ESG-aligned products are less volatile or financially safer. The EU framework

focuses on disclosure and environmental classification, not on capital protection.

At the same time, past financial scandals demonstrate how reputation, innovation, or complexity can create misplaced investor trust. In a similar way, ESG labels may function as powerful signals in retail markets. Even without false statements, sustainability branding can influence perception. Investors may associate “green” with prudence or stability, even though the law does not support this assumption. This creates what the paper describes as a perceptual gap: the law treats sustainability and risk separately, but investor perception may combine them. As a result, greenwashing can occur not only through false information, but also through framing and presentation.

The solution is not overregulation, but refinement. ESG labels must be clearly defined and consistently supervised. Sustainability claims should be properly verified. Most importantly, investor protection must consider behavioural realities, especially in digital markets where simplified ESG signals are highly visible. If sustainable finance is to remain credible, “green” must not silently become a synonym for “safe.” Protecting retail investors requires not only transparency, but also clarity about what ESG labels do and do not mean.

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# REGULATORY GAPS IN HYDROGEN TECHNOLOGY IN THE SHADOW OF THE GREEN TRANSITION: COMPLEX LEGAL AND SAFETY-TECHNICAL ANOMALIES IN THE ESTABLISHMENT OF HYDROGEN REFUELLING STATIONS

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## ABSTRACT

The development of hydrogen-based transport and energy storage depends on a coherent regulatory framework adapted to the technology's specific characteristics. Based on an analysis of the Hungarian regulatory environment, this study argues that hydrogen-related rules remain fragmented, creating administrative burdens and investment uncertainty for market participants. The paper examines taxation, urban planning, occupational safety, and fire protection rules, with particular attention to deficiencies in excise regulation and the safety-technical gaps of the National Hydrogen Strategy.

The analysis shows that the lack of defined excise tax rates, the quality assurance shortcomings of NFM Decree 17/2017, and the strict installation restrictions of the National Telecommunications and Infrastructure Framework hinder both investment and the development of residential hydrogen infrastructure. In the absence of detailed domestic rules, market actors and authorities are often forced to rely on international standards, which only partly compensate for regulatory gaps.

The study concludes that technological development has outpaced legislation and that targeted legal intervention is needed. It proposes the adoption of an independent hydrogen-specific disaster management guide, the harmonisation of intervention protocols with domestic legal frameworks, and the supplementation of the Technical Guidelines for Fire Protection with explosion-protection requirements. The findings underline that the objectives of the National Hydrogen Strategy cannot be achieved without integrating safety-technical considerations and resolving permitting anomalies affecting green technologies.

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The article offers a regulatory roadmap for legislators and technical planners seeking to reduce risks arising from the current regulatory hiatus.

**KEYWORDS** Hydrogen economy, regulatory gaps, excise taxation, explosion safety, disaster management protocols

## 1. The Fundamentals of the Regulatory Environment for Hydrogen

In Hungary, the integration of hydrogen technology is currently being implemented within the framework of existing occupational safety, fire protection, technical-safety, and environmental norms; however, this fragmented framework obstructs technological progress and dampens investment appetite at several points. In the absence of a standalone structure tailored to the specificities of the technology, legal practitioners are frequently forced to rely on analogies or international recommendations in daily practice, which increases legal uncertainty and the potential for error. Although Act CXVII of 2010 is of fundamental importance with regard to the use of renewable energy for transport purposes, it only promotes the expansion of hydrogen as an alternative fuel in a general framework, without providing concrete implementation instructions for investors. While NFM Decree 17/2017 (V. 26.) on the quality requirements of motor fuels already includes parameters for electricity and CNG/LNG beyond traditional fuels, it does not yet provide for the quality requirements of hydrogen; therefore, supplementing the legislation in this area is an unavoidable task.

To bridge this gap, the application of the MSZ EN ISO 14687 standard has become widespread in international practice, as it sets out in detail the purity categories of hydrogen fuel – parameters that are critical for the lifespan of fuel cells. Due to this regulatory hiatus, investors themselves must define quality expectations vis-à-vis suppliers, which increases legal risks. The issue of fuel quality is not merely a technical matter but also raises consumer protection concerns, as hydrogen of inadequate purity can cause irreversible damage to the fuel-cell systems of vehicles. The legislator should strive to ensure that specific purity and sampling protocols for hydrogen are recorded in domestic decrees, in alignment with European Union directives. The current state, in which designers must establish quality guarantees on the basis of foreign standards, causes unnecessary administrative complications during licensing procedures. Due to the lack of legal regulation, spheres of liability also become blurred, which may lead to lengthy legal disputes between the operator and the fuel supplier in the event of a technical failure.

From an economic perspective, the most significant obstacle is represented by the deficiencies in excise regulation, which act as a direct barrier to market-based proliferation and long-term business planning. In its current form, Act LXVIII of 2016 does not define a specific tax rate for hydrogen as a motor fuel, which is an untenable situation for sectoral players, as economic returns become unpredictable. This regulatory deficiency creates significant economic uncertainty for operators, as illustrated by the case of the first Hungarian hydrogen refuelling station (HRS), where the lack of clarity regarding excise regulation and tax warehouse frameworks contributed significantly to the temporary shutdown. The legal determination of hydrogen's excise status and precise tax rate is essential for the sector's development, as its absence deters potential domestic and foreign investors. The legislator must recognize that the clarification of the economic environment for hydrogen can wait no longer, as the current vacuum hinders the realization of goals set out in the National Hydrogen Strategy and the fulfilment of climate protection commitments (ITM; 2021).

Uncertainties surrounding tax warehouse licensing indicate that authorities are also unprepared to handle hydrogen as a fuel, further increasing the administrative burdens on investors. The lack of coherence in the regulatory environment is not merely a theoretical problem but a factor that renders daily operations impossible, requiring urgent legislative intervention at all levels. Due to tax uncertainty, the banking sector also deems hydrogen projects risky, making it difficult to secure external funding for infrastructure development. During the clarification of excise regulation, the environmental benefits of green hydrogen should be taken into account, potentially encouraging its spread over fossil energy carriers through tax incentives.

The current regulatory environment distorts market competition, as it places hydrogen at a disadvantage compared to other alternative fuels, such as electricity. Due to the lack of clear legal frameworks, domestic companies face a competitive disadvantage vis-à-vis market players in neighbouring countries, where regulation is already further advanced.

## 2. Urban Planning Constraints and Anomalies in Environmental Permitting

The establishment process for hydrogen refuelling stations (HRSs) is further complicated by recently introduced stringent urban planning regulations, which are often inconsistent with the technology's actual risk profile. Pursuant to Government Decree 280/2024 (IX. 30.) (TÉKA), it is prohibited to install HRSs in small-town, suburban, and village residential areas, as well as in holiday zones; this effectively excludes the technology from the vicinity of residential districts,

thereby hindering network development. Construction licensing procedures are regulated by Government Decree 281/2024 (IX. 30.) and Government Decree 31/2014 (II. 12.) on specific industrial structures; the latter deviates from general residential building rules due to technological complexity.

Under the current Hungarian settlement-planning framework, the issue is no longer governed by Government Decree 314/2012 (XI. 8.), but primarily by Government Decree 419/2021 (VII. 15.) and the TÉKA, introduced by Government Decree 280/2024 (IX. 30.). The TÉKA recognises protective areas, safety zones, protective strips and protection distances as instruments serving protection against harmful effects or ensuring safety. Their extent and the conditions for their use and development must be determined on the basis of sector-specific legislation or, in the absence of such legislation, by the competent authorities. Where no clear environmental threshold or hydrogen-specific domestic sizing rule exists, the minimum required protection distance may therefore be determined on a case-by-case basis. This does not prevent such zones from being recorded in settlement-planning instruments, but it may create uncertainty for designers and authorities and may lead to conservative land-use restrictions. In the case of hydrogen infrastructure, such uncertainty may hinder deployment in residential or mixed-use areas where demand for clean energy solutions is likely to be highest.

While the regulation for specific industrial structures allows for individual assessment, in practice authorities often remain cautious due to a lack of precedents. In urban planning, the designation of protection zones is crucial for the public perception of safety, but these should be based on precise scientific data. Current regulation fails to differentiate between smaller stations storing a few hundred kilograms of hydrogen and large industrial tank farms, thereby imposing a disproportionately heavy burden on smaller investors.

In the field of environmental permitting, serious contradictions emerge, creating significant administrative barriers to the on-site production of green hydrogen. Under Government Decree 314/2005 (XII. 25.), on-site hydrogen production at refuelling stations would fall within the scope of integrated environmental permitting, regardless of whether it involves environmentally friendly electrolysis. This obligation remains even if the hydrogen is produced using renewable energy – a clearly green technology – yet it is treated as a major industrial environmental pollutant during the procedure. In its current form, the government decree is unnecessary, unjustified, and represents a significant obstacle to the installation of HRSs with on-site production, as it forces investors into complex and lengthy environmental licensing procedures ([Zero Carbon Hub, 2021](#)).

The decree does not distinguish between fossil-based and green hydrogen production methods, which distorts market competition and slows the achievement of national decarbonisation goals. A legislative amendment would be justified in order to exempt small-scale, green-based on-site electrolyzers from the strictest examinations, thereby facilitating infrastructure development. The novelty of the technology also presents difficulties for environmental authority experts, which in practice often leads to requests for supplementary information and further unjustified delays in the procedure. A fundamental prerequisite for sustainable transport is the simplification of on-site production, as this reduces transport costs and associated environmental impacts.

Legislators must recognize that environmental regulation should encourage, rather than hinder, the spread of eco-friendly alternatives. During domestic harmonisation with the EU IPPC and IED directives, the unique character of relatively small-scale production at refuelling stations should be taken into account. The current environmental permitting process is so time-consuming that many investors opt for hydrogen transport instead, which increases logistical risks and greenhouse gas emissions during road transport. Simplifying the licensing of on-site electrolyzers would be key to establishing a decentralised hydrogen economy in Hungary.

### 3. Operational Safety and Technical Compliance for Hydrogen Systems

The obligations imposed on employers during the operation of hydrogen technology are established by the framework of Act XCIII of 1993 on Occupational Safety and Health, which is further detailed by MüM Decree 5/1993 (XII. 26.) on the implementation of certain provisions of the Occupational Safety Act. In the presence of hydrogen, the employer is required to implement technological measures that prioritize the prevention of explosive atmospheres, such as the application of forced ventilation. Pursuant to Joint Decree 3/2003 (III. 11.) FMM–ESZCSM on the minimum safety and health requirements for work in potentially explosive atmospheres, operators must develop site-specific explosion protection documentation (EPD/ATEX) for every hydrogen refuelling facility. Workers operating in potentially explosive workspaces must receive specialized training, be familiarized with the EPD, and participate in regular evacuation drills along designated escape routes. Regarding electrical equipment, NGM Decree 40/2017 (XII. 4.) on the safety requirements for electrical installations stipulates the installation and operational rules for devices belonging to hydrogen's II.C gas group. Concerning personal protective equipment, workplace use of PPE is regulated by EüM Decree 65/1999 (XII. 22.), while PPE product-compliance requirements are governed by Regulation (EU)

2016/425. Rather than prescribing a uniform set of equipment for all workers, this framework requires employers to determine and provide appropriate PPE on the basis of workplace risk assessment. For hydrogen-related operations involving flammable gas, explosive atmospheres or electrostatic ignition hazards, this may include antistatic footwear and flame-retardant or antistatic protective clothing. Furthermore, NGM Decree 10/2016 (IV. 5.) on the safety requirements for pressure equipment and systems requires regular, documented technical inspections of high-pressure compressors to maintain safe operations.

Compliance with occupational safety regulations is not merely a legal necessity but a fundamental safety pillar, considering hydrogen's odourlessness and invisible flame. Based on Joint Decree 3/2002 (II. 8.) SzCsM–EüM on the minimum level of safety and health requirements for workplaces, facilities must ensure adequate air exchange and the physical demarcation of safety zones from unauthorized personnel. During the construction phase, Joint Decree 4/2002 (II. 20.) SzCsM–EüM on the minimum safety and health requirements to be implemented at construction sites regulates the work organization principles to be applied during the laying of high-pressure pipelines.

As domestic decrees contain few hydrogen-specific provisions, the international system of standards provides the most critical guidance for designers and operators. The purity of hydrogen as a fuel is a critical factor, for which MSZ EN ISO 14687 and MSZ EN 17124:2022 serve as the basis, establishing quality assurance requirements. For the physical design of stations, MSZ EN 17127:2024 regarding outdoor refuelling station protocols and MSZ EN ISO 17268:2020 for connection technology are authoritative. The backbone of hydrogen technology safety is formed by the MSZ EN 13237:2013 and MSZ EN 1127-1:2019 standards, the latter being particularly important with regard to non-sparking tools used in Zone 0. The significance of MSZ EN ISO 7539-11:2015 must be highlighted, as it examines the resistance of metals to hydrogen embrittlement, which is essential for material selection in high-pressure tanks. Technical guidelines issued by the European Industrial Gases Association (EIGA), such as EIGA Doc 15/21 or EIGA Doc 134/21, fill the gaps in national regulations, providing engineering support for the precise designation of protection zones.

Additionally, ISO 19880-1:2020, an internationally recognized foundational document for hydrogen stations, sets strict safety requirements for the performance-based placement of gas detection systems. Although the application of standards is not always mandatory by law, in practice, they constitute the expected technical level (state of the art), and authorities conduct inspections on that basis. During engineering design, these documents consolidate decades of industry experience; thus, their application is

indispensable for risk minimization. Materials science challenges, particularly metal embrittlement caused by high-pressure hydrogen, require continuous research and regular updates of standards. In the field of machinery safety, MSZ EN ISO 12100:2011 on risk reduction and MSZ EN 60204-1:2019 on the safety of electrical equipment provide the basic frameworks for station manufacturers. Control system safety is guaranteed by the MSZ CLC IEC/TR 61511-0:2022 standard on functional safety, which aims to ensure the reliability of software-based protection systems.

## 4. Disaster Management Frameworks and Emergency Response Protocols

Pursuant to Act XXXI of 1996 on Fire Protection, Technical Rescue, and Fire Brigades, HRSs are classified as facilities of strategic economic and safety importance, requiring specialized regulatory oversight. Consequently, a Firefighting and Technical Rescue Plan (TMMT) must be developed in cooperation with the professional fire services, incorporating hydrogen-specific extinguishing procedures and safety rules for intervention. Under Government Decree 219/2011 (X. 20.) on the protection against major-accident hazards involving dangerous substances, exceeding hydrogen threshold quantities may classify the facility as a hazardous establishment (Seveso III), mandating the preparation of rigorous safety analyses. While the National Fire Safety Regulations (OTSZ), established by BM Decree 54/2014 (XII. 5.), discuss various flammable and explosive gases, they still lack specific provisions explicitly applicable to HRSs, causing significant difficulties in legal application (Nagy & Bencs, 2023). Although the Technical Guideline for Fire Protection (TvMI) 13.5:2025.02.01 classifies hydrogen as a high-intensity explosive category, it sets no clear requirements for refuelling stations, though it does record the sizing of explosion pressure relief surfaces.

Regarding transport safety and disaster risk prevention, the road transport of hydrogen as a dangerous good is regulated under the ADR framework. In Hungary, the currently applicable ADR Annexes A and B are promulgated by Government Decree 165/2025 (VI. 24.), while certain aspects of domestic application are governed by ITM Decree 39/2021 (VII. 30.). This framework sets out the applicable requirements for the classification, packaging, tank or cylinder transport, vehicle marking, documentation and ADR training of drivers involved in the carriage of dangerous goods. Fire-safety conformity assessment is addressed separately by Government Decree 492/2017 (XII. 29.), which regulates the designation of organizations authorized to examine, inspect and certify the fire-safety compliance of certain technical products. In addition, NGM Decree 35/2014 (XI. 19.) establishes technical safety requirements for the

operation of certain transportable pressure equipment and contains the Gas Cylinder Safety Code, including requirements relevant to the filling, inspection, marking and structural integrity of gas cylinders.

The unique physical properties of hydrogen – the invisibility of its flame and the odourlessness of the gas – require a novel approach and specialized equipment from responding personnel. In the event of an accident, reconnaissance must be performed by a minimum of two persons equipped with thermal imaging cameras and personal gas detectors, with vehicles positioned at least 50 metres away, outside the safety zone and with due regard to wind direction. Fires caused by gas discharge must not be extinguished until the hydrogen supply has been isolated by closing the system; instead, efforts should concentrate on the intensive cooling of tanks using remote-controlled monitors to prevent explosion. The dispersion of the gas cloud must be restricted using U-shaped water shields at a distance of 5–10 metres from the leak, ensuring that the wind drifts the cloud toward the water curtain for dilution (Bérczi et al., 2024).

If units cannot commence intensive cooling within 10 minutes, preparations must be made for tank rupture due to internal pressure increase, and a full area evacuation must be ordered. Spraying tanks containing refrigerated (cryogenic) hydrogen with water is strictly prohibited to avoid thermal shock, and combustible materials must be removed from the endangered environment. Following fire suppression, cooling must continue until the risk of reignition is completely eliminated, accompanied by continuous gas concentration monitoring until the full inspection of the area is complete. During intervention, only non-sparking equipment and explosion-proof devices are permitted, in close professional cooperation with the operator. During the preparation of responding personnel, emphasis must be placed on handling cryogenic liquids and high-pressure leaks, as provided by professional training under BM Decree 9/2015 (III. 25.) on the training of the professional disaster management staff. Firefighters must be familiar with the thermal radiation characteristics of hydrogen flames, as they can cause severe burns from great distances even without visible light.

## 5. Conformity Assessment, Certification, and Challenges in Commissioning

A hydrogen refuelling station (HRS) is classified as a hazardous installation; therefore, prior to being placed on the market, it must possess a fire safety conformity certificate pursuant to ÖM Decree 22/2009 (VII. 23.) on the rules for the certification of fire safety or technical rescue compliance of certain fire-fighting or technical rescue equipment and facilities. A designated certification body must be involved in the process based on Section 20 of Act XXXI of 1996

on Fire Protection, Technical Rescue, and Fire Brigades, as an accredited examination is mandatory before the introduction of any fire- or explosion-hazardous technology. It is important to highlight that documentation certifying the conformity of individual sub-assemblies is insufficient to verify the collective CE conformity of the assembled equipment, which imposes significant liability on the contractor. According to NGM Decree 40/2017 (XII. 4.) on the safety requirements for electrical installations, the contractor must hand over the as-built design documentation, the machine manual, and the inspection reports for the electrical equipment.

In the case of high-pressure vessels, an EU type-examination certificate in accordance with the PED (2014/68/EU) Directive is indispensable and must be issued by an independent Notified Body (NoBo). The operation of conformity assessment bodies is regulated by Act CXXXIII of 2009 on the activities of conformity assessment bodies, ensuring their independence and professional competence, while Government Decree 315/2009 (XII. 28.) on the detailed rules for the designation of conformity assessment bodies sets out the strict order for their appointment to guarantee the credibility of test results. Furthermore, hydrogen technology components, such as electrolyzers or compressors, must also comply with the requirements of the Machinery Directive (2006/42/EC). In many cases, certification includes restrictions regarding the inspection of tank safety mechanisms, which the type-examination certificate generally does not cover; therefore, the verification of safety systems must still be approved prior to commissioning (Bérczi et al., 2024). Such critical elements may include the placement of pressure relief valves or the securing of cylinder valves, to which the manufacturer draws specific attention in the manual.

For investors, certified conformity is not only a legal obligation but also a fundamental prerequisite for safe operation and liability insurance. The certification body must review the entire documentation for the HRS and perform the necessary inspections for each technological unit. Due to the complexity of the process, investors should involve experts as early as the design phase in order to avoid subsequent modifications. The certificate issued at the end of the conformity assessment process guarantees that the facility complies with current fire and explosion protection regulations.

During the final inspection before commissioning, the presence of ATEX certificates pursuant to NGM Decree 35/2016 (IX. 27.) on the safety requirements for equipment and protective systems intended for use in potentially explosive atmospheres must also be examined for every electronic component. As the final stage of the process, full compliance with the administrative steps under Government Decree 281/2024 (IX. 30.) on the official procedures for the construction of specific industrial structures is required in order to obtain the

occupancy permit. Technical difficulties arising during the certification procedure often stem from the lack of preparedness of domestic testing stations, highlighting the necessity of developing the laboratory infrastructure.

## 6. Conclusion

The exhaustive analysis presented in this study has highlighted that deficient or ambiguous domestic regulation imposes significant administrative burdens and cost increases on investors, thereby slowing the technological transition. The most critical deficiency is found in the field of excise taxation, where Act LXVIII of 2016 on Excise Duty, in the absence of a specific tax rate, creates economic uncertainty, hindering operators' long-term return-on-investment calculations and directly contributing to the temporary shutdown of the first domestic refuelling station.

An equally serious problem is that Hungary's National Hydrogen Strategy (ITM, 2021) does not mention the terms "fire hazard" or "explosion hazard" even once, suggesting that safety-technical aspects were not given sufficient emphasis alongside economic goals during strategic planning. This omission entails serious risks during the implementation phase, as safety is a fundamental prerequisite for the social acceptance of the technology. The deficiencies in the National Fire Safety Regulations (OTSZ), established by BM Decree 54/2014 (XII. 5.), also reveal that legislation has not kept pace with technological progress, as provisions specifically for HRSs have still not been integrated into the normative text (Nagy & Bencs, 2023).

Due to the fragmented nature of the regulatory environment, designers are forced to use analogies, which increases the risk of technical error and administrative rejection. Looking forward, it is indispensable to integrate hydrogen-specific provisions into relevant national legislation, particularly regarding the recording of quality assurance parameters in NFM Decree 17/2017 (V. 26.) on the quality requirements of motor fuels. From a professional perspective, it is recommended that the National Directorate General for Disaster Management (BM OKF) issue a specialized operational guide that incorporates the tactical elements described in this study into official protocols, thereby assisting firefighter preparation. Furthermore, it would be expedient to supplement the Technical Guideline for Fire Protection (TvMI) 13.5:2025.02.01 on Explosion Protection with an independent hydrogen chapter to clarify specific zone classification and sizing issues for the engineering profession.

The preparation of regulatory experts, the adoption of international best practices, and the closer integration of international standards (e.g. ISO 19880-1:2020) into the domestic legal order are essential for the safe proliferation of hydrogen infrastructure. The legislator must also resolve the anomalies in

environmental permitting to ensure that eco-friendly technologies do not suffer an unjustified competitive disadvantage due to bureaucracy. Ultimately, the basis of safe operation is full and verified conformity, which necessitates the involvement of accredited certification bodies and independent experts throughout the entire lifecycle of the technology. The rise of the hydrogen economy is not merely an engineering achievement but also requires the active, supportive cooperation of the legislator and the authorities. A true green transition in Hungary can only be realized within a coherent, transparent, and predictable regulatory environment.

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# NEW FORMAT OF SECURITIES: SECURITIES REGISTERED IN DISTRIBUTED LEDGERS AND THEIR REGULATION IN CERTAIN EUROPEAN COUNTRIES

HALÁSZ, ZSOLT<sup>1</sup> 

## ABSTRACT

Like many other subject areas, technological progress is also transforming the world of securities. New technological solutions and opportunities may lead to the emergence of new institutions, including new legal institutions. The distributed ledger technology enabling the operation of well-known cryptocurrencies is – among many other things – a tool suitable for the registration of securities; although it has not yet become widespread, some countries have already established the legal framework for its application. This study presents a comparative analysis of existing European regulatory solutions to demonstrate the options available for establishing an effective regulatory framework for securities recorded on a distributed ledger and the benefits of introducing such a securities registration system from both a regulatory and a practical perspective.

**KEYWORDS** Securities; distributed ledger technology; crypto-assets

## 1. The Appearance of Securities Registered in Distributed Ledgers

Besides securities issued in the form of well-known paper-form instruments or electronically stored data (in dematerialised form), a new form of securities is emerging in a growing number of European countries: securities registered in distributed ledgers. For most people, distributed ledger technology (DLT) is a notion associated with the registration of crypto-assets, but it is a technology that can be used not only for crypto-assets but also for recording and registering other data, and can therefore also be used for the registration of securities.

The EU first introduced rules for securities issued via distributed ledger technology (DLT securities) with a 2022 amendment to the MiFID Directive. This

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was implemented by the DLT Regulation, which establishes a pilot regime for market infrastructures using DLT.

Although the European Union regulates various aspects of securities law, from the issuance of securities (Prospectus Regulation) to market infrastructures (CSD Regulation) and the regulatory measures against market abuse, it has not yet adopted a comprehensive set of provisions governing securities law, and there is currently no uniform European substantive securities law and no uniform European definition of securities. As a result, the legal definition of securities falls within the competence of the Member States, which have broad autonomy in determining the regulatory framework for substantive securities law. Most Member States, including Hungary, have not yet taken any real steps to regulate DLT securities beyond the basic technical requirements of transposing the aforementioned amendment to the MiFID Directive into their own legal systems.

Although Hungarian securities law does not yet allow securities to be issued on DLT, several European countries – including Germany, Switzerland, Liechtenstein, Luxembourg, Spain, and France – have already paved the way for doing so. Market participants have responded positively to the possibility of issuing such securities. One of the first major DLT bond issues was undertaken by the European Investment Bank (EIB) in 2021. The EIB's first digital bond has been followed by an increasing number of issues on the capital markets of Member States. According to the German Financial Supervisory Authority (BaFin), a total of 277 DLT securities had been issued in Germany by March 2026. An official list of issued and registered DLT securities is published on BaFin's website.

Despite developments in European legislation, similar regulations have not yet been introduced into the US legal system, which regulates the world's pre-eminent capital market.

The aim of this paper is to present aspects and explore existing regulatory examples that may be relevant to legislators in Member States that have not yet established their own regulatory frameworks. In addition to dogmatic analysis, the study primarily employs a comparative method, analysing regulatory examples that apply the most divergent solutions. Due to space constraints, it was not possible to present all regulatory examples.

## 2. The Distinction between Crypto-Assets and DLT Securities

Within the sphere of crypto-assets, there are several different types of tokens, depending on their purpose:

- a. *Payment tokens* – often referred to as cryptocurrencies – function as a means of exchange or payment and are intended to be used for the payment of goods and services and the execution of payment transactions. (In addition to this basic function, they are also often used for reserve accumulation.) Some sources refer to these tokens as “virtual assets for payment” (Veres, 2023). Their payment value is not based on any obligation, but on the value judgment of the user community according to the rules of market supply and demand. Payment tokens are not equivalent to electronic money. The most typical examples are Bitcoin, Ether, Ripple, Litecoin, and Monero.
- b. *Investment/security tokens*, as their name suggests, are similar to conventional securities in that they grant the holder the right to a future share in the issuer's profits, a fixed payment, and/or voting rights. An investment token presumes an issuer who issues the token in exchange for a claim against it. Such a right or claim may be against the issuer or a third party, e.g. a credit relationship, or a share in capital, profits, or income, voting rights, or rights of disposal over assets.
- c. *Utility tokens* provide immediate or future access to a service or product (or a claim for a product or service), and their value is essentially dependent on the value of this access right. They typically lack a general exchange function, do not confer ownership rights, but are transferable and can be used as a means of payment, thus most closely resembling a coupon or voucher. Utility tokens do not generally function as a means of payment, but rather only in the relationship between the issuer and the user, and therefore cannot be considered money.
- d. *Hybrid tokens* are crypto-assets that incorporate multiple features of utility, payment, and security tokens (Sajnovits & Wilhelm, 2024).
- e. *Non-fungible tokens* (NFTs), which are unique and cannot be substituted by other crypto-assets, include digital artworks and collectables, as well as non-fungible crypto-assets representing unique services or tangible assets, such as product warranties or real estate (Breszkovics, 2025).

The aforementioned list demonstrates that the world of crypto-assets displays an extremely diverse picture. While payment and utility tokens are clearly not analogous to securities, security tokens – and, in certain cases, hybrid tokens – exhibit many similarities. The question is therefore whether there can be a crypto-asset that qualifies as a security in the legal sense, and, if so, which regulatory regime should be applied.

In addressing this question, the US Securities and Exchange Commission (SEC) focuses on whether a digital asset based on distributed ledger technology qualifies as a security under US federal securities law<sup>2</sup>. The SEC and the courts use the test developed in the *Howey* case (*SEC v. W.J. Howey Co.*, 1946) to determine whether an asset is a security.

The test evaluates not only the legal form and contractual terms of the instrument, but also its substantive characteristics. If an instrument qualifies as a security, it must be registered with the SEC, and various information relating to the security and its issuer must be submitted to the SEC. The elements of the *Howey* test are as follows:

- a. Is money being invested?
- b. Is the investment made in a common enterprise in which investors share a common risk?
- c. Is the investment made with a reasonable expectation of profit?
- d. Does the profit depend on the efforts of others?

In the European Union's legislative framework, a comparison of the MiCA Regulation on crypto-assets and their markets and the MiFID Regulation on financial instruments and their markets clearly demonstrates that, apart from technological differences, the structure and content of these regulations are similar in many respects, and there are also significant overlaps in certain basic regulatory elements. It is therefore necessary to clarify when the instruments in question fall within the scope of the respective regulations and, depending on this, whether the MiCA or MiFID regulatory framework applies to them.

The starting point for this distinction is the basic EU crypto regulation, the MiCA Regulation, which covers asset-referenced tokens, e-money tokens, and other tokens (collectively referred to as crypto-assets), but does not apply to crypto-assets that qualify as financial instruments (in particular transferable securities) under MiFID (MiCA Regulation, Article 2(4)(a)). At the same time, in capital market regulation, the MiFID Directive has recognized distributed ledger-based financial instruments since 2023.

Consequently, the regulatory background applicable to different types of instruments can be defined as follows ([Wittinghofer & Lorenz, 2024](#)):

- a. traditional transferable securities issued as paper-form instruments or in dematerialized form are clearly subject to MiFID and related securities law regulations, as has been the case to date;

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<sup>2</sup> In particular: Section 2(a)(1) of the Securities Act of 1933, Section 3(a)(10) of the Securities Exchange Act of 1934, Section 2(a)(36) of the Investment Company Act of 1940, and Section 202(a)(18) of the Investment Advisers Act of 1940.

- b. the regulatory framework for crypto-assets is provided by the MiCA Regulation;
- c. transferable DLT securities, characterised by the fact that they are based on the same technological background as crypto-assets, but are securities and therefore excluded from the scope of the MiCA Regulation (Article 1(4)) and subject to securities law regulations;
- d. securities tokens, although they appear to be crypto-assets, are also subject to securities law if they are classified as securities under the law of the place of issue (Marjosola, 2021), unless the token does not represent a property right but only other rights, such as voting rights (Zickgraf, 2020);
- e. unique crypto-assets (e.g. NFTs) are outside the scope of the MiCA Regulation, and the applicability of securities law must be assessed on a case-by-case basis.

Based on these considerations, it can be concluded under both the European Union and US regulatory systems that instruments that fully possess the characteristics of a transferable security, even if issued in tokenized form, should be considered securities rather than security tokens (crypto-assets). This regulatory constraint severely limits the spread of security tokens to those countries whose legal systems allow the issuance of security-like tokens in parallel with, or in place of, securities that otherwise have the characteristics of securities.

### 3. The Value Added of DLT Securities

The issuance and use of DLT securities would considerably simplify the complex financial processes associated with the holding and trading of securities. Among their many advantages, it is worth highlighting the easy traceability of the ownership position of individual securities and of trading transactions related to securities, not only by service providers but also by investors and customers.

Easy traceability helps to reduce insider trading and prevents many other types of malpractice (e.g. backdating transactions).

The use of distributed ledger technology enables faster – almost instant – and cheaper settlement of securities transactions. Faster settlement also reduces the risk associated with transaction execution by reducing the counterparty's solvency risk, which in turn may lead to a reduction in the need for transaction collateral and its ongoing maintenance.

DLT securities also enable transactions to be executed within the framework of so-called smart contracts, which can result in the automatic execution of

transactions, the automation of interest, dividend, and other yield payments, and the automatic payment of collateral in the event of insolvency.

From a supervisory perspective, the possibility of automated data reporting and collection could be a particularly advantageous development (Seretakis, 2019).

## 4. Regulatory Challenges for DLT Securities

The EU regulations adopted so far do not regulate financial instruments issued via distributed ledgers or other trusted technologies (but regulate only the related services, activities, and market infrastructure, and even these only on a pilot basis). The regulation of such instruments remains within the competence of the Member States, so it is appropriate to review the relevant national regulations and identify regulatory similarities and disparities.

A general requirement for regulation is to adapt to the opportunities offered by modern technologies and to enable the widest possible use of them. Given that the technological landscape is evolving continuously and at an unprecedented pace, the legislature must create a regulatory framework capable of keeping pace with technological innovations.

The development of a technology-neutral regulatory framework is a fundamental factor, in line with the relevant UNIDROIT Principles on Digital Assets and Private Law (UNIDROIT, 2023), which does not consider distributed ledger technology to be the only and exclusive option among financial innovation solutions. As technology evolves, a number of as-yet-undeveloped technological solutions may emerge that could serve as a secure backbone for the functioning of capital markets. The legal regulatory framework must define the requirements for both known and still unknown solutions in order to allow their application.

The foundation of the capital market's operation is the trust of investors. Since the trust of investors cannot be gained without adequate safeguards, it is essential that regulation ensures this level of protection

- by providing a regulatory environment that offers a secure legal framework on the one hand, and
- by establishing a supervisory system that ensures the integrity, transparency, and proper functioning of the securities market, on the other.

It is essential to establish an interoperable technological and regulatory environment for different developers and government regulations in order to ensure the functioning of the global capital market.

In the European Union, the CSD Regulation already mandates issuance in dematerialized form for transferable securities (which, in practice, is no longer a

novelty in most cases). Some Member States (e.g. Germany, Luxembourg, Spain, and France) have combined this mandatory regulatory transition with the creation of a regulatory environment for DLT securities.

## 5. Examples of Certain State Regulations

The regulatory examples presented are not exhaustive in the sense that, in addition to the examples detailed below, other countries also have similar regulatory solutions.

### 5.1. German Regulation

In Germany, the Electronic Securities Act (eWpG) was adopted by the Federal Parliament in 2021. Its scope originally covered only debt securities (bonds), but was extended to shares two years later by the *Zukunftsfinanzierungsgesetz*. The Act is a significant step forward in the development of German securities law, creating a new form of securities through the general regulation of electronic securities.

Under the Act, the issuance of securities as electronic securities is an option, a right, and not an obligation (eWpG, art. 2(1)).

The Act regulates and distinguishes between two basic types of electronic securities:

- centrally registered (dematerialized) securities, and
- crypto-securities.

An electronic security is classified as a security in the same way as a security issued in traditional certificate form; it possesses all the elements of the traditional concept of a security, but instead of a physical (certificate) form, it appears as an entry in an electronic registry.

Based on the two types of electronic securities, the eWpG differentiates between two different securities registration systems. Centrally registered securities are recorded in a central registry (at a custodian institution or central securities depository), while crypto-securities are recorded in a crypto-securities registry. These two systems are not hierarchically linked to each other; neither can be considered legally stronger or weaker than the other, and both have equal probative value, with the common goal of ensuring the publicity and transparency of securities. Electronic securities cannot exist outside these registries. Both types of registries are private and non-public registries (Szilágyi, 2023).

The crypto-securities registry operates as a decentralised registry system – not managed by any central institution – that is tamper-proof, forgery-proof, and

deletion-proof. This system must ensure that the recorded data cannot be modified or deleted retroactively. The crypto-securities register may be kept either by the issuer itself or by a service provider commissioned by the issuer. The crypto-securities register qualifies as an investment service under the German Banking Act (*Kreditwesengesetz*, KWG), and for this reason, a supervisory licence (from BaFin) is required for the provision of this service. It is crucial to note that the crypto-securities register is considered an investment service only under German law; it is not included among the activities subject to mutual recognition as defined in the CRD Directive.<sup>3</sup>

To ensure the public disclosure and transparency of crypto-securities, the issuer is required to publish a statement on the issuance of crypto-securities – containing the information specified by law – in the *Bundesanzeiger* and to notify BaFin, which publishes a public list of these securities on its website (eWpG, art. 20).<sup>4</sup>

A key difference between the central securities register and the crypto-securities register, from the perspective of securities trading, lies in the fact that only securities held in the central securities register may be entered into the securities settlement system (eWpG, art. 12(3)), which implies that only centrally registered securities may be traded on the stock exchange. Crypto-securities are also negotiable securities, but as securities outside the settlement system, they may only be traded on over-the-counter trading platforms (e.g. MTFs).

The eWpG does not introduce a new type of securities instrument, unlike, for example, the Swiss approach, but retains the traditional conceptual framework of securities law and designates and treats electronic securities (both types) as securities alongside securities appearing in traditional paper certificate form. The German legislature also refrained from adopting the Liechtenstein-style general and comprehensive regulation of tokens (Casper, 2021).

An electronic security has the same legal effects in terms of property and obligations as a traditional certificate-based security and, by virtue of a legal fiction, it is considered a security – and, pursuant to Article 90 of the German Civil Code (BGB), a thing – despite having no physical form and despite the fact that its substantive basis consists of an entry in a registry. In other words, an electronic security is considered a normative thing (Szilágyi, 2023).

The German legislature's goal was to create technology-neutral regulations (Lieder, 2024); thus, terms such as “blockchain” do not appear in the regulatory framework.

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<sup>3</sup> Annex I – List of Activities Subject to Mutual Recognition

<sup>4</sup> The *Bundesanzeiger* (Federal Gazette) is the official publication medium for legal and statutory announcements in Germany, issued by the Federal Ministry of Justice.

## 5.2. Swiss Legislation

In Switzerland, according to Art. 965 of the Swiss Code of Obligations (*Obligationenrecht*, OR), a security is the physical instrument to which a right attaches in such a manner that it may not be exercised or transferred to another without the instrument. The transfer of ownership of a security always requires the transfer of possession of the instrument, meaning that the right embodied in the security can be transferred as a tangible thing (OR, art. 967). The novelty of dematerialized securities lies in their lack of physical incarnation, and their comprehensive regulation took effect in 2008 through the *Bucheffektengesetz* (BEG).

The central umbrella term in Swiss securities law is the “Effekt”, which encompasses both securities in certificate form (*Wertpapiere*) and property rights that do not qualify as securities (*Wertrechte*). Under applicable law, the Financial Services Act (FIDLEG) defines the scope of the term “Effekt”, which includes:

- standardised certificated securities (*Wertpapiere*);
- uncertificated securities (*Wertrechte*), in particular uncertificated securities in accordance with Article 973c of the OR and ledger-based securities (DLT securities) in accordance with Article 973d of the OR;
- derivatives; and
- intermediated securities (*Bucheffekte*),

which are suitable for mass trading.

Under Swiss law, a traditional dematerialized security is therefore referred to as a “*Bucheffekt*”, which is a security-like instrument that represents rights in value (e.g. a claim, membership rights) through registration – by crediting a securities account – without the issuance of a physical certificate. Under Swiss regulations, therefore, the issue is not approached by regulating securities issued in physical and dematerialised forms, but rather by retaining the concept of a security for physical certificates and, in addition, creating another concept that grants the same rights to the holder without the issuance of a tangible document. The BEG does not mandate the dematerialization of securities; it merely creates the opportunity for it.

The further development of the system for non-certificated securities was implemented in 2020 through a comprehensive legislative measure, when the Swiss Parliament adopted the DLT Act (*DLT-Gesetz*), aimed at aligning regulatory elements with the development of distributed ledger technology, thereby enabling the issuance of ledger-based securities.

Contrary to German legislation, ledger-based securities (DLT securities) are, under the Swiss Code of Obligations (OR), instruments similar to securities:

electronically recorded, non-replicable and non-manipulable instruments registered on distributed ledger technology. Although they are not considered securities under private law, they are classified as securities under Article 2 of the Financial Market Infrastructure Act (*Finanzmarktinfrastrukturgesetz*, FinfraG). Contrary to its German name, “*Registerwertrecht*” is not a right, but it fulfils the same functional role and may represent the same rights as a security in certificate form.

A DLT security is created upon entry in the registry (securities ledger / *Wertrechtregister*) and can be transferred only through this ledger. Any right capable of being issued as a security can also be issued as a ledger-based security (DLT security), which allows for the creation (issuance) of claims, membership rights, and property rights. The securities ledger or registry enables transfers of securities without the involvement of a separate intermediary.

The securities ledger or registry must meet the following requirements (OR, art. 973d(2)):

- it uses technological processes to give the creditors, but not the obligor, the power of disposal over their rights;
- its integrity is secured through adequate technical and organisational measures, such as joint management by several independent participants, in order to protect it from unauthorised modification;
- the content of the rights, the functioning of the ledger, and the registration agreement are recorded in the ledger or in linked accompanying data;
- creditors can view relevant information and ledger entries, and check the integrity of the ledger contents relating to themselves without intervention by a third party.

Similar to German legislation, Swiss regulatory provisions are technology-neutral; however, given the current state of technology, only ledgers based on distributed ledger technology are capable of meeting these requirements. The regulations do not, however, preclude the use of other technologies if they meet the above requirements.

Unlike the German eWpG regulations, Swiss regulatory requirements do not consider ledger-based securities (DLT securities) to be a tangible asset, but they do require that the ledger or registry grant rights of disposal over ledger-based securities to the entitled parties (OR, art. 973d(2)(1)). A further difference between the two systems is that, while German regulations require a supervisory licence for the keeping of the crypto-securities register, the Swiss system sets out only the basic requirements for registries and ledgers.

### 5.3. Spanish Regulatory Framework

In Spain, the Law on Securities and Investment Services adopted in 2023 (LMVSI) incorporated numerous new elements into securities law, thereby creating the possibility of issuing DLT securities. According to the preamble of the law (LMVSI, Section II), the definition of financial instruments is being amended to clarify, without legal ambiguity, the possibility of issuing financial instruments using distributed ledger technology. The law has incorporated DLT securities into the general framework of securities law, without creating a separate legal category or independent regulation for them. Spanish regulations also adopt a technology-neutral approach.

Article 6 of the LMVSI specifies that transferable securities may be issued as securities certificates, dematerialized securities, and DLT securities; however, only dematerialized and DLT securities may be admitted to trading on trading systems. The legal status of DLT securities is equivalent to that of securities issued in the form of certificates or as dematerialized securities recorded in a securities account. Furthermore, the law does not impose any restrictions regarding the types of securities that may be issued on a distributed ledger.

The Act requires that, in cases where the issuer uses systems based on distributed ledger technology to record negotiable securities, such systems must ensure the integrity and immutability of issuances executed through them, and they must directly and indirectly identify the holders of transferable securities, as well as the characteristics and number of such securities. Holders of securities registered in systems based on distributed ledger technology must be granted access to all information relating to the securities and to transactions involving the securities.

DLT securities become securities upon their initial registration in these systems and are transferred to the ownership of the issuer or the securities' registrars. The transfer of these securities takes place through the registry (LMVSI, art. 11).

The law makes it explicit that the Spanish Securities Market Authority (*Comisión Nacional del Mercado de Valores*) also has supervisory authority over organizations responsible for managing the registration and record-keeping of securities that operate using systems based on distributed ledger technology (LMVSI, art. 232).

### 5.4. Liechtenstein Approach to Tokenised Securities

The regulatory framework in Liechtenstein differs in several aspects from the previously analysed legislative schemes. It is based on the Law on Tokens and Trusted Technology Providers (TVTg), adopted in 2020, whose regulations aim

to provide a comprehensive and technology-neutral framework for market participants regarding token-related services (not merely in a financial sense).

One of the fundamental terms of Liechtenstein's regulatory framework is the "security", as defined by the Act on Persons and Companies (PGR). Similar to Swiss rules, Liechtenstein's regulations (cf. Art. 267 of the PGR) are based on securities issued in certificate form; however, they also allow the issuance of securities without a certificate, though unlike Swiss regulations, they do not create a separate concept or category of securities law for this purpose (Layr, 2021).

An additional fundamental term in the legislation is the "token", which the TVTG defines as information stored on a reliable technological system and which:

- may represent a claim or membership rights against a person, rights related to property, or other absolute or relative rights; furthermore,
- is associated with one or more trusted technical identifiers (keys).

Any right may be tokenized, with the exception of rights linked to a person. Based on the definition of a token, Liechtenstein's regulations do not distinguish between crypto-assets and DLT securities as defined by EU law, but instead apply the broad concept of a token to both. The issuance and trading of any token, as well as related services, may take place in accordance with the TVTG. Within this framework, tokenized assets may therefore be either crypto-assets under the MiCA framework or financial instruments under the MiFID Directive, with the distinction that tokenized securities are subject not only to securities law regulations based on and fundamentally consistent with EU regulations but also to the provisions of the TVTG.

Under Liechtenstein's property law, similar to Swiss law and unlike German law, the concept of "tangible property" does not extend to tokens and tokenized securities (cf. Art. 20 and Art. 171 of the SR).

## 6. Conclusion

Regulating the issuance, registration, and trading of DLT securities offers several benefits to all participants in the financial markets. These benefits serve to protect the interests of both retail investors and non-retail clients.

For issuers, this constitutes a new, innovative fundraising tool; for investors, it is an efficient, fast, and secure form of investment. One of the most remarkable advantages for both sides is the fast, even instant, settlement of transactions. While the settlement period for traditional securities transactions is currently T+2 days under the CSD Regulation (T+1 day as of 2027), the use of distributed ledger technology enables instant, real-time settlement.

Although the distributed ledger-based registry also operates in a digital environment, the data in this registry cannot be multiplied or manipulated.

In the case of DLT-based securities, a further benefit is that the number of intermediary institutions (registrars/custodians) is reduced, as their functions are taken over by the ledger itself. For the same reason, there is no need for a central securities depository. As a result, transaction costs can also be reduced. Reducing the number of parties involved in transaction processing also reduces the potential for errors.

The use of reliable technological solutions – due to the transparency of the registry system and the immutability of the records created (e.g. blocks) – also reduces the risk of intentional fraud.

Whereas the concept of a security is not defined in EU law, it is possible to determine on a case-by-case basis, based on the substantive securities laws of the Member States, whether a particular asset is to be considered a crypto-asset or a security recorded on a distributed ledger. Until the concept of a security is defined at the EU level, distinguishing between specific cases will remain challenging. Considerable differences can be observed among Member States' securities laws even on fundamental issues, such as whether the legislation provides a definition of a security or whether a tokenized security qualifies as a tangible asset.

Except for a single sentence of the Investment Firms Act (Bszt., art. 6), the Hungarian legal system does not provide regulations for DLT securities. Although the Bszt. permits the provision of services and trading in Hungary related to such financial instruments issued in other countries, their issuance is not currently permitted under Hungarian law, and Hungarian law does not regulate the framework for keeping records of them either.

This regulatory gap represents not only a legal constraint but also a competitive disadvantage, as companies wishing to issue such securities or other financial instruments in order to take advantage of the benefits described above are forced to do so in another country where the legal framework exists. Legal barriers and regulatory gaps thus hinder the development of the domestic capital market, despite the fact that the issuance of DLT securities would entail numerous legal and economic benefits.

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# EMERGING TRENDS IN INTERNATIONAL CONSUMER PROTECTION: SUSTAINABLE CONSUMPTION LAWS AND ADR MECHANISMS IN THE EUROPEAN UNION

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## ABSTRACT

The Sustainable Development Goals (SDGs) call for environmentally sustainable production and consumption in line with the green transition within the European Union (EU); however, the EU is yet to fully incorporate Alternative Dispute Resolution Mechanisms (ADR) in the resolution of environmental matters, let alone in providing redress for disgruntled consumers and traders. This paper attempts to analyse the effectiveness of the incorporation of ADR mechanisms in consumer protection disputes within the EU as an alternative to litigation, with a keen look at international emerging trends and international best practices.

**KEYWORDS** Alternative dispute resolution, sustainable development goals, sustainable consumption and production, European Union, environmental sustainability

## 1. Introduction

ADR is now a globally accepted means of dispute resolution (Egbunike-Umegbolu, 2024). In the United States of America (USA), ADR has been in use since the 20th century, and its effectiveness continues to be felt, with at least 90% of the cases submitted to ADR being successfully settled by 2006, and the number continuing to rise (Miller, 2006). The goal has been, and remains, to curb case backlog caused by lengthy court processes (Sander, 1985). The institutionalisation of ADR can be attributed to the aforementioned success in achieving speedy settlements (Nosyreva, 2001). The African continent also follows suit in its implementation of ADR as a means of providing access to justice for its populace (Ntuli, 2018).

EU regional laws and policies have incorporated the United Nations 2030 Agenda and the 17 Sustainable Development Goals (SDGs) in their provisions to aid the green transition towards sustainability (Erimia et al., 2015). The Member States strive to curb the negative effects of climate change by ensuring

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sustainable production and consumption, the use of eco-friendly products, effective waste management to reduce negative effects on the environment, and the effective utilization of available natural resources (Firoiu et al., 2025). Likewise, consumers within the EU now strive to purchase products that are environmentally sound (Pettoello-Mantovani & Olivieri, 2022).

It is important to note that sustainable consumption and production can only be achieved through mechanisms that reduce environmental degradation and foster effective waste and pollution management (Salzman, 1997). A report by the World Economic Forum in 2020 attributed at least 83% of environmental degradation to human activities, contrary to Goal 12 of the SDGs, which is meant to promote responsibility with regard to human activities of production and consumption for the sake of future generations (Arora & Mishra, 2023). Further, the SDGs are meant to be a guide towards climate change action plans that foster climate justice, economic development, and social development (Ladan, 2018).

Among the targets set out under the SDGs is the promotion of the rule of law and equitable access to justice for all people by 2030, both at the national and international levels of governance (Manuel & Manuel, 2018). As a principle, it fosters democracy, equitable development, and responsible stewardship (Logan, 2017). Moreover, the SDGs call for the promotion of peace and the establishment of robust institutions that promote justice for all (Alkhayer et al., 2022). Insofar as consumer protection disputes are concerned, Alternative Dispute Resolution Mechanisms (ADR) are preferred due to their cost efficiency, flexibility, and time efficiency in the resolution of consumer protection disputes (Juškys & Ulbaitė, 2012).

Further, ADR is seen as a tool that fosters confidence among consumers and traders within the internal marketplace (Creutzfeldt, 2016). ADR and Online Dispute Resolution (ODR) are intertwined and work in correlation with each other, with the latter being an extension of the former, meant to take advantage of the current digital age in offering consumer redress (Cortés, 2010).

## 2. Consumer Protection and the Sustainable Development Goals (SDGs) within the EU

Fairer and better market competition for consumers can only be attained through effective consumer protection rules that aim to safeguard consumers' rights, safety, and economic interests (Czarnecka & Zych, 2024). The European Union's digital transformation priorities for 2024, dubbed the Europe Fit for the Digital Age Agenda, are intended to introduce new technologies that foster new innovative business models which allow consumers and traders to trade easily through instant technologies. However, due diligence ought to be upheld to

ensure that illegal content is not freely circulating, while civil liabilities and conflicts are reduced (Magalhães & Calle, 2025).

The 2015 United Nations Guidelines for Consumer Protection provide for access to justice through the use of Alternative Dispute Resolution Mechanisms (ADRs), which ensure justice for vulnerable consumers, as they are less expensive compared to litigation (Benöhr, 2020). In the EU, Directive 2013/11/EU was meant to promote ADR for timely and fair justice for consumers in the Member States (Biard, 2019). Equally, Regulation (EU) No 524/2013 on ODR was enacted with the hope of accelerating the use of ODR in cross-border dispute resolution (Cortés, 2022).

There is an interrelationship between the attainment of the SDGs in the EU by 2030 and the implementation of policies that best address the issues of healthy living, consumption, and production among the Member States (Firoiu et al., 2025). Companies should thus strive to embrace eco-friendly consumption and production that boost sustainable economy, sustainable industrialization, and innovation in favour of the climate change policies enacted (Fonseca & Carvalho, 2019). From the aforementioned sentiments, it is clear that ecologically sound practices are the cornerstone of the SDGs, as they aid in environmental protection (Blind & Heß, 2023). This is not lost on the EU Member States, as demonstrated by the adoption of the European Green Deal (EGD), which is meant to encourage sustainable economic growth that provides for sustainable production and consumption (Reins & Wijns, 2025).

Moreover, Directive (EU) 2024/825 and Regulation (EU) 2024/1781 both advocate for informed green production choices while still protecting consumers from prejudicial production practices (Keirsbilck, 2024). The primary ultimate aim is the realisation of a carbon-neutral EU by 2050, in line with the zero-emissions agenda, which is informed by the endeavour to stop global warming (Ström, 2020). The EU legislature endeavours to ensure that products that are detrimental to the environment do not make their way into the EU market, and consumers are encouraged to make ecologically friendly choices when choosing their consumer products (De Almeida & Esposito, 2023). This is in line with Agenda 16 of the SDGs, which calls for the public participation of the citizenry; in the current study, it goes a long way towards the attainment of the zero-carbon-emissions agenda (Cappellaro et al., 2022).

The EGD equally propels the Member States towards the use of renewable energy, with the EU regarding corporate social responsibility as a tenet towards the realization of the SDGs, as Directive 2014/95/EU calls for sustainable business models that take into consideration the environmental impacts of companies' operations (Assanova et al., 2025). Moreover, the Clean Industrial

Deal (CID) Policy also brings to the surface the efforts by the EU Member States to ensure that decarbonization is attained gradually (Sabato & Grossi, 2025).

### 3. Judicial Standing on Consumer Protection Law within the EU

In the EU, national courts rarely initiate consumer protection legal disputes on their own motion; this means that a party has to bring a matter before the court in order to be heard (Mišćenić, 2019). At the national level, consumer protection law should be efficient, practical, and should facilitate the proper functioning of free movement in trade among the Member States (Cseres & Reyna, 2021).

Moreover, effective justice is tied to verdicts that guarantee the appeal of commercial investments within the EU for both local and foreign investors and ensure transparency in this regard (Yiatrou, 2023). As a reflection of substantive law, access to justice within the EU mandates that the challenges posed by cross-border trade are addressed through international best practice, especially among states that lack an effective and efficient legal framework for such trade (Howells et al., 2017).

Furthermore, the Court of Justice of the EU (CJEU) becomes a point of call insofar as the interpretation of the provisions and directives issued on consumer protection is concerned (Unberath & Johnston, 2007). This provides uniformity in consumer protection law among the Member States, as the CJEU is clear on the distinction that exists between the interpretation of law and the application of the law, the latter of which is left under the watchful eye of the national courts (Howells & Straetmans, 2017).

### 4. The Implementation of ADRs within the EU in Consumer Protection Disputes and the Challenges Encountered

Environmental dispute resolution is understood as the resolution of disagreements in a manner that fosters environmental, social, and economic sustainability in a transparent way, thereby enabling the parties involved to be held accountable for conduct that undermines environmental sustainability and, in turn, promoting sustainable practices (Gupta & Bajpai, 2023). Various states have adopted ADR for the resolution of green disputes, but this has yet to be fully realised among the EU Member States (Ansari et al., 2017). This remains the case even though the European Commission tabled a draft directive on the importance of mediation as a dispute-settlement tool before the European Parliament and the Council in 2004 (Abdullah, 2015). Furthermore, the Commission needs to develop a policy framework for redress in environmental

degradation claims relating to production and consumption within the EU (Hamřík, 2020).

ADR is primarily promoted within EU trade policies that encourage the attainment of the SDGs while also supporting the resolution of emerging disputes through ADR (Baroncini, 2025). Moreover, ADR directives within Europe call for the incorporation of ADR in consumer disputes in place of litigation; however, this is applicable only where the complainant is the consumer and consent is given by the trader (Loos, 2016). Directive 2008/52 provides for the stay of proceedings where ADR may be used as an alternative to litigation, although this does not impede the complainant's right to institute a claim if the mediation fails (Davies & Szyszczak, 2010).

Moreover, preventing a party from approaching the court as a remedy would run contrary to Article 6 of the European Convention on Human Rights, which guarantees the right to a fair trial for all individuals (Halsey v Milton Keynes General NHS Trust, 2004). The EU ADR framework on consumer disputes aims to promote redress for consumers, even in cross-border consumer disputes (Zdraveva, 2025). This is what Article 12, read together with Article 114 of the TFEU, strives to achieve, and with new policy advances comes the necessity for online dispute resolution mechanisms (ODR) (Senatore & di Prisco, 2022).

Despite the existence of operational ADR directives and ODR mechanisms, their utilization in consumer protection disputes remains inadequate due to lack of awareness and resistance from traders to subscribe to the ADR process. Additionally, there is a lack of uniformity among the Member States in the implementation of ADR directives and ODR mechanisms, as they are left to maintain their own individual ODR national contact points (Kaya & Sahin-Sengül, 2025).

Likewise, inconsistency in monitoring approaches across the EU leads to disorder in the organisation of initiatives due to the high number of National Competent Authorities, which are marked by highly divergent monitoring behaviours, poor rationalisation of ADR, and insufficient embedment of ADR within the civil justice system (Biard, 2018). Furthermore, the ADR Directive fails to consider instances where the complainant is the trader, and neither the aforementioned directive nor the Consumer Rights Directive provides for a mandatory requirement that the trader convey prior information on whether he or she intends to adhere to the ADR scheme (Loos, 2016).

Within the EU, ADR as a dispute resolution mechanism lacks visibility due to low levels of consumer awareness, as it is viewed as a tool that is more professionally focused than the public nature of litigation; thus, it is underfunded (Kawiński, 2009). Moreover, the risk of duplicated cost may be unavoidable in instances

where awards by an ADR body are challenged in court. The end result is usually costly and lengthy litigation proceedings that build up administrative costs in both the civil and ADR processes, both of which require adequate funding (Weber, 2015).

The European Commission (DG JUST), as a public regulatory body, ought to incorporate ADR into its policy framework as an avenue of redress for consumer protection disputes (Hodges, 2015). This is particularly justified by the fact that, as a civic body, it is clothed with the mandate of ensuring compliance with enacted consumer protection law, the certification of ADR bodies, and the facilitation of regulatory compensation herein (Zdraveva, 2025).

Jurisdictional uncertainty is a hindrance to the full realization of ADR when it comes to the enforcement of arbitral awards in cross-border consumer disputes, due to the conflict that may arise in cross-border enforcement and the subsisting national law systems already in place among different nations (Gillies et al., 2022). Further, a challenge may be experienced in the enforcement of ODR, given the public-policy nature of consumer protection laws among the Member States (Hanriot, 2015).

## 5. The International Element of Consumer Protection

In jurisdictional conflicts concerning consumer protection practices, states such as the USA apply the national law of the habitual residence that accords the consumer the greatest protection, provided that this is not contrary to public policy (Rühl, 2011). This contrasts with EU party-autonomy limitations in instances of insurance contracts, which restrict the applicable law to the habitual residence of the policyholder (Marques, 2014). This goes to show that the concept of consumer protection has now become an international concept that demands the protection of consumers from harm and the availability of redress where necessary (Scott, 2018).

The security of consumer rights ought to be clearly set out in legal norms through effective and efficient legislation and well-reasoned judicial precedent (Benöhr & Micklitz, 2018). Additionally, its human-rights nature within the EU can be attributed to its incorporation in the Charter of Fundamental Rights of the European Union as one of the Union's primary objectives. Consumer protection has gained traction in the modern economy by protecting consumers from harmful and hazardous business practices both in physical and digital markets (Howells & Weatherill, 2017).

The legal footing of ADR in consumer protection remedies has been demonstrated by the United Nations Trade and Development (UNCTAD), which is a strong advocate of the SDGs in trade, investment, finance, and technological

dealings and offers robust consumer protection legislation that calls for the incorporation of ADR as a channel for consumers to seek redress in disputes (Moreira, 2019). Moreover, the organization provides harmonized guidelines on consumer protection through the UN Guidelines for Consumer Protection while striving to deliver digital trading infrastructure and ODR mechanisms for dispute resolution meant to progress international trade and e-commerce (Gillies et al., 2022). Additionally, the UN Commission on International Trade Law is equally at the forefront of overseeing the implementation of ADR and ODR in international trade disputes (Awada, 2023).

It is clear that the internationalization of consumer protection was meant to aid in the establishment of a universally acceptable minimum standard of consumer protection law, thereby curbing the obstacles that may be experienced in cross-border trade transactions (Durovic, 2020).

## 6. Environmentally Sustainable Consumption Policies and Societal Involvement

One cannot purport to champion consumer protection without first addressing issues of environmental sustainability, as highlighted under the SDGs' objectives on responsible consumption and production and the ever-persisting measures that ought to be implemented to curb climate change (Amaral Junior et al., 2020). Stakeholder engagement is key when formulating policies that concern issues of production and consumption, as the citizenry is the most affected. Thus, the policies adopted ought to be socially focused and take into account the health and safety of minorities and vulnerable groups in any given society (Spaargaren, 2009). Moreover, the policies enacted need to accommodate the industrial revolution that is being experienced in the 21<sup>st</sup> century so as to aid environmental sustainability, social recognition, and economic growth (Cohen, 2001).

Sustainable consumption is a thread of social inclusivity that fosters environmental governance and takes into consideration environmental efficiency, apprehensions, and impacts (Wang, 2017). A green economy is accomplished through the use of renewable energy for industrial advancement to reach sustainable economic growth (Dernbach, 2011).

Though international law issues mandates on sustainable consumption policies among nations, it lacks the binding nature to compel states to abide by them and, in some instances, it conflicts with domestic policies, which are more production-driven and fail to consider the rights of consumers (Benöhr, 2023). This can be remedied through product-service strategies that address

environmental impacts to the satisfaction of consumer needs (Mont & Dalhammar, 2005).

Moreover, access to information via green labelling leads to the promotion of consumer awareness, aided by the availability of sustainable consumption labels on consumer products (Farber, 2012). This corresponds to the need for environmental guidelines to outline the environmental impacts and benefits of any product or undertaking to the public for their collective input, making it a comprehensive and inclusive decision-making process (John et al., 2016). The SDGs cannot be achieved without sustainable social consumption and a careful analysis of the effects that the production of consumer products has on the environment (Jackson, 2004).

## 7. Conclusion

From the foregoing, it is clear that ADR is a more suitable means of dispute settlement than litigation due to its low-cost nature and timely resolution of disputes. A renewed hope for the place of ADR within the EU is cemented by the adoption of Directive (EU) 2025/2647, which shines a light on the integration of ADR in digital markets. However, there is a need for public awareness regarding the incorporation of ADR in consumer protection disputes within the EU. Equally, a legal and institutional framework is needed for the realization of environmental sustainability and the settlement of environmental sustainability commercial disputes within the EU in line with the SDGs.

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# THE ROLE OF SMART COURTS AND ARTIFICIAL INTELLIGENCE IN ENHANCING CONSUMER PROTECTION: A COMPARATIVE ANALYSIS OF CIVIL LAW SYSTEMS

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## ABSTRACT

This article examines how smart courts and artificial intelligence can strengthen consumer protection in civil law systems while also creating new risks for fair trial rights and equality before the law. It compares developments in the European Union, the United Kingdom, and China, focusing on online filing, virtual hearings, automated case management, AI-assisted document review, and judicial decision-support tools. The article argues that these technologies can improve access to justice for consumers by reducing delay, lowering costs, simplifying small claims procedures, and supporting cross-border dispute resolution. At the same time, it shows that algorithmic bias, black-box reasoning, automation bias, data protection concerns, and digital exclusion may undermine the very protective function that consumer law is meant to serve. The comparative analysis suggests that AI is most defensible in assistant functions, such as triage, translation, document organization, and procedural guidance, but is far more problematic when it approaches substantive adjudication. The article concludes that smart courts can contribute meaningfully to consumer justice only if they are designed around transparency, human oversight, inclusivity, and effective procedural safeguards.

**KEYWORDS** Smart courts; artificial intelligence; consumer protection; access to justice; digital justice

## 1. Introduction

Courts have not changed all that much in the last few centuries. The basic image of a courtroom – a judge at the front, parties and lawyers on either side, and stacks of papers on the table – has remained surprisingly stable even as the rest of society moved at remarkable speed into the digital age. But that image is now shifting. In the last decade or so, and especially after the disruptions caused by the COVID-19 pandemic, the modernization of court systems has accelerated in

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ways that most legal observers did not expect to see quite so soon. Electronic filing, virtual hearings, algorithmic case management, and AI-assisted decision support have moved from pilot projects to mainstream infrastructure in several countries around the world (Susskind, 2019).

This change affects many areas of law, but it is especially important in consumer protection. Today, consumers often deal with businesses that operate across borders and use complex algorithms to set prices, handle complaints, and sometimes even reject claims. When a dispute arises over a faulty product, an unfair contract term, or a misleading advertisement, the consumer usually has to face a legal system that is slow, costly, and hard to understand without legal assistance. In small-value cases, the cost of going to court can be so high that seeking a remedy becomes unrealistic. This is the access-to-justice problem that smart courts and AI-assisted civil justice systems may help solve (Paterson & Maker, 2024).

The concept of the “smart court” was formally introduced in China around 2016, but similar ideas have been developing under different names across the EU, the UK, and beyond. What these systems share is an ambition to use digital technology and, increasingly, AI to make justice faster, cheaper, more consistent, and more accessible. For consumers, this holds real promise. Online dispute resolution platforms, AI-assisted document review, and automated case triage can reduce the practical barriers that currently prevent many consumers from enforcing their legal rights. At the same time, the use of AI in judicial processes raises serious concerns about fairness, transparency, and the protection of fundamental rights (Tang, 2025).

A few examples show how fast technology is changing the justice system. One clear example is online proceedings. Before the pandemic, they were used only to a limited extent, but now they have become a normal part of court practice, with millions of hours of hearings taking place online each month. Judges, court staff, lawyers, and litigants have already adapted to this shift, so it is likely that online hearings will remain an important feature of litigation. At the same time, online dispute resolution (ODR) platforms have also grown rapidly. Unlike live court hearings, these platforms provide online spaces where parties can communicate, often at different times, and try to reach a settlement. In the past, ODR was mainly associated with e-commerce platforms such as eBay, but after the COVID-19 pandemic it has expanded significantly and is now being used or tested in around 200 state and local court jurisdictions, with further expansion expected (Katsh & Rabinovich-Einy, 2017).

## 2. Concept and Development of Smart Courts

### 2.1. *What Is a Smart Court?*

The term "smart court" was officially introduced in China by Chief Justice Qiang Zhou, President of the Supreme People's Court (SPC), in a 2016 SPC Working Report. According to that report, Chinese courts were encouraged to make "the most of technologies including the internet, cloud computing, big data and AI" to enhance fairness and efficiency, improve judicial credibility, and achieve highly intelligent court management. As Zheng Sophia Tang explains in her 2025 book *Smart Court: The Court of the Future*, this term covers not just the digitization of court paperwork but the entire ecosystem of litigation services, adjudication, execution of judgments, case management, and court governance (Tang, 2025).

Although the term may have Chinese origins, the idea itself is not limited to China. Similar developments can be seen in the EU under the concept of "e-justice", in England and Wales through the reform programme of His Majesty's Courts and Tribunals Service (HMCTS), and in other jurisdictions under names such as "online court", "digital court", or "internet court". Even though the technologies and institutional models are not the same everywhere, the main goal is largely similar: to use digital technology to make courts more efficient, more accessible, and more capable of using AI-based tools in judicial processes (HMCTS, 2018).

Tang identifies three features that distinguish smart courts from earlier, simpler forms of court digitization. The first is sophistication: smart courts use not just basic internet connectivity but advanced technologies including cloud computing, facial recognition, big data analytics, blockchain, and AI. The second is comprehensiveness: unlike early e-court systems that digitized only part of the process (usually filing and service of documents while leaving hearings and evidence assessment offline), smart courts can digitize the entire trial process. The third is automation: smart courts do not just move offline processes online; they automate aspects of those processes using AI and machine learning, reducing the level of routine human intervention required (Tang, 2025).

These three features together define a qualitative shift from what existed before. A court that allows electronic filing of documents is doing something useful, but it is not yet a smart court in the full sense. A smart court uses AI to automatically categorize and route incoming cases, alerts judges to relevant precedents, transcribes hearings in real time, detects inconsistencies in evidence, assists with scheduling, tracks deadlines, and, in the most advanced implementations, provides suggestions about likely case outcomes based on an analysis of past



decisions. Consumer disputes, which often involve relatively straightforward legal questions applied to a large volume of similar factual situations, are well suited to several of these applications (Tang, 2025).

## 2.2. *The Development of Smart Courts Globally*

China has taken the most ambitious steps in developing smart court technology. Since 2016, the Supreme People's Court has released several important policy documents that set out a plan for building smart courts. One of the most important documents for this discussion is the 2017 SPC text, Opinions on Accelerating the Building of Smart Courts, which presented a broad vision for introducing AI into the judicial process at all levels. In 2018, China also created three specialised Internet Courts in Hangzhou, Beijing, and Guangzhou to deal fully online with disputes arising from online activities. The Hangzhou Internet Court, established in August 2017, was the first court of this kind in the world. These courts hear cases such as e-commerce disputes, online copyright cases, and internet-related financial disputes, which makes them especially relevant in the field of consumer protection (Stern et al., 2021).

The COVID-19 pandemic gave further impetus to the development of smart courts everywhere. In England and Wales, data collected by HMCTS showed that the number of court hearings conducted by audio or video technology increased from fewer than 1,000 per week in late March 2020 to approximately 3,000 by mid-April of that year. On 24 April 2020, 90 per cent of the 3,200 hearings taking place that day were conducted through audio or video technology. What had been a marginal practice became the norm almost overnight, and much of that change has persisted since. Similar developments occurred in continental Europe, with courts in France, Germany, the Netherlands, and elsewhere rapidly expanding their use of video hearings and electronic communication (Suskind, 2019).

In the EU, digital justice has developed through a number of policy frameworks and legal measures. The European e-Justice Strategy and its Action Plans, which are updated from time to time by the Council of the EU, have provided a general roadmap for the digital transformation of justice systems in the Member States. In 2021, the European Commission stated in its Communication on the Digitalization of Justice in the EU that access to justice must remain effective in the digital age, and it suggested a set of measures to modernize judicial procedures. This later led to the proposal for a Regulation on the digitalization of judicial cooperation in civil and commercial matters, often called the Digitalization Regulation. Its purpose is to support the cross-border service of documents, the taking of evidence, and communication between courts and parties through digital tools (European Commission, 2021).

The UK's HMCTS Reform Programme, launched around 2016, committed to investing £1 billion in the modernization of the courts and tribunals system. This included the development of online services for a range of claim types, including the money claims online service (MCOL), which allows claimants to issue and manage straightforward money claims through a digital platform. The Online Civil Money Claims (OCMC) service, which expanded during the reform programme, is particularly relevant to consumers because it covers the type of small-value disputes that consumers most commonly bring. These reforms were influenced by the recommendations of Lord Justice Briggs in his 2016 Civil Courts Structure Review, which proposed the creation of a new Online Court for lower-value civil claims (HMCTS, 2018, Briggs, 2016).

### 3. The Role of AI in Civil Justice Systems

#### 3.1. *The Role of AI in Civil Justice Systems*

As can be seen from the formula system of ancient Roman civil proceedings, a judicial process is a procedure that is largely oriented towards form and formality. Of course, in the Roman era, the formality of court proceedings was necessary, as legal concepts were not yet established, but in the modern system of legal proceedings, the form of court proceedings has remained important in order to prevent arbitrary decisions by a powerful judge. As Rudolf von Jhering said in the 19th century, form is the sworn enemy of arbitrariness and the twin sister of freedom (Jhering, 1898). This did not change much in the legal and judicial system until the end of the 20th century, when communication via email became commonplace due to transformations in communication technologies. From that point onward, digital communication began to play an increasingly important role in legal practice.

Artificial intelligence (AI), as is well known, is difficult to define, but a useful brief description is that it is the machine's ability to imitate human rational behavior. One of the advantages of this definition is that it does not refer to any specific underlying technology, which is in constant and rapid development and is too diverse to be clearly formulated as a defining characteristic of AI. This concise definition also avoids the question of whether our machines are truly intelligent. Do they think? Most importantly, this definition serves as a useful reminder in the context of the remarkable productivity of modern generative artificial intelligence (GenAI) – the subject of this research guide in its connection with law. It reminds us that GenAI is a technology that generates results that look like – that is, imitate – people's intellectual works, from everyday speech to creative literary works (Merriam-Webster, n.d.).



According to P. M. Morkhat, assigning certain functions to artificial intelligence as a judge's "companion" in administering justice allows a human judge to relieve himself or herself of routine work, including internal control of the judge's activities, information-documentary, expert-analytical, linguistic-translational, and organizational support of court proceedings (Morkhat, 2018). Another study on the application of AI in court has led to the conclusion that it is impossible to separate a human judge from AI, especially in complex cases, and that cooperation between them is expedient, allowing a human judge to control AI. A key issue is the analysis of the algorithm for facilitating communication between artificial intelligence and humans (Buocz, 2018).

According to A. Hintze, a researcher and professor at Michigan State University, artificial intelligence (AI) can be categorized into four main types: reactive machines, limited memory, theory of mind, and self-awareness. Reactive machines are the simplest form of AI, designed to perform specific tasks without memory or learning capability. They respond to inputs with predetermined outputs and cannot use past experiences to improve future decisions (Hintze, 2017). For instance, IBM's Deep Blue chess computer defeated world champion Garry Kasparov in the 1990s by analyzing the current state of the chessboard but without learning from previous matches. Another example is Netflix's recommendation engine, which analyzes a user's viewing history to suggest new movies or shows but does not adapt beyond that data. Limited-memory AI represents a more advanced stage that can use historical data for short-term decision-making. These systems can observe, analyze, and adjust based on recent information, though they do not permanently store experiences as humans do. A good example is self-driving cars, which monitor surrounding vehicles' speed, direction, and position to make safe driving choices in real time. The next type, theory-of-mind AI, remains largely theoretical and aims to enable machines to understand human emotions, beliefs, and intentions – an essential step towards natural human–AI interaction. Finally, self-aware AI represents the most advanced and still hypothetical stage, where machines would possess consciousness, emotions, and an understanding of their own existence. Such AI would not only process information but also recognize its internal states, similar to human self-awareness. In this spectrum, ChatGPT falls under generative AI, a subset of limited-memory AI, capable of generating human-like text by predicting the most probable response from vast datasets – demonstrating linguistic intelligence without true understanding or consciousness (Coursera, n.d.).

### **3.2. AI Applications in Court Operations**

AI is being applied in courts in a variety of ways, and it is important to distinguish between them because they raise different legal and ethical questions. The

applications can broadly be grouped into three categories: administrative and case-management tools, document-processing and legal-research tools, and decision-support tools that assist judges in substantive matters (Sourdin, 2018).

In case management, AI systems can automate many administrative tasks that currently take up a great deal of time in court work. These tasks include the automatic classification and transfer of incoming cases to the correct court or judge, tracking deadlines and sending alerts, scheduling hearings, and checking whether procedural rules have been followed. China's smart court system has introduced these kinds of administrative AI tools on a large scale. For example, the AI-assisted case-filing system used in Chinese Internet Courts can automatically check whether all necessary documents have been submitted, detect possible problems in the application, and guide the applicant on how to fix them. This kind of automated support is especially useful for people without legal representation, including many consumer claimants (Stern et al., 2021).

Document processing represents another important application of AI in courts. Natural language processing (NLP) tools can extract key information from large volumes of documents, identify relevant precedents, flag inconsistencies between documents submitted by different parties, and assist in the translation of documents in cross-border cases. In the EU context, where consumer disputes frequently cross-national boundaries and involve parties communicating in different languages, AI-assisted translation and cross-border document management could significantly reduce the practical barriers to effective redress. These tools are already being used to some extent in commercial arbitration and in the management of large class-action-style proceedings, and there is no technical reason why they could not be applied in consumer disputes.

The third and most sensitive category of AI applications is that of decision-support tools that assist judges in making substantive decisions about the outcome of cases. In China, AI systems like "206" (used in criminal cases) and similar tools in civil proceedings can analyze the facts of a case and suggest likely outcomes based on an analysis of similar past cases. These systems do not make binding decisions – the final judgment remains with the human judge – but they provide a form of algorithmically generated guidance that can influence how the judge approaches the case. Similar, if less developed, tools are being explored in various European jurisdictions, though generally with greater caution (Sourdin, 2018).

## 4. Smart Courts and Consumer Protection: Opportunities

### 4.1. *Improving Access to Justice*

Perhaps the most important opportunity that smart courts offer for consumer protection is the improvement of access to justice. Access to justice is both a fundamental human right, recognised in Article 47 of the EU Charter of Fundamental Rights, Article 6 of the ECHR, and the Universal Declaration of Human Rights, and a practical prerequisite for effective consumer protection. If consumers cannot realistically enforce their rights, those rights have limited value, regardless of how well drafted the underlying legislation may be (Hagan, 2018).

The barriers to access to justice for consumer claimants are well documented. They include financial costs (court fees, lawyers' fees, and the cost of time spent pursuing a claim), geographical barriers (the need to attend court hearings in person), informational barriers (difficulty in understanding complex legal processes and legal rights), and psychological barriers (unfamiliarity and intimidation associated with formal legal proceedings). Smart courts can address all of these barriers to varying degrees. Online filing eliminates the need to travel to a court office in order to initiate a claim. Virtual hearings eliminate the need to be physically present in court. AI-guided processes reduce the informational demands placed on unrepresented litigants. Reduced administrative costs can also translate into lower court fees (Hagan, 2018).

Research on the Chinese Internet Courts provides some evidence of these effects. As Meirong Guo notes in a 2021 study published in the *Computer Law and Security Review*, the Internet Courts in China were able to reduce average case-resolution time significantly when compared with traditional courts, while also handling a growing volume of cases. In their early years of operation, the Hangzhou Internet Court was reportedly resolving cases in an average of fewer than 30 days from filing to judgment, a fraction of the time typically required by traditional courts. While these figures must be interpreted with caution, given that the cases handled by Internet Courts are relatively simple and standardised compared with the full range of civil disputes, they nevertheless suggest that AI-assisted processing can genuinely increase efficiency (Guo, 2021).

In the EU context, the development of the European Small Claims Procedure under Regulation (EC) No 861/2007 represents an attempt to create a simplified and accessible process for cross-border consumer claims of up to €5,000, later expanded to €10,000 by Regulation (EU) 2015/2421. The procedure is designed to be usable without a lawyer and relies heavily on standardised forms. Smart-court tools, including AI-guided form completion, automated translation, and digital evidence submission, could significantly improve the usability and

effectiveness of this procedure, which has been criticised for remaining underutilised in practice due to persistent practical barriers ([European Small Claims Procedure Regulation](#)).

#### **4.2. Reducing Costs and Time in Consumer Disputes**

Consumer disputes are often low in absolute monetary value, even when they are significant from the consumer's perspective. A defective appliance worth €300, an unauthorised bank charge of €150, or a holiday booking that failed to deliver what was promised for €500 are all disputes that are real and significant for the individuals affected, yet the cost of conventional litigation is often disproportionate to the amount at stake. This is one reason why alternative dispute resolution (ADR) mechanisms have been promoted so strongly in EU consumer policy through frameworks such as the ADR Directive (2013/11/EU) and the ODR Regulation (EU) 524/2013, which created the EU Online Dispute Resolution platform ([Paterson & Maker, 2024](#)).

Smart-court technologies can lower the cost of formal legal proceedings and make court-based dispute resolution more realistic even for small-value consumer claims. Automated case management can reduce the amount of time court staff need to spend on routine tasks. AI-assisted document review can ease part of the workload of judges. Standardised online procedures can make the filing and processing of claims cheaper and more efficient. Virtual hearings can also save parties time and money by removing the need to travel to court or miss work. Taken together, these changes can make formal adjudication more accessible to consumer claimants who might otherwise abandon their claims or settle for less than they deserve ([ADR Directive; ODR Regulation; Susskind, 2019](#)).

It is important to note, however, that cost reduction in court operations does not automatically translate into cost reduction for consumers. Court fee structures, lawyers' costs, and the practical complexity of procedures are shaped not only by the underlying costs of operating the system but also by policy choices. For the efficiency gains of smart courts to benefit consumers specifically, they must be accompanied by deliberate policy measures, such as simplified procedures, capped fees, and accessible self-help tools, that channel those gains towards the people who most need them. The mere existence of online filing or AI-assisted case management does not, by itself, make a justice system more accessible to vulnerable consumers ([Paterson & Maker, 2024](#)).

#### **4.3. Handling Small Consumer Claims More Effectively**

The small-claims dimension of consumer protection is crucial and deserves particular attention. In many jurisdictions, small-claims procedures have been established precisely to handle the type of everyday consumer dispute that

would otherwise be economically unviable to pursue through ordinary civil proceedings. In England and Wales, the small-claims track, for claims of up to £10,000, is designed to be accessible to self-represented litigants, with simplified procedural rules and a cap on the costs that can be recovered from the losing party. In the EU, the European Small Claims Procedure performs a similar function for cross-border disputes ([European Small Claims Procedure Regulation](#)).

Smart-court tools can be particularly valuable in this small-claims context. An AI system that guides consumers through the process of completing and filing their claims, identifies defects before submission, flags relevant legal provisions that support the consumer's position, and provides clear information about the evidence required can meaningfully improve the likelihood that consumers will successfully pursue legitimate claims. In jurisdictions where small-claims hearings are now conducted online, the technological infrastructure that enables this also allows consumers to present their cases from home, thereby significantly reducing practical barriers ([Hagan, 2018](#)).

The interaction between AI-powered case triage and small consumer claims also deserves attention. In courts handling large volumes of similar cases – for example, airline passenger compensation claims under EU Regulation 261/2004, utility billing disputes, or housing deposit disputes – AI tools can identify patterns across cases, flag potential mass-harm situations, and suggest consistent approaches to recurring legal questions. This has the potential not only to speed up individual case resolution but also to improve the consistency and quality of outcomes across similar cases, which is a significant fairness benefit from the consumer's perspective ([Tang, 2025](#)).

#### **4.4. Cross-Border Consumer Disputes**

E-commerce has made cross-border consumer transactions routine, but it has also created a level of jurisdictional complexity that makes dispute resolution difficult. When a consumer in Hungary purchases goods from an online retailer based in the UK, which law applies? Which court has jurisdiction? How does the consumer actually pursue a claim in a foreign jurisdiction? These questions are real and practically significant, and they have not been adequately resolved by the existing legal framework, despite considerable effort ([Consumer Rights Directive](#); [ODR Regulation](#)).

Smart courts equipped with AI-assisted tools offer some hope of progress in this regard. The EU ODR Platform, established by Regulation (EU) 524/2013, was an early attempt to create a pan-European online mechanism for resolving cross-border consumer disputes through ADR. Its effectiveness has been limited by a number of factors, including uneven trader participation and the variable

quality of the ADR entities connected to it. However, the technological infrastructure it represents – a digital platform for submitting, routing, and resolving cross-border consumer disputes – is a building block on which more effective systems could be developed ([ADR Directive](#); [ODR Regulation](#)).

The Digitalisation Regulation proposed by the European Commission could significantly strengthen the framework for cross-border judicial cooperation in civil and commercial matters. It would support the electronic service of documents, the digital transfer of evidence, and the use of video hearings across EU Member States. In consumer disputes, these changes could remove some of the practical difficulties involved in cross-border enforcement and make it easier for consumers to bring genuine cross-border claims. AI tools for automatic translation, document verification, and jurisdictional assessment could reduce even further the friction that currently makes cross-border consumer justice slow and difficult ([European Commission, 2021](#)).

Z. S. Tang's analysis of smart courts and transnational access to justice highlights the cross-border dimension as a key area for future development. She argues that smart courts should be capable of addressing "transnational challenges" while preserving accessibility and fairness in an increasingly "interconnected world". This point is especially relevant in the consumer-protection context, where digital markets have expanded more rapidly than accessible dispute-resolution mechanisms designed to manage cross-border conflicts ([Tang, 2025](#)).

## 5. Risks and Challenges of AI in Consumer Justice

### 5.1. Algorithmic Bias and Discrimination

One of the most serious risks associated with the use of AI in judicial processes is the risk of algorithmic bias – that is, the risk that AI systems will systematically produce outcomes that disadvantage certain groups of people in ways that are unjustified and potentially unlawful. This risk is particularly acute in consumer protection because the groups most at risk of unfair outcomes – including consumers from lower-income backgrounds, elderly consumers, consumers with disabilities, and consumers whose first language is not the language of the court – are also those who are most dependent on fair and effective legal protection. This risk is especially serious in consumer justice because the people who rely most heavily on legal protection are often the most vulnerable to hidden bias.

Algorithmic bias in AI systems usually stems from bias in the historical data used to train them. If past judicial decisions have unfairly disadvantaged consumers from certain backgrounds, an AI system trained on that data may reproduce the same pattern. This is not merely a theoretical concern. In the United States,

research has shown clear racial disparities in AI-based risk-assessment tools used in criminal sentencing, especially in relation to the well-known COMPAS system. Similar concerns have also appeared in civil contexts, including credit scoring, insurance pricing, and employment screening, where discriminatory effects on protected groups have been identified (Citron & Pasquale, 2014).

In the judicial context specifically, Molbæk-Steensig and Quemy draw on research by Kahneman, Sibony, and Sunstein on “noise” in human judgment in order to argue that AI tools might actually reduce certain types of bias and inconsistency in judicial decision-making. There is some force in this argument: AI systems are at least consistent in the sense that they apply the same algorithm to all cases, whereas human judges are subject to fatigue, mood, and a range of other factors that introduce variability into their decisions. However, consistency in applying a biased algorithm is not the same as fairness, and the apparent objectivity of an algorithmic recommendation may actually make it harder for judges and litigants to identify and challenge underlying biases (Molbæk-Steensig & Quemy, 2023).

The problem is compounded by the fact that training data for AI systems in judicial contexts may be systematically incomplete. If certain consumer groups have historically been less likely to bring claims because the barriers to access to justice have been too high, they will be underrepresented in the datasets of resolved cases on which AI systems rely as training data. An AI system trained on such data may then produce recommendations that reflect the outcomes those groups have historically received, rather than the outcomes they would receive if barriers to justice were removed. This is a subtle but important form of bias that could perpetuate and entrench existing inequalities, even if the AI system is technically well designed (Molbæk-Steensig & Quemy, 2023).

## **5.2. Transparency and the Black Box Problem**

A related challenge is the lack of transparency that characterizes many AI systems, particularly those that use deep learning or complex machine-learning algorithms. These systems are sometimes described as “black boxes” because it is difficult, or even impossible, to understand from an external perspective how a particular input – the facts of a case – leads to a particular output – a recommendation or prediction. This lack of explainability creates serious problems for the rule of law and, more specifically, for consumer rights (Molbæk-Steensig & Quemy, 2023).

The right to a fair trial under Article 6 ECHR includes the right to know the reasons for a judicial decision. If a court relies significantly on an AI-generated recommendation in reaching its decision, and the workings of that AI system are opaque, then the requirement of reasoned decision-making is effectively

undermined. A consumer who receives an adverse judgment has a legitimate interest in understanding why, and in being able to challenge the reasoning if it is flawed. This becomes difficult if the judge's decision is materially influenced by an algorithm whose internal logic is inaccessible (ECHR, art. 6; *Öcalan v. Turkey*, 2005).

The EU AI Act (Regulation (EU) 2024/1689), which entered into force in August 2024, addresses this concern to some extent. It classifies AI systems used in the administration of justice and in democratic processes as "high-risk" systems (Annex III, point 8), subject to stringent requirements regarding transparency, documentation, human oversight, accuracy, and robustness. Developers of high-risk AI systems must provide detailed technical documentation on how the system works, keep logs of system operation, and ensure that the system can be appropriately monitored by human overseers. However, the Act does not require full algorithmic transparency in the sense of making the internal logic of the system publicly intelligible, and the technical-documentation requirements may not be practically accessible to judges, litigants, or consumer advocates (AI Act).

The CEPEJ Ethical Charter specifically addresses the transparency requirement in judicial AI. It calls for AI systems used in courts to be developed in a transparent manner, with clear documentation that enables evaluation of the quality and appropriateness of the data used, the methodology of the algorithm, and the potential impact on the rights of the parties. It also calls for the right of parties to obtain explanations of AI-generated recommendations and to challenge those recommendations. These principles represent an important normative standard, but their practical implementation remains challenging (CEPEJ, 2018).

### 5.3. *Data Protection and Privacy Concerns*

Courts handle some of the most sensitive personal data that exists. Case files contain information about parties' health, financial circumstances, family situations, employment history, and, in some cases, past criminal records. The processing of this data by AI systems raises serious data-protection concerns that are directly regulated by the General Data Protection Regulation (GDPR, Regulation (EU) 2016/679) in the EU, as well as by national data-protection laws in the UK and other jurisdictions (GDPR; PIPL).

The GDPR is particularly relevant to AI-assisted judicial processes in several respects. Article 22 of the GDPR gives individuals the right not to be subject to decisions based solely on automated processing where those decisions produce legal or similarly significant effects. While this provision is subject to exceptions

– including where the processing is authorized by EU or Member State law – it establishes an important principle: automated decision-making in legally significant contexts requires special justification and safeguards. Court decisions, and the algorithmic recommendations that may influence them, clearly fall within the category of legally significant effects (GDPR, art. 22).

The principle of data minimization under the GDPR (Article 5(1)(c)) requires that personal data be collected and processed only to the extent necessary for the specified purpose. AI systems that process large volumes of case data to generate predictions or recommendations may struggle to demonstrate that all the data they use is strictly necessary. The purpose-limitation principle (Article 5(1)(b)) raises further questions about the permissibility of training AI systems on historical case data when that data was originally collected for the purpose of resolving individual cases (GDPR, art. 5).

In the consumer-protection context, these data-protection concerns are particularly acute because consumers may be interacting with smart-court systems without fully understanding the extent to which their personal information is being processed by automated systems. The right to information under the GDPR (Articles 13–14) requires that individuals be told how their data will be processed, but the information provided in practice about AI processing in court systems may not be sufficiently detailed or accessible for consumers – particularly those who are not digitally literate – to make genuinely informed choices (Paterson & Maker, 2024).

#### 5.4. *The Risk of Over-Reliance on AI*

Perhaps the most insidious risk associated with AI in courts is the possibility that judges and other actors in the justice system will come to rely too heavily on AI-generated recommendations, gradually surrendering their capacity for independent judgment. This phenomenon, sometimes called “automation bias” in the cognitive-psychology literature, is well documented in other fields where humans work alongside algorithmic decision-support systems, including medicine, aviation, and security screening. It poses a particular threat to the integrity of judicial decision-making because the appearance of independent human judgment is preserved – the judge formally makes the decision – while the substantive process of reasoning may increasingly be shaped by the algorithm (Sourdin, 2018).

In the context of consumer disputes, where cases often involve relatively standardised factual situations and recurring legal questions, the risk of automation bias may be particularly high. If an AI system consistently recommends outcomes in a certain category of consumer claim, judges handling large volumes of such claims may find it easier and quicker to follow

the recommendation than to engage in independent analysis. Over time, the AI's patterns may become the court's patterns, regardless of whether those patterns reflect the correct application of the law (Sourdin, 2018).

This risk is recognized in the CEPEJ Ethical Charter, which emphasizes that AI should be used to "assist" rather than "replace" judicial decision-making, and that judges must retain "the capacity to act otherwise than an AI system recommends". However, the Charter acknowledges that achieving this in practice requires not only formal rules but also appropriate training, institutional culture, and careful system design. If AI tools are designed in ways that make it inconvenient or difficult to deviate from their recommendations, the formal right to exercise independent judgment may become effectively meaningless (CEPEJ, 2018).

For consumers, the consequences of excessive judicial reliance on AI are significant. If a defective AI system consistently underestimates the damages to which consumers are entitled, or consistently classifies consumer claims into categories that attract less favourable legal treatment, and judges routinely follow these recommendations, the cumulative harm may be substantial even if no single case involves an obvious injustice. This is precisely the kind of systemic harm that is difficult to detect and challenge through conventional means, because no single case provides a sufficiently clear picture of the pattern.

### *5.5. The Digital Divide and Inclusion*

Smart courts are premised on digital access and digital literacy. They assume that parties can file documents online, participate in video hearings, and interact with AI-powered tools. But this assumption is not valid for all consumers. A significant proportion of consumers – particularly the elderly, persons with disabilities, those in rural areas with poor internet connectivity, and those from lower-income backgrounds who may lack access to suitable devices – cannot effectively participate in digitized court processes. If smart courts are designed primarily around the capabilities of digitally competent and well-resourced consumers, they risk excluding precisely those consumers who are most vulnerable and most in need of effective protection (Tang, 2025).

Tang identifies inclusivity as one of the three main pillars of a smart justice system, together with transparency and judicial independence. She argues that an inclusive system should reflect the community it serves and help build public trust and confidence. This idea is highly important for consumer protection. A smart-court system cannot be seen as a genuine improvement if it helps well-informed and digitally skilled consumers bring cross-border claims, but at the same time makes it more difficult for elderly or less technologically confident

consumers to pursue simple domestic cases. Even if such a system improves overall efficiency, it may still fail from an access-to-justice perspective.

Addressing this inclusion problem requires careful design and clear policy choices. Smart-court systems should offer accessible alternatives for people who cannot fully participate in digital procedures. This may include support staff who help users complete online steps, in-person options for those who are genuinely unable to use digital tools, accessible design for persons with disabilities, and multilingual interfaces for consumers whose first language differs from the language of the court. Some jurisdictions have started to respond to these concerns more directly. For example, the UK's HMCTS Reform Programme included an Assisted Digital scheme aimed at helping users who could not use online services on their own, although its implementation has not always been fully consistent (Hagan, 2018).

## 6. Conclusion

The digital transformation of civil justice systems is not simply a matter of technological change; it is a transformation of the institutional arrangements through which societies resolve disputes, enforce rights, and distribute justice. Smart courts and AI-assisted judicial processes offer genuine and significant opportunities to improve consumer protection: by reducing the costs and time of dispute resolution, by making court processes more accessible to unrepresented consumers, by enabling more consistent application of consumer protection rules across similar cases, and by facilitating the resolution of cross-border disputes that currently fall into practical enforcement gaps.

These opportunities are real and should be pursued. The access-to-justice gap in consumer protection is a genuine problem with real consequences for real people. Consumers who cannot practically enforce their rights against businesses that exploit them are not protected by legislation alone. If smart courts and AI tools can help to close this gap by making it easier and cheaper for ordinary consumers to pursue legitimate claims, then they represent a genuinely valuable contribution to the rule of law and to the fairness of market relations (Paterson & Maker, 2024).

But the risks are equally real and cannot be downplayed. Algorithmic bias can reproduce and entrench existing inequalities. Lack of transparency can undermine the right to a fair trial and make it impossible for parties to challenge the reasoning behind decisions that affect them. Data protection violations can expose parties' most sensitive personal information to unauthorized processing. Automation bias can gradually hollow out genuine judicial deliberation, replacing it with the appearance of human judgment backed by algorithmic determination. The digital divide can mean that the benefits of smart courts flow

primarily to the digitally confident, while the most vulnerable consumers are effectively excluded (CEPEJ, 2018).

The comparative analysis in this article shows that different jurisdictions have taken meaningfully different approaches to managing these risks. The EU has developed the most comprehensive regulatory framework, with the AI Act, the GDPR, and the CEPEJ Ethical Charter together providing a multi-layered governance structure that addresses transparency, human oversight, non-discrimination, and data protection. China has deployed the most ambitious AI tools in its smart court programme, achieving significant efficiency gains but with governance challenges and transparency limitations that make independent evaluation difficult. The UK has pursued pragmatic reform under significant fiscal and institutional constraints, with a regulatory approach that is more permissive than the EU's but also less comprehensively developed. The research demonstrates a clear consensus: AI's benefits (efficiency, access, data analysis) are concentrated in its "assistant" functions, while its profound procedural challenges (due process violations, bias, inexplicability) are concentrated in its "adjudicative" functions. The future of a just and efficient civil legal system depends on successfully harnessing the former while procedurally barring the latter.

In closing, the central message is this: the future of justice is not a choice between human judges and artificial intelligence. The future lies in a smart, effective partnership between them. The goal is not to replace human wisdom, experience, and compassion. The goal is to augment these human qualities with the speed, accuracy, and analytical power of modern technology. AI may handle the calculations; the judge must remain responsible for justice.

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# THE SPECIFICS OF JUVENILE CRIMINAL LAW IN THE CZECH LEGAL SYSTEM

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## ABSTRACT

This study examines the specific features of criminal liability for juveniles in the Czech legal system, from both a historical and a contemporary legal perspective. It reviews the development of the legislation from Austrian criminal law traditions through the 1931 Juvenile Act and the regulations of the socialist era to the current Act No. 218/2003 on Juvenile Justice. The study focuses on a child-centered, educational, and restorative approach, which prioritizes the social reintegration, development, and restitution of harm caused by juveniles over retribution. The study analyzes the minimum age of criminal responsibility, the principle of relative accountability, and the assessment of intellectual and moral maturity. It presents the system of educational, protective, and punitive measures, as well as the principle of deprivation of liberty as a measure of last resort. Special attention is given to procedural safeguards, including juvenile courts, mandatory defence, restrictions on publicity, and the role of the Probation and Mediation Service.

**KEYWORDS** Juvenile criminal law; Czech legal system; child-friendly justice; restorative justice; criminal liability

## 1. Introduction

The special treatment of young offenders has long been a focus of attention in criminal law. Since the end of the nineteenth century, the prevailing view has been that juvenile offenders should be dealt with in a justice system distinct from that of adults, and that responses to their offences should focus primarily on education and social reintegration (Kasnyik, 2017). As a result, during the twentieth century many countries introduced specific regulations for handling juvenile cases, and significant developments in this regard were made in the Czech Republic as well.

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However, within the evolution of Czech law, juvenile criminal justice has followed a long and unique path, with its roots laid as early as the era of the Austro-Hungarian Monarchy. Current Czech criminal justice is grounded in the provisions of Act No. 218/2003 on Juvenile Justice, which aims to uphold the principles of child-centred justice.

This study aims to present the evolutionary process of criminal regulation regarding juveniles, as well as to provide an overview of the current legal provisions.

## 2. The Historical Evolution of the Criminal Assessment of Juveniles

The foundations of juvenile criminal law in the territory of the present-day Czech Republic were laid during the era marked by Maria Theresa and Joseph II through the *Constitutio Criminalis Theresiana* of 1768. Although this document did not contain specific provisions regarding juveniles, it played an indisputable role in establishing the groundwork for criminal law concepts.

This was followed by the Penal Code of 1787, which already expressed the special status of children by classifying those under the age of 14 as lacking criminal capacity and declaring that the actions of such persons could be followed only by police registration (Mašková, 2014). Subsequently, the Penal Code of 1803 introduced the concept of the juvenile offender, setting the upper age limit at twenty years (Papanová, 2023). This provision already reflected the distinct status of adolescence as a special stage of life. The final penal code of the Monarchy valid in the Czech lands was the Code of 1852, which distinguished three age stages (Mašková, 2014):

- Childhood (up to 10 years): total incapacity to commit a crime.
- Minority (between 10 and 14 years): conditional responsibility – the adjudicating court had to assess whether the minor involved possessed the necessary intellectual and moral maturity to recognize the unlawfulness of the act at the time of its commission.
- Juvenile age (between 14 and 20 years): juveniles bore criminal responsibility for their actions in the legal sense, but with certain limitations: the imposition of the death penalty or life imprisonment was prohibited in their case.

Following the dissolution of the Austro-Hungarian Monarchy, two distinct legal traditions persisted in the territory of the newly established Czechoslovakia: the rules of the Austrian Penal Code of 1852 remained in force in the Czech lands, while earlier Hungarian law remained valid in Slovakia and Transcarpathia (Šámal et al., 2007). The approach in the latter territories was significantly more progressive, as Act XXXVI of 1908 and Act VII of 1913 on the Juvenile Court laid

the foundations for modern juvenile criminal justice. Consequently, courts in Slovakia and Transcarpathia already possessed the specialized institutional system that had yet to be established in the Czech territories.

However, the legislature soon recognized that the special status of juveniles required specific attention. As a result, Act No. 48/1931 on Juvenile Criminal Justice entered into force on 1 October 1931 (*Zákon č. 48/1931 Sb.*). This Act was considered pioneering for its time (*Kalvodová & Fryšták, 2022*). On the one hand, it regulated the age of criminal responsibility in such a way that persons under 14 years of age – termed *nedospělí* (children) – fell outside the scope of criminal law, thus enjoying absolute impunity. If a person of such age committed a punishable act, the case was brought before the guardianship court, which could apply only educational or curative measures, such as placement in a remedial educational institute.

Furthermore, the Act defined the concept of a juvenile at the definitional level, encompassing persons who had completed their 14<sup>th</sup> year but had not yet completed their 18<sup>th</sup> year at the time of committing the offence (*Knoll & Pezl, 2022*). However, the Code did not permit the unrestricted criminal prosecution of these persons; it excluded from this circle those juveniles who, at the time of the act, were incapable of recognizing the unlawfulness of the act or of controlling their conduct in accordance with such recognition (*Zákon č. 48/1931 Sb.*).

Moreover, the Act introduced a significant innovation in legal terminology: it adopted a distinct designation for acts committed by juveniles, defining them by the term *misdemeanour* (*Šámal et al., 2007*). By using a different term for punishable acts committed by juveniles, the legislature reflected the fundamental attitude that deviant behaviour by youth is distinct from adult criminality.

Regarding sanctions applicable to juveniles, the 1931 Code declared the primacy of educational measures: while individual educational measures and punishments formed a unified system, they stood in a strict hierarchical relationship. The legislature permitted the imposition of punishment only as a last resort, when educational measures proved insufficient (*Komrsková, 2014*). With respect to educational measures, courts possessed a broad toolkit: they could order, among other things, family supervision, a reprimand, or the strictest educational measure, protective education, which was executed in special educational institutes for an indeterminate duration, but no longer than until the attainment of majority (*Krejčířiková, 2010*). If the educational measure was insufficient, the court could impose a penalty; however, the aim of this was not retribution, but rather resocialization.

Perhaps the greatest achievement of the Act was the establishment of a separate court system for juvenile cases, operating independently from ordinary criminal courts and with a specific composition – for instance, involving lay judges possessing pedagogical knowledge (Karabec et al., 2011).

The Act laid down the principles of restorative justice in the modern sense by emphasizing that traditional punishments were unsuitable in the fight against juvenile delinquency; thus, it sought to apply primarily educational tools to this age group. In this spirit, convicted juveniles were placed in reformatories, and the adjudicating courts frequently applied alternative measures not involving the deprivation of liberty.

The political changes following World War II exercised a significant impact on Czechoslovakia's legal system. In 1950, the communist leadership repealed the 1931 Act and simultaneously merged the provisions regarding juveniles into the new unified Penal Code (*Trestní zákon č. 86/1950 Sb.*), which entered into force on 1 August 1950 (Blažek & Tarabová, 2019). This Code recognized adolescence as a special age category only to the extent of treating it as a mitigating circumstance within the general system.

Legislation during this period viewed juvenile offenders as “products” of socialist society (Kalvodová & Fryšták, 2022), who were to be guided back to the right path primarily through ideological and educational means. Thus, the main emphasis was placed on resocialization and social supervision: juveniles committing serious crimes were placed in reformatories, while mechanisms similar to probation supervision were applied in cases of less serious offences (Krejčířiková, 2010).

During this period, Czechoslovak law set the lower age limit of criminal responsibility at 15 years, and the principle of relative imputability applied by the 1931 Act remained in force. As a further innovation, the category of young adults appeared, in whose case the court could exercise discretion to treat offenders aged 18–21 as juveniles if it deemed that the offender's personality and level of maturity were closer to that of a juvenile (Blažek & Tarabová, 2019).

A significant step backward was the abolition of separate juvenile courts.

In the early 1960s, a new wave of codification followed with the adoption of Penal Code No. 140/1961, which refined the system somewhat but did not alter the fundamental ideological framework.

A key concept of socialist criminal law was danger to society. Under Section 75, courts could waive punishment if the act's danger to society was negligible. This rule allowed adjudicating courts to ensure more lenient and equitable treatment for young offenders coming before them.

Section 74 defined the lower age limit of criminal responsibility at the 15<sup>th</sup> year; a juvenile was defined as a person who had completed their 15<sup>th</sup> year but had not yet completed their 18<sup>th</sup>.

In the juvenile justice system of the socialist era, correctional institutional education became the most important tool for managing problematic youth, thus prioritizing state institutional care.

Following the regime change, a comprehensive reform of criminal law began in Czechoslovakia – and, from 1993, in the independent Czech Republic. The Czech Republic acceded to the UN Convention on the Rights of the Child in 1991, after which the principles of child-centred justice increasingly came to the fore. Following the Beijing Rules and the recommendations of the Council of Europe, the legislature recognized the necessity of creating a standalone act containing provisions specifically applicable to juveniles. As a result, Act No. 218/2003 on Juvenile Justice entered into force on 1 January 2004. This Code, for the first time, regulated the issue of juvenile criminal responsibility, the scope of sanctions applicable to juveniles, and the relevant procedural issues within a standalone act. The significance of the Act lay in the fact that offences committed by juveniles were henceforth adjudicated by special courts established for this purpose, according to special rules, utilizing a wide range of punishments and educational measures (Večerka et al., 2003). With the entry into force of this Act, the Czech Republic introduced the principles of restorative justice and diversion into criminal law (Kalvodová & Fryšták, 2022).

### 3. The Current Legal Framework

The currently effective Czech juvenile justice system sharply distinguishes between general criminal law applicable to adult offenders and the special regulations applicable to juveniles. Its basis is still provided by Act No. 218/2003, which comprehensively regulates both substantive criminal law and the specific rules of criminal procedure, defines the scope of sanctions imposable on juveniles, and establishes the necessary institutional system. The legislation rests fundamentally on four pillars:

- A separate system of liability (it avoids the use of the term “crime”);
- Child-friendly procedural guarantees (judges specializing in juvenile cases);
- Primarily educational and protective measures;
- The best interests of the child as a fundamental principle (Válková, 2025).

Its Preamble and introductory provisions clearly designate the direction of juvenile justice. The purpose of the Act is not retribution, but rather to ensure that the young offender refrains from further legal violations and finds their place in society, while contributing to the reparation of the harm caused. In this

way, the legislature proclaimed the primacy of restorative justice and education, which is also reflected in the terminological innovations introduced by the Act.

The Act introduced a tripartite conceptual system:

- *Misdemeanour*: the range of punishable acts defined by the Czech Criminal Code committed by a juvenile.
- *Measure*: the collective designation for sanctions applicable to juveniles, comprising educational, protective, and penal measures.
- *Act otherwise punishable*: the designation for acts committed by children under the age of criminal responsibility (15 years) or by juveniles classified as lacking criminal capacity, emphasizing the absence of criminal liability (Novák, 2024).

The Czech legal system distinguishes the following main categories among young persons:

- *Child*: a person under 15 years of age who commits an act that the law would otherwise treat as punishable. Under Czech law, such a person cannot be held criminally liable (although juvenile courts may impose educational measures within civil proceedings).
- *Juvenile*: a person who has completed their fifteenth year but has not yet completed their eighteenth year at the time of committing the offence. The special provisions defined by Act No. 218/2003 apply to this group of persons.
- *Young Adult / Person Close to the Age of a Juvenile*: the issue of this category also deserves mention. Although the Czech legislature did not introduce the category of young adult as an independent criminal-law group – thus full criminal liability sets in unconditionally upon the completion of the 18th year – Section 41(b) of the Criminal Code recognizes the status of a “person close to the age of a juvenile”. This fundamentally means that, in the case of an offender who has completed their 18th year but not yet their 21st, the court may take into account the protracted process of personality maturation. In this case, although the procedure is conducted according to the general rules governing adults, this status may be considered as a mitigating circumstance during sentencing.

Based on Act No. 218/2003, Section 1(c), a juvenile is a person who, at the time of committing the offence, has completed their fifteenth year but has not yet completed their eighteenth year. Based on this definition, the minimum age of criminal responsibility is 15 years. Prior to attaining this age, children enjoy absolute immunity from criminal liability and thus cannot be subjected to criminal proceedings for any offence. The Act provides no exceptions to this rule.

The determination of the minimum age of criminal responsibility is a recurring issue, which returned to the agenda in the second half of the 2000s, when the

lowering of the age limit from 15 to 14 years was proposed – indeed, some argued for setting the age of criminal liability at 13 years. The initiative sparked heated debate; thus, citing the lack of professional consensus, the 15-year age limit remained unchanged (*Věková hranice trestní odpovědnosti se snižovat nebude*, 2007). The Czech legal community remains divided regarding the age limit to this day; however, according to the results of research conducted by the Institute of Criminology in 2024, 67% of professionals working in reformatories consider lowering the age limit justified (*Hulmáková et al.*, 2024). The reason for this presumably lies in the fact that, in practice, they observe the behaviour of problematic youth over extended periods and, on that basis, deem the solutions of the current system insufficient. In contrast, the vast majority of legal practitioners would leave the age limit unchanged (*Hulmáková et al.*, 2024).

The upper age limit of juvenile status is the completion of the 18<sup>th</sup> year. A person who has already completed their 18th year at the time of committing the act is liable for the act according to the criminal provisions governing adults. An exception may be made regarding the execution of sanctions: the Act allows persons who have completed their 18th year to remain, under certain conditions, in a correctional facility reserved for juveniles in order to complete their studies or therapeutic programmes, thereby avoiding the negative effects of the adult prison environment.

Alongside age limits, the legislature introduces an additional set of criteria. This acknowledges that attaining a certain age is not necessarily sufficient to establish criminal liability; therefore, it must be examined whether the young person having reached the given age actually possessed the cognitive and moral maturity necessary for being held liable. In this regard, the Act applies the principle of relative criminal liability, under which an offender between the ages of 15 and 18 is punishable only if, at the time of the commission of the offence, they possessed the intellectual and moral maturity necessary to recognize the nature of the act and to control their conduct. With this provision, the legislature acknowledges that the mental development of certain persons may lag behind their biological age. The Supreme Court addressed the conceptual elements of maturity in detail in its guideline No. 8 Tdo 1069/2006. In this context, courts must evaluate two components that are inseparable yet must be examined individually (*Hlaváčová, n.d.*):

- Intellectual maturity encompasses cognitive abilities, within the scope of which the court examines the juvenile's capacity to recognize the harmful or unlawful nature of their actions.
- Moral maturity may be understood as a developmental process through which a juvenile gradually internalizes socially accepted behavioural norms and incorporates them into their own personality, moral character,

and value system. This individual value system then exists in a particular relationship with the values of the surrounding society (Hlaváčová, n.d.). Regarding incomplete moral maturity, it should be highlighted that it can very often be traced back to deficiencies in upbringing or a dysfunctional family background.

A lack of maturity, and thus relative non-imputability, may be invoked only if specific facts arise that cast doubt on the youth's development. In this case, pursuant to Section 58 of Act No. 218/2003, the involvement of two experts is required: a medical expert specializing in child psychiatry, and a child psychologist or pedagogical expert. Their opinion must answer the question of whether the juvenile suffers from any mental disorder and whether their personality development corresponds to their biological age.

## 4. The System of Sanctions

The sanction system established by Act No. 218/2003 is hierarchically structured, progressing from milder interventions towards more severe ones. The Act distinguishes three main categories: the triad of educational measures, protective measures, and penal measures. With regard to this classification, the principle of gradation applies: when sanctions are imposed, priority should be given to the milder instrument, particularly where its educational character predominates. Moreover, the measures should be tailored to the juvenile offender's individual circumstances, including their personality, age, intellectual and moral maturity, health condition, and personal, family, and social background. They must also remain proportionate to the nature of the act committed (European e-Justice Portal, n.d.).

Educational measures are the mildest, non-custodial sanctions, the aim of which is to positively influence the juvenile's lifestyle without removing them from their own family environment. Their distinct feature is that the public prosecutor may also apply them during the preparatory proceedings, provided that the juvenile consents thereto. This allows for the swift conclusion of the proceedings. The measures may be applied independently, but frequently appear in combination with other measures.

The Code specifies the following educational measures:

- probation supervision,
- probation programme,
- educational obligations,
- educational restrictions,
- admonition.

Probation supervision represents the most intensive intervention in the youth's life among the above measures, without removing them from their accustomed environment. It fundamentally fulfils a dual role, as it embodies both control and assistance in relation to the juvenile concerned; thus, its primary goal is the continuous monitoring of the juvenile's behaviour, the reduction of the risk of recidivism, and the provision of assistance so that the juvenile may lead a life in the future in accordance with legal and social norms, as stated in Section 16(2) of Act No. 218/2003. Research by the Czech Institute of Criminology points out that, among educational measures, this is the most frequently applied measure (Večerka et al., 2003), as the recidivism rate is significantly lower in the case of youths affected by it.

The probation programme is a more intensive and targeted intervention aimed at addressing specific problems. In this regard, only programmes accredited by the Ministry of Justice may be applied (Ministry of Justice of the Czech Republic, 2014), thereby ensuring that proven effective interventions take place during the measure applied. However, pursuant to Section 17(2), the fulfilment of three conjunctive conditions is necessary for ordering the programme:

- the programme is consistent with the juvenile's needs and the interests of society,
- the juvenile has had the opportunity to become acquainted with the content of the programme, and
- the juvenile has consented to participation in the programme.

The purpose of educational obligations and educational restrictions is to encourage the juvenile to perform active actions or, conversely, to refrain from certain activities. The statutory list in this regard is merely exemplary, so the adjudicating court possesses broad discretion in determining the specific obligation. With regard to restrictions, it should be highlighted that they primarily aim to eliminate criminogenic factors from the youth's environment; however, these restrictions must not hinder the juvenile in fulfilling their compulsory education or practising their profession, pursuant to Section 19(2) of Act No. 218/2003.

Admonition is the mildest form of educational measure, during which the prosecutor or judge, in the presence of the juvenile's legal representative, expresses disapproval of the juvenile's act and warns the young person of the consequences of future legal violations. This legal consequence may be particularly appropriate for first-time offenders, as, in their case, appearing in a court environment often possesses sufficient deterrent force.

Table 1: Educational Measures in the Czech Juvenile Justice System

Type of measure	Legal basis	Objective	Nature of the measure	Specifics of application
Probation supervision	Section 16	Control and assistance	Continuous, intensive monitoring of lifestyle	An individual educational plan is required
Probation programme	Section 17	Skill development, behavioural change	Structured, therapeutic in nature	Only accredited programmes may be applied
Educational obligations	Section 18	Active conduct, reparation	Obligation to act (positive obligation)	Any obligation may be prescribed
Educational restrictions	Section 19	Exclusion of risk factors	Obligation to refrain (negative obligation)	Must not hinder the pursuit of studies or employment
Admonition	Section 20	Moral disapproval, deterrence	One-off, symbolic act	The mildest sanction

In the execution of educational measures, the central role is played by the Probation and Mediation Service, established on 1 January 2001; however, its activity begins already during the preparatory proceedings. Within this framework, the probation officer prepares a social inquiry report, assesses potential risks, and makes a recommendation to the prosecutor or judge regarding the appropriate measure.

Educational measures essentially fulfil the requirement that the imposition of sanctions, and their nature, should take place primarily with due regard to the interests and proper development of the young person. In practice, however, disparities in opportunities provided by large cities and rural or smaller settlements can be problematic – for example, with regard to accredited programmes available within the framework of the probation programme.

The primary objective of protective measures, alongside the protection of society, is to positively shape the juvenile's psychological, moral, and social development when deviant behaviour is involved. These measures are applied where the previously mentioned educational measures are insufficient, but punishment is either unavailable or not considered appropriate.

The protective measures are:

- protective treatment,
- security detention,
- forfeiture and confiscation of property,
- protective education.

Protective treatment is applicable if the commission of the offence can be traced back to the youth's mental illness or addiction. In such a case, inpatient or

outpatient care for the offender may be prescribed, partly for the treatment of the juvenile and partly for the protection of the community.

Within the framework of security detention, the juvenile is placed in a closed, high-security institution. This measure is applicable to offenders displaying severe psychological disorders for whom protective treatment does not appear sufficient and who, furthermore, cannot be managed within the framework of traditional penal execution.

The primary goal of the forfeiture of a thing or property is to eliminate the financial motivation for crime; in this context, the withdrawal of tools used in the commission of the offence is involved on the one hand, and the confiscation of assets or material goods derived from the offence on the other.

Protective education is one of the most specific institutions of the Czech juvenile criminal justice system and is arguably the most drastic measure involving deprivation of liberty, executed in a special educational institute. At the same time, among protective measures it is the only one applicable exclusively to juveniles. Section 22(1) of the Act contains a taxative list of the conditions under which the court may order it. This is possible if the upbringing of the juvenile in their own family environment is seriously neglected or their behaviour displays such serious disorders that it cannot be managed within the family environment.

Table 2: Protective Measures in the Czech Juvenile Justice System

Type of measure	Legal basis	Objective	Nature of the measure	Specifics of application
Protective treatment	Section 21	Treatment of mental illness or addiction	Therapeutic/medical	Applicable if the commission of the offence can be traced back to illness or addiction
Security detention	Section 21	Protection of society	Security-oriented/isolative	Applicable only in particularly justified cases
Forfeiture and confiscation of property	Section 21	Elimination of the financial motivation for criminal activity	Property-related/pecuniary	Withdrawal of assets or material gain related to the offence
Protective education	Section 22	Removal of the young person from a high-risk environment	Educational and protective	Applicable in cases of neglect or insufficient family circumstances

Although the Czech legislature frequently uses the term “education” with regard to the measures regulated within the scope of protective measures, in reality it is not the educational function that primarily prevails in these cases, but rather

the deprivation or restriction of liberty, thus producing a situation functionally similar to traditional imprisonment.

Penal measures applicable to juveniles are ultima ratio sanctions, which can also be found in regulations governing adults, but in the case of juveniles they take a milder form. In this context, Section 24 of the Code contains a taxative list of possible penal measures, which are as follows:

- community service,
- pecuniary penalty,
- conditionally suspended pecuniary penalty,
- forfeiture and confiscation of property,
- prohibition of undertaking activities,
- prohibition of keeping and breeding animals,
- expulsion,
- house arrest,
- prohibition of visiting sports, cultural, and other social events,
- suspended sentence of imprisonment,
- unconditional imprisonment.

Community service is the type of alternative sanction in Czech criminal law most frequently applied in practice (Mlynaříková, 2025). The Code specifically regulates the minimum and maximum duration of the measure, ranging from 50 to 150 hours. A further important requirement is that the offender's opinion regarding the measure must be sought before the order imposing it, and the adjudicating court must take into account the offender's health condition as well as employment opportunities, for instance whether there are sufficient workplaces in the offender's place of residence or its vicinity (Mlynaříková, 2025).

Pecuniary penalties may be applied to a limited extent against juveniles: a fundamental requirement is that the young person concerned must be engaged in gainful activity and thus possess an independent income. The pecuniary penalty is defined in daily rates, with a maximum of 365 days. Furthermore, based on Section 29(1) of Act No. 218/2003, there is a possibility of suspending the execution of the pecuniary penalty for up to three years, which can serve as a powerful motivation for the person concerned. The reason for this is that, if the person concerned does not commit a new offence during the probationary period, they are exempted from paying the penalty. In practice, however, this measure is rarely applied, as a significant proportion of juveniles do not possess independent income. For example, in 2023 juveniles committed over 1,700 offences in the Czech Republic, of which a pecuniary penalty was imposed in only seven cases (Paseková, 2024).

Within the framework of the prohibition of undertaking activities, the court typically prohibits the juvenile from engaging in activities related to the criminal

offence, for example the prohibition of practising a profession if the juvenile previously worked or studied in the field in which the offence was committed, although the prohibition of any other specific activity is also possible. The legislature set the maximum duration of this at five years. The Act specifically names a special form of prohibition, which the adjudicating court may apply if an offence related to animals has been committed, for example animal cruelty.

The possibility of expulsion exists only if the juvenile of foreign nationality does not possess stable family ties within the territory of the Czech Republic.

In the course of penal measures, the juvenile may also be obliged not to leave their home or place of residence for a specified period (house arrest). This is a suitable alternative to imprisonment, as, although freedom of movement is restricted, it allows the sanction to be served within the person's accustomed family environment.

It is also possible to prohibit attendance at certain events, which is typically applied by the court if the commission of the offence is linked to a particular event.

In the case of a suspended sentence of imprisonment, the execution of imprisonment is suspended for a minimum of one year and a maximum of three years. This measure is frequently applied alongside other measures, such as probation supervision, thus providing both an opportunity and a framework for improvement for the young person, while simultaneously maintaining the possibility of deprivation of liberty should the youth's lifestyle not change in a positive direction. In this way, the legislature intended to reinforce the ultima ratio nature of actually executed imprisonment, which may be applied only as a last resort in cases of serious offences.

The system of penal measures – specifically the lower sentencing ranges and the wide array of alternative sanctions replacing deprivation of liberty – fulfils the requirements of child-friendly justice. The rules discussed above faithfully demonstrate that the legislature champions a primarily education-focused approach, relegating retribution to the background.

As can be seen, the rehabilitative approach plays a central role in the Czech juvenile criminal justice system. Section 3(1)–(2) of Act No. 218/2003 establishes as a fundamental principle that the objective of sanctions against juveniles is the restoration of disrupted social relations, the facilitation of the juvenile's family and social integration and reintegration, and the prevention of further legal violations.

Table 3: Penal Measures in the Czech Juvenile Justice System

Type of measure	Legal basis	Objective	Nature of the measure	Specifics of application
Community service	Section 26	Reparation to the community	Active obligation	Duration ranges between 50 and 150 hours
Pecuniary penalty	Section 27	Assumption of financial responsibility	Pecuniary/property-related	Applicable only if the juvenile possesses independent income
Forfeiture	Section 30	Elimination of the financial motivation for criminal activity	Pecuniary in nature	Withdrawal of assets or material gain related to the offence
Prohibition of undertaking activities	Section 26	Prevention of recidivism	Restrictive in nature	Duration may be up to five years
Expulsion	Section 26	Departure from the territory of the country	Obligation to depart	Duration may be up to five years
House arrest	Section 26	Restriction of liberty without removal from the accustomed environment	Restrictive in nature	Duration may be up to one year
Prohibition of visiting sports, cultural, and other social events	Section 26	Prevention of disorder	Prohibition on attending certain events	Duration may be up to five years
Suspended sentence of imprisonment	Section 33	Deterrence from crime while maintaining the possibility of execution	Psychological deterrence	Duration may range from one to three years
Unconditional imprisonment	Section 31	Isolation and intensive institutional resocialization	Deprivation of liberty	Execution separate from adults

By setting the minimum age of criminal responsibility at 15 years, the Czech Republic ensures that children under this age cannot be subjected to criminal proceedings; at the same time, it does not disregard the deviant behaviour of such persons. The settlement of cases involving those under 15 within civil proceedings and the application of educational measures serve as an excellent example of the protective approach towards children, offering a suitable solution for incorporating the child-friendly requirements of criminal regulation.

The legislature also kept this approach in mind when creating the sanction system, emphasizing the avoidance of traditional punishments whenever

possible. This is reflected in the *ultima ratio* nature of retributive sanctions and the requirement that the imposition of sanctions must take into account, among other factors, the young person's age, maturity, social background, and the gravity of the act. These requirements did not necessarily prevail in early Czech criminal policy; however, the currently effective regulation reflects a strong shift towards restorative justice.

The effective criminal regulation of the Czech Republic has established a multi-tiered sanction system in juvenile cases, creating the flexibility to provide alternatives that can be appropriately tailored to the offender's personality. This flexibility is also evident in the fact that the court, having regard to all the circumstances of the case, may apply multiple measures concurrently at its discretion. Furthermore, it provides the opportunity for the decision-maker, acting on the basis of free discretion and taking into account individual needs, to select the measures most suitable for the offender.

As previously mentioned, the Czech legislature consciously strives to prioritize non-custodial solutions, and, in the spirit of this philosophy, numerous alternatives to traditional incarceration are available both during the criminal proceedings and at the level of the execution of punishment. On this basis, it can be stated that the Czech system of penal sanctions regarding juveniles is built upon modern, child-centred principles. The educational and reintegration-oriented approach is clearly delineated at both the legislative and practical levels.

## 5. Procedural Guarantees

Act No. 218/2003 is not merely a code of substantive law; accordingly, it also contains detailed special procedural provisions regarding juveniles.

In the Czech legal system, the Youth Court, which forms part of the ordinary court system, has exclusive jurisdiction to conduct criminal proceedings initiated against juveniles. In this system, juvenile cases may be heard only by judges who have participated in special training at the Judicial Academy (Mejstříková, 2023). As a general rule, proceedings are conducted by the court competent according to the juvenile's residence (Salmonová, 2012), thus helping to ensure that the juvenile remains in their own social environment and thereby prioritizing the requirements of child-friendly justice. The advantage of proceedings before the court of residence is that this court acts with due regard to local conditions, can cooperate effectively with the relevant local authorities (e.g. the child-protection authority), and can furthermore make the execution of the punishment or measure imposed on the juvenile more effective.

However, the Czech legal system recognizes exceptions to this primary rule of jurisdiction: if the residence cannot be established, or if the interests of the juvenile justify the conduct of proceedings by a court other than the one competent by residence (*Nejvyšší státní zastupitelství, 2009*). In such cases, the legislature provides for the possibility of transferring the case, a mechanism that has been further refined in practice. In Court Decision No. R 11/2009, the Supreme Court stated that the transfer of the case is not automatic, and that judicial discretion is based on two criteria: primarily the interests of the juvenile and, secondarily, the expediency of conducting the proceedings.

It also deserves mention that, with regard to the composition of the adjudicating court, Amendment Act No. 319/2024, which entered into force on 1 January 2025, altered the role of the lay element in proceedings involving juveniles. This provision states that criminal proceedings conducted at the lower court level – at District Courts – are conducted by a single judge without the participation of lay judges (*Sakařová, 2020*), which may ultimately make the proceedings faster. It is clear from the provision that proceedings conducted before Regional Courts, however, continue to be heard by a panel.

A special guarantee in proceedings involving juveniles is the mandatory nature of legal representation. Section 42a of the Code regulates this and provides that the juvenile must have defence counsel at the earliest possible stage of the criminal proceedings. This same section also establishes the rule regarding the duration of mandatory defence. According to this provision, in special cases – on the basis of a decision of the adjudicating judge or the prosecutor – mandatory defence may be maintained until the completion of the 21st year of the young person concerned, if this is justified in view of the young adult's "level of intellectual and moral maturity, as well as the circumstances of the case", as stated in Section 42a(2) of Act No. 218/2003.

The issue of publicity is also of paramount importance from the perspective of the best interests of juveniles. While the conduct of the trial is not public, the pronouncement of the judgment takes place in public, as declared by Section 53 of Act No. 218/2003, with the restriction that it is prohibited to publish in the media any data regarding the juvenile from which the juvenile's identity could be established.

In addition, the authorities have a duty to ensure that the juvenile receives information appropriate to their age concerning the proceedings involving them and their rights, a requirement also reinforced by EU Directive 2016/800.

One of the most sensitive issues in proceedings is the deprivation of liberty, which the Act treats according to the principle of *ultima ratio*. Accordingly, the legislature defined the maximum length of detention as significantly shorter

than in the case of adult offenders: as a general rule, it may last for two months and, in the case of a particularly serious offence, up to six months. These deadlines may be extended only once in the preparatory proceedings and once in the court stage, by an additional two or six months respectively, pursuant to Section 47 of Act No. 218/2003.

Serious concerns have arisen in practice regarding the applicable deadlines and their review. The regulation applicable to adults in the Czech Code of Criminal Procedure states that the court is obliged to review the necessity of detention every three months; failing this, the accused must be released. However, Act No. 218/2003 does not contain a specific review deadline with regard to the detention of juveniles.

This problem culminated in 2020, when the authorities ordered the detention of the juvenile P. Spišák on suspicion of having committed such serious acts as robbery, grievous bodily harm, and attempted murder ([Spišák v. Czech Republic](#)). After spending three months in detention, he submitted a request for release, arguing that the three-month review requirement prescribed by the Code of Criminal Procedure had not been complied with. The first- and second-instance courts rejected this argument, on the basis that Section 72(1) of the Code of Criminal Procedure was inapplicable to juveniles and that, since the accused was suspected of committing particularly serious offences, his detention could last up to six months without a judicial decision. This position was shared by the Supreme Court and the Constitutional Court as well.

Subsequently, the accused brought the case before the European Court of Human Rights. The Court found that Section 47(1) of the Juvenile Justice Act placed juveniles at a disadvantage compared with adult defendants under Section 72(1) of the Code of Criminal Procedure, since the latter provided more favourable rules for adults in detention proceedings than those applicable in juvenile cases ([Nejvyšší soud, 2025](#)). As a consequence of that judgment, an amendment to Act No. 218/2003 is currently in progress, intending to supplement the regulations governing juveniles with provisions on mandatory review ([Ministry of Justice of the Czech Republic, 2026](#)).

Upon analysing the Czech criminal procedural regulation, the legislature's intention to spare youths displaying deviant behaviour from proceedings in the traditional sense becomes clearly apparent, thus prioritizing educational principles and the possibility of reparation. In line with this, it provides for several alternatives – although these are not applicable exclusively to juveniles, they offer excellent opportunities for diversion from the path of criminal proceedings.

Conditional discontinuance of prosecution is the most frequently applied diversionary tool in cases involving juveniles, the detailed rules of which – including the conditions for its application – are regulated by the Czech Code of Criminal Procedure. Accordingly, the court or the prosecution service may decide on the conditional discontinuance of the proceedings if the accused:

- has admitted the act,
- has remedied the harm caused by the crime – whether financially or in another form of reparation – and, furthermore,
- is considered likely to achieve a positive outcome on the basis of the young person's personality and circumstances.

Alongside the conditional discontinuance of the proceedings, the Probation and Mediation Service monitors the youth's lifestyle throughout, as well as whether they observe the obligations and rules of conduct potentially prescribed for them. If the probationary period governing the conditional discontinuance elapses successfully, the proceedings must be regarded as permanently discontinued; concomitantly, the youth is exempted from the disadvantages of a criminal record. Otherwise, the proceedings may be continued against them.

Another form of diversion from criminal proceedings is settlement, through which the legislature seeks to encourage the parties involved in the proceedings to reach an agreement. A specific element is that, beyond admission and reparation, or the restitution of unjust enrichment, the offender is obliged to pay a specified sum for public purposes. The role of the Probation and Mediation Service is significant here as well: it assists in mediation between the parties and may make recommendations regarding the conditions of the settlement (Ourednickova et al., 2008). While settlement may be advantageous for the offender, the victim, and the community alike, practice shows that its application in cases involving juveniles is negligible. The reason for this can primarily be traced back to the difficulties of fulfilling the financial condition, given that, at a young age, the individual usually does not possess an independent income or sufficient financial means.

Among diversionary tools, there exists a solution applicable exclusively to juveniles; thus, unlike the previously mentioned measures, it is regulated by Act No. 218/2003. Withdrawal from prosecution is possible only in cases of minor offences punishable by imprisonment of no more than three years, provided that “criminal proceedings would not be expedient, and punishment is not necessary to deter the juvenile from further legal violations”, as declared by Section 70(1) of Act No. 218/2003. This legal institution allows for the termination of proceedings even in cases where the conditions for conditional discontinuance are not met (e.g. in the absence of an admission); however,

practical experience indicates that its application has shown a declining trend in recent years.

In proceedings initiated against juveniles, and during diversionary measures, the Probation and Mediation Service, operating under the direction of the Ministry of Justice and regulated by Act No. 257/2000, plays a prominent role in the Czech Republic. In the Czech model, the organization participates not only in the execution of sanctions but also acts as an active participant in the entire procedure from the very initiation of proceedings, of which the police and the prosecution service are obliged to notify it without delay.

Pursuant to Section 56 of Act No. 218/2003, a detailed social inquiry report is prepared during the proceedings, covering the juvenile's personal, family, and social background, as well as their current living situation. The preparation of this report falls within the responsibilities of probation officers. Section 56(3) of the Act further sets out the minimum required content of the report. Accordingly, it must include information on the juvenile's age, level of maturity, attitude towards the offence, and readiness to repair the harm caused or address its consequences. It must also cover the juvenile's family circumstances, including their relationship with their parents, the degree of parental influence, and their connections with the wider family and immediate social environment. In addition, the report must contain relevant information on school attendance, conduct, and performance, or, where applicable, workplace behaviour, together with an overview of previous offences, measures imposed, their implementation, and the juvenile's conduct during that process.

Beyond preparing the social inquiry report, an important task of the probation officer is the preparation of mediation; at the same time, they may initiate the application of conditional suspension by the prosecutor and strive to create a settlement between the offender and the victim.

Should the case nevertheless proceed to the court stage, the probation officer plays a significant role there as well, endeavouring to ensure that the court does not focus merely on the objective gravity and legal classification of the act, but also takes into account the offender's personality and circumstances. To this end, the officer presents the social inquiry report in detail and may make a recommendation regarding which measure, in their view, would most effectively serve the offender's resocialization (Ourednickova et al., 2008). As mentioned during the discussion of sanctions, probation officers also play a prominent role during the execution of individual measures, throughout which they monitor the juvenile's life and, in many cases, take an active role therein.

Similar to the substantive-law provisions, the fundamental objective of the Czech Republic's rules on juvenile criminal proceedings is the protection of

children's rights; consequently, the legislation incorporates numerous explicitly child-friendly elements.

The establishment of specialized judicial forums for juvenile cases, along with rules distinct from those applicable to adults, aims to shield young people from the detrimental effects of traditional criminal proceedings, placing primary emphasis on rehabilitation and education (Coufalová, 2018).

Child-friendly justice requires that the child receive adequate legal assistance. The rules regarding mandatory legal representation serve as procedural guarantees and fully comply with the requirements laid down in the UN Convention on the Rights of the Child and the guidelines of the Council of Europe. Following the recent emergence of the need to provide mandatory defence not only for persons who have reached the age of criminal responsibility but also for children under the age of 15 (International Commission of Jurists, 2021), the extension of the relevant regulations has made the Czech juvenile criminal framework particularly notable.

The involvement of the Probation and Mediation Service during proceedings, the possibility of mediation, and the prosecutorial diversion introduced by the 2024 amendment are positive examples of restorative-justice principles, which fit perfectly within the framework of child-centred justice. The primary aim of these measures is not to punish the youth for their conduct, but to help them understand the consequences of their actions and to provide an opportunity for reparation at the earliest possible stage of the proceedings. Diversion options in the Czech legal system are solutions that decidedly prioritize the interests of the younger generation. This is supported by practical experience; according to reports from the Probation and Mediation Service, the recidivism rate is lower among juveniles involved in successful diversion than among those subjected to traditional criminal proceedings (Dünkel et al., 2015). This further validates the child-friendly nature of the Czech criminal justice structure.

It is also worth mentioning that Czech law allows for the expungement of the criminal record following the service of the sentence or upon reaching the age of majority (Czech Criminal Law, n.d.). This contributes to ensuring that a poor decision made in youth does not stigmatize the individual for life. The requirement to restrict or exclude the public during proceedings serves the same purpose, offering effective protection for the youth involved.

Based on the above, it can be concluded that the Czech Republic's regulation of juvenile criminal proceedings prioritizes the best interests of the child in numerous respects and fulfils the fundamental requirements of child-friendly justice.

## 6. Conclusion

The juvenile justice system of the Czech Republic demonstrates a distinct developmental trajectory, in which a retribution-focused approach has gradually been superseded by a child-centred perspective that prioritizes educational considerations. The historical overview has shown that the criminal-law assessment of deviant behaviour among young people has always been regarded as a more sensitive domain than that of adult offenders; however, current legislation now consciously strives to uphold the principle of the best interests of the child.

The analysis of the prevailing regulations revealed that significant dilemmas regarding the age of criminal responsibility persist to this day. Nevertheless, both substantive and procedural provisions have been designed to prioritize the healthy development of the group in question, although the possibility of employing repressive measures remains available. Consequently, the role of judicial practice is pivotal in ensuring that legal frameworks effectively serve the objectives of social reintegration. The prominent role assigned to the Probation and Mediation Service throughout the proceedings is intended to facilitate this process.

In summary, the Czech juvenile justice system constitutes a framework that may serve as a model for other legal jurisdictions in many respects. However, it is crucial to emphasize that the establishment of child-friendly justice requires not merely isolated legislative measures, but rather legal development and legal application that continuously adapt to societal changes. Interventions concerning juvenile offenders must not be limited to the de-escalation of punitive measures; rather, the primary objective must be to ensure that these children mature into responsible, law-abiding adults who form a productive part of society.

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# CAN CRYPTO-ASSETS BE USED IN INTERNATIONAL INVESTMENTS? AN ANALYSIS OF LEGAL AND FINANCIAL IMPLICATIONS

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## ABSTRACT

This study examines the use of crypto-assets in international investment, focusing on their legal, financial, and regulatory dimensions. Against the background of declining global investment flows and the rapid growth of the digital economy, crypto-assets are assessed as an emerging component of international financial activity. The study evaluates key regulatory frameworks, including the European Union's Markets in Crypto-Assets Regulation (MiCA) and Türkiye's Law No. 7518, with particular attention to the legal status and usability of crypto-assets.

The paper also explores the role of crypto-assets in cross-border payments and international financial transactions. Stablecoins are considered in terms of their potential to reduce transaction costs and improve efficiency, making them relevant not only for payment systems but also for investment flows. At the same time, the study highlights major limitations, including volatility, regulatory uncertainty, systemic risks, and market instability. In this context, tokenization methods used by international organizations are presented as a more integrated and sustainable alternative.

The study further analyzes Türkiye's evolving regulatory framework, especially the licensing and supervision of crypto-asset service providers. Finally, it hypothetically considers whether crypto-assets could be used as company capital within international investment law. The findings suggest that although crypto-assets offer functional advantages, they cannot currently serve as stable instruments in international investment processes due to regulatory fragmentation, market volatility, and valuation problems.

**KEYWORDS** Crypto-assets, financial regulation, tokenization

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## 1. Introduction

International investment denotes the cross-border flow of capital and factors of production and is considered one of the core components of the global economic system. Traditionally studied in the context of foreign direct investment (FDI) and portfolio investment, this concept is now undergoing a transformation driven by digitalization, financial technologies, and the creation of new types of assets. This transformation is not limited to investment instruments alone; it also affects the manner in which investment processes are conducted. In this regard, the question of whether crypto-assets can be used in international investments is gaining increasing importance from both a financial and a legal point of view.

Current data on the global investment landscape suggests that this debate is not merely incidental. As of 2024, global foreign direct investment (FDI) flows totalled around USD 1.51 trillion, representing a contraction from the prior year. This decline is even more pronounced when transition investments, or “conduits” as they are often known, are excluded. At the same time, the rise of investments in the digital economy, data infrastructures, and technology sectors indicates a structural shift in global investment patterns. This implies that investment is no longer driven primarily by physical assets but, more importantly, by digital infrastructures and digital assets (UNCTAD, 2025).

Within this process of transformation, crypto-assets occupy a noteworthy yet uncertain position. On the one hand, they present significant drawbacks, such as price volatility, the risk of market manipulation, regulatory uncertainty, and exposure to money laundering. On the other hand, they offer important advantages, such as faster cross-border transactions, lower transaction costs, and the digital representation of assets. The regulatory approach adopted at the level of the European Union reflects this dual nature. Crypto-assets are acknowledged as having the potential to bring about financial innovation and alternative forms of finance; however, it is also stressed that there needs to be a comprehensive and harmonized legislative framework to ensure their safe use (MiCAR).

Evaluations by international organizations also show a cautious attitude towards the role of crypto-assets in the financial system. In analyses of the future of finance, tokenization technology is considered to present significant opportunities for cross-border payment systems as well as for securities transactions. However, it is also pointed out that stablecoin-type crypto-assets do not completely meet the criteria of singleness, elasticity, and integrity that are key features of a robust monetary system. This assessment does not suggest that crypto-assets are entirely without utility; rather, it indicates that they are

currently not in a position to replace traditional financial instruments as they presently exist (BIS, 2025a).

A similar situation is evident in relation to regulatory frameworks. Although several countries have implemented legal regulations concerning crypto-assets and related service providers, major gaps remain in their implementation. In particular, a globally harmonized system has not yet been established in areas such as licensing procedures, supervision mechanisms, decentralized finance (DeFi), and cross-border service provision. This suggests that the usability of crypto-assets in international investments depends not only on technological capabilities but also on legal compliance and governmental coordination (FATF, 2025).

Within this framework, this study systematically investigates the compatibility between crypto-assets and international investments. First, the notion of international investment and its basic principles will be analyzed. Next, the definition, classification, and current use cases of crypto-assets will be examined. Thereafter, the potential of crypto-assets in the field of cross-border payments, payment systems, and financial transactions based on swaps will be discussed. In addition, the current legal framework established in Türkiye will be briefly assessed. One of the possible areas of application of crypto-assets within international investment practice is their potential use as capital for companies. The possibilities of using crypto-assets as company capital will therefore be explored from a hypothetical perspective.

The main argument of this study is that crypto-assets are not yet able to replace traditional international investment instruments. However, they have started to play an increasingly important role in cross-border financial transactions, the digital representation of assets, and payment infrastructures. The growth of this role depends upon several conditions, including regulatory compliance, market stability, the resolution of valuation problems, and trust in the monetary system. Therefore, crypto-assets should not be considered direct alternatives to the international investment system; rather, they should be understood as evolving elements that are gradually increasing in importance in certain areas.

## 2. International Investment Concept and Basic Principles

International investment can be described as the transfer of capital across national borders in order to generate economic value or financial return in another country. This concept includes not only foreign direct investment (FDI) as classically understood, but also portfolio investment, cross-border investment in financial instruments, and investment in the form of digital assets, which has become increasingly significant in recent years. In the global

economic system, international investment plays a critical role both in providing finance for economic growth and in facilitating technology transfer, job creation, and increased production capacity. However, the structure of investments has changed considerably in recent years; in particular, the digital economy and data-based investments have come to the fore. Indeed, current data on global investment flows show that, although the proportion of traditional sectors of the economy in the overall volume of investments is falling, digital infrastructures and technology investments have risen relatively (UNCTAD, 2025).

The functioning of international investment is based on certain basic principles, and these principles determine the economic and legal framework of investment decisions. In this context, the risk–return balance presents itself as the most basic determinant of investment decisions. Investors allocate their funds on the basis of a variety of factors, including political risk, currency risk, regulatory risk, and market volatility. Increasing geopolitical uncertainties, financial fluctuations – especially on a global scale – and the risk of insufficient diversification, among others, are some of the factors that prompt investors to seek safer and more predictable markets. However, investment decisions do not depend solely on economic criteria, but also on legal security and regulatory stability. Factors such as the protection of investors’ property rights, the enforceability of contracts, and the free movement of capital are decisive for the viability of international investment (IMF, 2025a).

Another important constituent part of the international investment system is the freedom of capital movement, together with the institutional structure relevant to the functioning of the financial system. In the traditional financial system, these processes are mostly conducted via banks, payment systems, and centralized financial infrastructures. However, due to the changes that have occurred in financial technologies in recent years, this structure has been transformed. In particular, blockchain technology and distributed ledger systems enable the transfer of values to be carried out without intermediaries or with fewer intermediaries; this situation is transforming the technological infrastructure of international investment. However, it is obvious that this transformation has yet to be completed and institutionalized in such a way as to replace the current financial system. Therefore, the evaluation of crypto-assets in the context of international investment should not be considered only with regard to technological innovations, but also by considering the relationship of these tools to the current financial system (BIS, 2025a).

The presence of digitalization in international investment is becoming more and more apparent, particularly through the concept of tokenization. Tokenization can be understood as the digital representation of physical or financial assets

and their transaction on a blockchain, rendering them more divisible, transferable, and traceable. This development is regarded as an indicator of a new era in which investment can be realized not only through traditional tools but also through digital assets. However, for this system to function properly, legal regulations and technical infrastructure must be harmonized. Otherwise, uncertainty, valuation problems, and a lack of trust may arise in investment processes (BIS, 2025b).

When all these factors are evaluated together, it is obvious that international investment is no longer a concept confined to the geographical movement of capital; at the same time, it has become a multi-layered financial structure influenced by regulatory arrangements and technological developments. This transformation process requires a re-evaluation of the place of crypto-assets in international investment. However, when making such an assessment, it is necessary to clarify whether crypto-assets constitute an alternative to, or a complement within, the existing financial system. Therefore, in the next section, the concept of crypto-assets, their types, and their current areas of use will be discussed in detail, and the potential of these assets in the light of international investment will be analyzed in a more concrete way.

### 3. Crypto-Assets: Definition, Types, and Global Usage

#### 3.1. Definition and Legal Framework

The most comprehensive and binding regulation with respect to the legal definition of crypto-assets has been adopted within the framework of the Markets in Crypto-Assets Regulation (MiCA) of the European Union. According to Article 3 of MiCA, a crypto-asset is defined as an asset that is capable of being transferred and stored electronically via distributed ledger technology or similar technology and that digitally represents a value or a right (MiCA). This definition makes clear that crypto-assets are not merely technical elements; rather, they also possess economic and legal value.

The definition is anchored in three important elements: the digital representation of value or rights, electronic transferability, and the use of distributed ledger technology infrastructure. The European Securities and Markets Authority (ESMA) stresses that this definition is to be assessed in the light of the principle of technology neutrality. Accordingly, it is the economic function of the asset and the rights associated with that function that are decisive in determining whether an asset qualifies as a crypto-asset, rather than its technical structure (ESMA, 2024).

Similarly, in Türkiye, the legal definition of crypto-assets has been set out quite clearly through the legal regulations adopted in 2024. Within the framework of Law No. 7518, crypto-assets are defined as intangible assets created using distributed ledger technology or a similar technology, distributed on digital networks, and capable of expressing value or rights ([Law Amending the Capital Markets Law](#)). This definition is closely aligned with MiCA, which means that the approach of Türkiye is consistent with the international regulatory trend.

### 3.2. *Types of Crypto-Assets*

Crypto-assets are divided into various categories on the basis of their legal and economic characteristics. The MiCA Regulation divides these assets into three main groups. The first category is that of electronic money tokens (EMTs). These assets act as a means of payment by linking their value to a single fiat currency. The second category is asset-referenced tokens (ARTs). These assets aim to offer value stability linked to multiple currencies, commodities, or other crypto-assets. The third category is that of crypto-assets that do not fall within either of these two categories, in which case common cryptocurrencies such as Bitcoin and Ether qualify for inclusion in this group ([MiCA](#)).

In addition, different classifications are made in practice according to the purpose of use. Utility tokens are used to gain access to a particular platform, whereas security tokens can be used to obtain rights similar to those associated with traditional financial instruments. Some such assets are outside the scope of MiCA because they qualify as financial instruments and are therefore subject to different regulations ([ESMA, 2024](#)).

Stablecoins, on the other hand, occupy a special position in the crypto-asset ecosystem. These assets, which usually peg their value to a fiat currency, are particularly significant when compared with the traditional monetary system in terms of payment and value transfer. Stablecoins, in particular USDT and USDC, have achieved a substantial scale in terms of market volume and have begun to be widely used in global financial transactions ([ESRB, 2025](#)).

### 3.3. *Global Use Cases and Purposes*

The global use of crypto-assets reveals a multidimensional structure. The first and most common application is speculative investment and the storage of value. Assets such as Bitcoin and Ether are commonly used as investment instruments because of their price volatility and their potential to gain or lose value on the basis of market factors. This suggests that crypto-assets are diverging from their original vision as a means of payment and are becoming increasingly speculative financial instruments ([BIS, 2025b](#)).

The second important use case is cross-border payments and money transfers. Stablecoins in particular provide low-cost and fast transfers, making them an alternative to traditional banking systems. This is also important in terms of financial inclusion and makes it possible for crypto-assets to function as an alternative financial instrument, especially in developing countries (BIS, 2025a).

The third use case is decentralized finance, or DeFi, applications. Through smart contracts, it is possible to execute transactions such as lending, borrowing, and the provision of liquidity without relying on traditional financial intermediaries. However, the fact that this system is not yet regulated in its entirety brings with it significant risks (ECB, 2019). In addition, crypto-assets occupy an important place in discussions of tax transparency and financial traceability. The Crypto-Asset Reporting Framework (CARF) developed by the Organisation for Economic Co-operation and Development (OECD) has become an indicator of the need for regulation in this area (OECD, 2024).

Finally, the tokenization of real-world assets is gaining increasing importance. This refers to the process of converting real estate, bonds, and other financial instruments into digital representations, thereby helping to speed up investment processes and making assets accessible through fractionalization. This development is an important part of the transformation of the financial system from a structural perspective (BIS, 2025b).

### 3.4. Risks of Crypto-Assets

While there are substantial opportunities associated with crypto-assets, there are also a number of risks. One of these is their high volatility. The fact that the prices of crypto-assets fluctuate substantially within a short period of time creates uncertainty for investors. Additionally, issues including market manipulation and lack of transparency constitute a significant threat to financial stability (FSB, 2023).

Another important area of risk is money laundering and terrorist financing. Reports published by the FATF show that regulatory compliance within the crypto-asset sector is still far from satisfactory, and that supervision challenges exist, particularly in cross-border transactions (FATF, 2025).

Furthermore, the rapid growth of the stablecoin market introduces new risks to the financial system. If stablecoins gain widespread use, the destabilization of their value can have a domino effect on the financial system (ESRB, 2025). International organizations stress that crypto-assets are still not currently at the scale of a systemic crisis, but they remain an area that needs to be closely monitored because of their rapid development. Especially in times of rising

global uncertainty, the influence of these assets on financial stability may become more evident (IMF, 2025a).

It is apparent that the risks in crypto-asset markets are not limited to investor behaviour at the micro level, but have also expanded into an area of concern in terms of macro-level financial stability. Recent studies conducted by the European Central Bank reveal that the connections between crypto-asset markets and the traditional financial system are increasing, and that this interaction is becoming more visible, especially through investment products, fund structures, and financial intermediaries. This situation lends further weight to the possibility that sudden depreciation or liquidity shocks occurring in the field of crypto-assets may spill over into traditional financial markets through indirect channels. In particular, the fact that multifunctional crypto-asset platforms operate, within the current regulatory environment, as transaction intermediaries, custody service providers, and investment product providers can lead to an intensification of risks and an increase in systemic effects. Therefore, when assessing the role of crypto-assets in the financial system, attention should be paid not only to individual investor risks, but also to systemic risks arising through market structure and financial linkages (ECB, 2024).

## 4. Use of Crypto-Assets in International Money Transfers and Swap Transactions

### 4.1. *Vulnerabilities of the Current System*

The correspondent banking system, on which international money transfers are still largely based, has long formed part of the basic structure of the global financial architecture. However, this system gives rise to significant problems, particularly from the perspective of speed, cost, transparency, and accessibility. The fact that messaging, settlement, and clearing transactions are often carried out through disconnected infrastructures leads to increased processing times and creates a multi-layered cost structure. Differences in working hours, public holidays, regulatory requirements, and banking practices across jurisdictions also result in delays and operational risks in cross-border payments. Accordingly, while the current structure continues to function for high-volume and institutional transactions, it is increasingly criticised, particularly against the backdrop of expectations of a fast, low-cost, and continuously available payment ecosystem. Indeed, it has been emphasized that a typical cross-border payment involves a chain structure with more than one intermediary bank, operating through nostro and vostro accounts, and that in this process only record changes in connection with account balances are transferred, rather than physical value moving directly from one party to another (BIS, 2025b).

Another important dimension of this structure is the foreign-exchange market, and particularly FX swap transactions. FX swap markets play a central role in meeting short- and medium-term liquidity needs in different currencies and are of great importance for the continuation of cross-border investment relations. Investors, banks, funds, and other financial institutions use these markets extensively for risk management, especially for currency risk, and for temporary access to particular currencies. Current data indicate that the gross notional value of foreign-exchange derivatives, including forward foreign-exchange positions and exchange-rate swaps, reached USD 111 trillion by the end of 2024. More remarkably, this field is no longer merely an interbank market: funds, insurance companies, pension funds, and other non-bank financial institutions have also become a rapidly growing group of participants. In particular, the segment represented by non-bank financial institutions has almost tripled since 2009, illustrating the extent to which the global financial system has become complex and interconnected (BIS, 2025a).

This picture makes clear that the current system is not only complex but, in some respects, also fragile. Because messaging systems, clearing infrastructures, liquidity management, and regulatory obligations are closely interrelated, yet do not operate within one integrated structure, cross-border investment transactions tend to be associated with high transaction costs, delays, dependence on intermediaries, and difficulties in monitoring transactions. For this reason, central banks, international organizations, and financial technology developers are moving towards the development of more efficient and safer alternatives without entirely removing the current system. This is precisely the central reason for the discussion of crypto-assets and tokenization-based structures in general: not to replace the existing system immediately, but to find solutions to some of the structural problems that it generates (BIS, 2025a; IMF, 2025a).

#### ***4.2. The Role of Crypto-Assets in Cross-Border Flows Today***

The role of crypto-assets in cross-border financial flows today is not one-dimensional. These assets are used, in some cases, as speculative investment instruments; in others, as payment and transfer channels; and in yet others, as alternative financial instruments for overcoming the limits of capital control and financial regulation. Therefore, when evaluating the movement of crypto-assets between countries, it must be borne in mind that different economic motivations may coexist within the same dataset. An empirical study examining the flows of Bitcoin, Ether, USDT, and USDC across 184 countries found that speculative motives and global financing conditions were dominant in the cross-border movements of large crypto-assets; by contrast, transactional

motives were found to be stronger in stablecoins and in small-value Bitcoin transfers. The relationship between stablecoin flows and countries with high remittance costs also suggests that crypto-assets may indeed function as alternative transfer channels in certain remittance corridors (Auer et al., 2025).

This is important for understanding the place of crypto-assets in the global financial system. Whereas large-volume and highly volatile crypto-assets often follow classical investment behaviour, characterised by return-seeking and speculation, stablecoins and small transfers are used more frequently in connection with everyday financial transactions, the need for a store of value, or practical ease of transfer. This distinction demonstrates that there is no single answer to the question whether crypto-assets are used in cross-border payments. More accurately, some crypto-assets, and especially certain types of stablecoins, make a limited but growing contribution to payment and transfer infrastructure in particular geographies and categories of transaction.

Procedural difficulties in measuring stablecoin flows also complicate assessments in this area. There is not always a one-to-one correspondence between on-chain data and actual economic transfers; exchanges, custody structures, cross-platform migrations, and netting mechanisms all complicate the measurement of true economic movement. Therefore, it is not sufficient merely to examine the number of transactions recorded on a blockchain in order to understand the extent to which stablecoins are used in international money transfers. An IMF working paper that seeks to measure stablecoin flows more accurately proposes a new methodology for bridging the gap between on-chain data and real-money flows between exchanges, and reveals findings suggesting that stablecoins can be used to circumvent restrictions, especially in countries that impose capital controls. This conclusion indicates that crypto-assets should be considered not only for their financial inclusivity and ease of transfer, but also as tools that can erode the regulatory environment (Reuter, 2025).

The observations of central banks support this picture. A 2024 survey of 93 central banks indicates that stablecoin usage remains limited when compared with traditional payment systems. However, the same study notes that, in domestic wholesale payments, retail payments, and cross-border retail payments, approximately 20% of central banks report significant stablecoin usage. While this rate may appear low, the increasing visibility of stablecoin-based use, particularly in emerging economies, suggests that this area is no longer marginal. Therefore, the role of crypto-assets today should not be exaggerated; however, nor should it be dismissed as entirely insignificant. The current trend is that crypto-assets are not replacing the classical monetary system, but are beginning to function as complementary and alternative tools in certain cross-border transactions ((Illes et al., 2025).

### 4.3. *Tokenization and Next-Generation Correspondent Banking*

To understand the potential of crypto-assets in cross-border financial transactions, it is necessary not only to examine their current use, but also to follow the infrastructural transformation they may enable in the future. At this point, the concept of tokenization becomes particularly relevant. Tokenization is the process of converting money, securities, or other assets into digital forms and storing transactions involving them on blockchain or other distributed ledger infrastructures. In this way, financial transactions could be conducted in a manner that is not only faster, but also more integrated and programmable. Tokenization, therefore, does not result merely from creating a new mode of investment; rather, it has the potential to re-engineer payment, clearing, collateral-management, and settlement processes.

In this respect, the “unified ledger” approach developed by the BIS has been advanced as a new model for overcoming the fragmented structure of the current correspondent banking system. According to this model, tokenized central-bank reserves, tokenized commercial-bank money, and tokenized financial assets can be brought together on the same infrastructure, and transactions can be concluded in an atomic – that is, simultaneous and inseparable – structure. The theoretical advantage of such a system lies in the reduction of time losses and transaction costs caused by the traditional separation of messaging, settlement, and clearing processes. The simplification of the complex chain of cross-border payments, which currently depends on multiple intermediaries, different data formats, and different working hours, could represent a significant innovation, especially for international investment and capital movements (BIS, 2025b).

This vision has not remained at a purely theoretical level; it has been supported by various projects and pilot applications. Project Agora brings together central banks and private-sector actors to examine how tokenized currencies can operate in cross-border payment infrastructure. Project Mandala, by contrast, focuses on automating compliance checks and regulatory requirements in cross-border transactions with the assistance of smart contracts. Both projects seek to address issues considered to be among the primary causes of problems in the current system, including high costs, compliance delays, and transaction fragmentation. The shared logic underlying these projects is the possibility that cross-border finance may evolve into a more programmable, traceable, and synchronous infrastructure (BIS, 2025b).

Similarly, central bank digital currencies (CBDCs) have been viewed as tools capable of transforming cross-border payment systems, especially in the field of wholesale usage. Although retail CBDC projects are more visible in public

debate, the most striking area from the perspective of international investment and financial market infrastructures is wholesale CBDC applications. This is because such tools have the potential to create more secure and direct settlement mechanisms between banks and financial institutions. Nevertheless, important issues remain unresolved in areas including technical infrastructure, governance, data sharing, jurisdictional conflicts, and legal validity. Therefore, tokenization- and CBDC-based cross-border payment architectures do not represent a complete transformation in the short term; rather, they point to the possibility of medium- and long-term structural change (IMF, 2025b).

#### 4.4. *Can Stablecoins Pass the Monetary System Test?*

At the core of the debate concerning the future role of crypto-assets in cross-border transactions are stablecoins. Stablecoins are often presented as a structure claiming price stability in contrast to volatile crypto-assets, and they are frequently pegged to a particular fiat currency. Because of these features, they are commonly regarded as the most functional type of crypto-asset in the context of cross-border transfers and payment systems. However, the ease with which an asset can be transferred does not mean that it has become a reliable component of a monetary system. At this stage, the tripartite test put forward by the BIS – namely singleness, elasticity, and integrity – offers an important criterion for assessing the systemic adequacy of stablecoins (BIS, 2025b).

From the perspective of singleness, one of the principal purposes of a monetary system is that currencies with the same nominal value are exchanged at the same value. Stablecoins do not fully meet this criterion, since they do not have a final settlement mechanism based on central-bank reserves. Especially in secondary markets, deviations from parity may occur, as may deviations between different stablecoins or between the prices of the same stablecoin in different markets. In terms of elasticity, the issuance structure of stablecoins is not analogous to the credit-creation and balance-sheet expansion capacity that exists within the banking system. Since new issuance is, in most cases, based on a logic of full reserves, it is not possible to create money flexibly in accordance with the needs of economic activity. As regards integrity, the absence of know-your-customer (KYC), customer due diligence, transaction monitoring, and sanctions compliance in public blockchain structures renders stablecoins more problematic from the perspective of money laundering, proceeds of crime, and illicit transfers. For these reasons, stablecoins are regarded not as instruments capable of providing the backbone of the monetary system in their current form, but rather as complementary elements with limited functions (BIS, 2025b).

However, stablecoins are not entirely without utility. In particular, in some countries where access to banking services is limited, remittance costs are high,

and the tendency towards dollarization is strong, stablecoins can be used as practical means of value transfer. What is especially interesting is that stablecoins often gain strength where the existing system is weak, rather than at the centre of the system. This makes them hybrid financial structures that must be managed under conditions of risk, rather than instruments that should simply be banned. Evaluations at the European level also suggest that the issuance of US dollar-denominated stablecoins outside the European Union, and their use by users within the European Union, may give rise to serious concerns in terms of supervision and monetary sovereignty (ESRB, 2025).

#### 4.5. *The Intersection of FX Swaps and Crypto*

In order to assess the significance of crypto-assets within the framework of transboundary investment, it is also necessary to refer to their indirect relationship with FX swap markets. FX swap markets are among the most important mechanisms enabling access to different currencies, facilitating liquidity management, and helping to balance currency risk for market participants. However, most of these markets appear to be off-balance-sheet and cannot be adequately monitored within the traditional statistical framework. As a result, the real volume and structure of cross-border investment flows often appear narrower than they actually are. This invisibility has made it difficult to measure global financial risks accurately. Current assessments of FX swap markets show that data tracked under the OFI category are becoming increasingly important for understanding portfolio investment and liquidity movements (BIS, 2025a).

The connection between crypto-assets and FX swaps largely revolves around the use of stablecoins as digital representations of particular fiat currencies. The cross-border movement of a stablecoin often resembles the cross-border movement of the digital carrier of that fiat currency in terms of its economic consequences. Therefore, the use of stablecoins can have indirect but serious implications for exchange-rate regimes, capital controls, national monetary policy, and financial regulation. Particularly in economies with capital controls, the fact that stablecoins provide a channel for value transfer outside official foreign-exchange markets represents a key challenge from the perspective of public authorities. Empirical findings indicate that some capital-control measures, rather than curbing crypto-flows, may under certain conditions actually promote them. This result shows that crypto-assets are not only new technologies, but also alternative financial channels capable of operating within existing monetary and capital-management regimes (Auer et al., 2025).

Overall, the current role of crypto-assets in cross-border money transfers and swap-like financial transactions remains limited, but their future role is not

trivial. In particular, stablecoins, tokenization, and wholesale digital-currency projects may play a role in redesigning cross-border financial transactions in terms of cost, speed, and programmability. However, the realization of this potential depends not only on technical innovation, but also on legal validity, regulatory compliance, financial stability, and institutional trust. Therefore, although it cannot be said in the short term that crypto-assets will replace the current system, it can be said that they have become complementary instruments that must be taken into account in the transformation of international investment infrastructure.

## 5. Regulatory Framework for Crypto-Assets in Türkiye

The regulatory framework concerning crypto-assets in Türkiye has taken shape within a relatively short period of time, but in a highly intensive and gradual manner. The first significant step in this process was the Regulation on the Non-Use of Crypto-Assets in Payments, published by the Central Bank of the Republic of Türkiye in April 2021 (Türkiye Cumhuriyet Merkez Bankası, 2021). Under that regulation, the use of crypto-assets as a direct means of payment was prohibited; in addition, payment institutions and electronic-money institutions were restricted from acting as intermediaries for the transfer of funds to crypto-asset platforms. This approach indicates that Türkiye's initial response to crypto-assets was not strictly prohibitive, but rather aimed at limiting systemic risks.

The factors emphasized by the Central Bank in justification of this regulation included the decentralized nature of crypto-assets, their high price volatility, and their anonymity features. It was considered that these characteristics could potentially increase the risks of money laundering and terrorist financing, and could also weaken the security of payment systems. In this context, it can be said that Türkiye initially preferred to establish a controlled area by keeping crypto-assets outside payment systems, rather than pushing them entirely out of the financial system.

Following this first restrictive approach, Türkiye moved towards a more comprehensive and institutionalized regulatory model. The most significant event in this transformation was the adoption of Law No. 7518 amending the Capital Markets Law, published on 2 July 2024 (Law No. 7518, 2024). By virtue of this regulation, crypto-asset service providers were granted explicit legal status for the first time and brought within the regulatory and supervisory authority of the Capital Markets Board (CMB). Thus, the crypto-asset market in Türkiye came to be governed within a special regulatory field that is neither part of the banking system nor entirely unsupervised.

### 5.1. *Basic Regulations of Law No. 7518*

Law No. 7518 is a framework regulation determining the basic principles for the institutionalization of the crypto-asset market in Türkiye. Under this law, crypto-asset service providers are required to obtain authorization from the CMB in order to conduct their operations; thus, a licence-based structure has been established in the sector. This is considered an important step in limiting unregistered and unsupervised activities.

Another significant regulation introduced by the law concerns the security of technological infrastructure and information systems. Accordingly, service providers are required to possess infrastructure that complies with the technical criteria to be identified by TÜBİTAK. This approach makes clear that not only financial, but also technical, security has become part of the regulatory environment for the crypto-asset market.

Additionally, the provisions for protecting customer assets are of particular importance. It has been made mandatory that cash and crypto-assets belonging to customers must be kept separate from the assets of service providers, and that cash assets must be held in banks. The purpose of this regulation is to protect investors, particularly in cases of insolvency or operational risk. In addition, the fact that crypto-asset custody services may be provided only through authorized institutions represents another important step towards making the market structure more controlled and secure.

The CMB further elaborated this framework through the communiqués published on 13 March 2025 under the authority conferred by the law. In particular, Communiqué No. III-35/B.2 ([Sermaye Piyasası Kurulu, 2025](#)) regulates in detail the listing criteria for crypto-assets, principles concerning the execution of customer orders, provisions regarding hot and cold wallets, and capital-adequacy obligations. These regulations indicate that the crypto-asset market in Türkiye is not merely identified, but also regulated at the operational level.

However, the CMB's announcement of 2024 ([Sermaye Piyasası Kurulu, 2024](#)) also established a major transition period for crypto-asset service providers based outside the country. Under this arrangement, such organizations are required either to cease their activities in Türkiye within a specified period or to obtain a licence by complying with the relevant legislation. This regulation demonstrates that Türkiye has adopted a supervisory approach that encompasses not only domestic but also cross-border activities.

## 5.2. Türkiye's Compliance with International Standards

Türkiye's approach to crypto-asset regulation has been shaped within the framework of its efforts to comply with international standards. In particular, the standards defined by the Financial Action Task Force (FATF) and the Financial Stability Board (FSB) have become important benchmarks influencing the direction of regulation at the national level. Türkiye's decision to bring crypto-asset service providers within the scope of licensing and supervision can therefore be regarded as a significant step towards alignment with this international framework.

However, [FATF \(2025\)](#) show that the level of compliance existing in the virtual-asset sector on a global scale remains limited, and that many countries face difficulties in establishing effective licensing and supervisory mechanisms. In this context, the steps taken by Türkiye do not yet reflect a completed process of harmonization, but rather a continuing process of transformation. In particular, the effective implementation of practices such as the "Travel Rule" is critical for international integration.

On the other hand, the tax-transparency efforts of the Organisation for Economic Co-operation and Development with respect to crypto-assets also represent an important area of compliance for Türkiye. The Crypto-Asset Reporting Framework (CARF) envisages a system that would enable tax administrations to monitor crypto-asset transactions ([OECD, 2024](#)). The integration of this framework into national legislation is important both from the perspective of reducing the informal economy and of enhancing international information sharing.

Overall, Türkiye's regulatory approach towards crypto-assets, which initially took the form of a restrictive policy, has over time evolved into a supervised and institutionalized model. This model seeks not to prohibit crypto-assets completely, but rather to manage their risks within a controlled framework and to establish a market structure based on international standards. Nevertheless, it is equally clear that this process is not yet complete and remains open to further development, particularly in the areas of implementation, supervision, and international integration.

## 6. Crypto-Assets as Company Capital in the Context of International Investment

### 6.1. 6.1 Conceptual and Legal Framework

The question of the use of crypto-assets as company capital is not merely a matter of technical implementation, but also constitutes a fundamental area of

discussion in terms of company law, financial regulation, and the changing concept of asset value. Whether crypto-assets can substitute for cash or in-kind contributions in the establishment or capitalization of a company tests the flexibility of the classical concept of capital in relation to digital assets. In this context, the issue is not confined to the question whether such use is possible; it also includes the question under what conditions such use would be legally valid and economically sustainable.

From an international perspective, the uncertainty surrounding the legal nature of crypto-assets lies at the heart of this debate. [ESMA \(2024\)](#) and [FSB \(2023\)](#) assessments show that the classification of crypto-assets as financial instruments has a direct consequence for whether they may be regarded as capital elements. In particular, if crypto-assets giving rise to share-like rights are treated as securities, such assets are already digital versions of classical capital instruments and are therefore subject to a different legal regime. By contrast, assets such as utility tokens are subject to very different, and fragmented, legal evaluations depending on the nature of the rights they provide.

## **6.2. Evaluation within the Framework of Turkish Law**

Under Turkish law, company capital is regulated through the distinction between cash and in-kind capital within the framework of the Turkish Commercial Code. In order for an asset to be accepted as in-kind capital in joint-stock companies, it must have economic value, be transferable, and be free of any legal obstacle restricting its contribution. At this point, it may be said that crypto-assets theoretically satisfy the criterion of value measurable in money. However, the issue is not limited to the element of value alone.

One of the most significant problems concerning the acceptance of crypto-assets as in-kind capital is the valuation and registration process. Under Turkish law, where in-kind capital is contributed, the asset must be valued by court-appointed experts and registered in the trade registry on the basis of that valuation. The high volatility of crypto-assets, and the fact that their prices may vary across different platforms, makes the reliability of such valuation questionable. In addition, the lack of clarity between the technical transfer of crypto-assets on a blockchain and the transfer of legal ownership creates a further uncertainty.

When Law No. 7518 (2024) and the CMB regulations are examined, it becomes apparent that crypto-assets are primarily considered as objects of investment and service activity. These regulations define the activities of crypto-asset service providers; however, they do not contain an explicit provision concerning the use of crypto-assets as company capital. This situation has a twofold

consequence: on the one hand, there is no explicit prohibition, and on the other, there is no explicit permission capable of providing legal certainty. Therefore, under the current legal framework, the acceptance of crypto-assets as in-kind capital in the establishment of a company remains theoretically arguable, but in practice it involves serious legal and technical obstacles.

### *6.3. Comparative Law Perspective*

When the European Union's regulations are analysed, it becomes clear that MiCA is a comprehensive piece of legislation governing matters involving crypto-assets, but it does not contain a direct provision concerning the use of such assets as company capital. This demonstrates that a similar regulatory gap exists at the level of EU law. [ESMA \(2024\)](#) suggest that crypto-assets, in particular those classified as security tokens, would already be covered by the existing capital-market regime if they are considered securities. In that case, the debate shifts from the question whether crypto-assets can constitute capital to the question which crypto-assets already qualify as capital instruments.

In United States law, a less rigid and more pragmatic approach appears. In some states, crypto-assets are classified as intangible assets, with the result that they may be included in balance sheets. However, under accounting standards, crypto-assets are generally treated as intangible assets or, in some cases, as inventory. This classification gives rise to serious difficulties, particularly with respect to fair-value measurement and impairment testing. Owing to the high levels of volatility involved, this may lead to substantial fluctuations in company balance sheets. This suggests that the use of crypto-assets as capital should be evaluated not only from the legal perspective, but also in light of financial stability.

### *6.4. Opinion and Evaluation*

For crypto-assets to be used as company capital, three basic conditions would need to be fulfilled simultaneously. First, there must be legal admissibility: the crypto-asset must be accepted as a legitimate capital element under the company law of the relevant jurisdiction. Secondly, valuation reliability is essential: the asset contributed as capital must have an objective and verifiable market value at the time of registration. Thirdly, regulatory approval is required; in other words, the competent authorities must expressly or implicitly accept such a capital contribution.

At present, it cannot be said that these three conditions are met together, especially in Türkiye. The legal environment remains unclear, valuation methods are not yet sufficiently reliable, and the regulatory approach remains cautious.

For this reason, the use of crypto-assets as direct company capital is far from being a viable method under the current system.

However, it is equally clear that this picture is not static. With the institutionalization of the crypto-asset market, the adaptation of accounting standards to these assets, and the clarification of the regulatory framework, it is possible that transformation may occur in this field. [IMF \(2025b\)](#) recommends that the digital representation of assets and capital structures may change, especially with the development of central-bank digital currencies and tokenization processes. In this context, tokenized shares and digital capital instruments may emerge as alternative or complementary models to the traditional capital structure.

In conclusion, the issue of using crypto-assets as company capital is, for the most part, a theoretical debate today within the framework of Turkish law. However, this debate offers important insights into the future of the digitalized financial system. Therefore, the issue should be viewed not merely in the context of existing legislation, but also as part of the evolving financial architecture. This discussion is especially relevant in the context of international investment, as the recognition of crypto-assets as company capital could have a direct impact on cross-border investment structures and capital formation.

## 7. Conclusion

This study examined the relationship between international investment and crypto-assets within a holistic framework encompassing its economic, technological, and legal dimensions. The findings show that the global investment system continues to undergo a process of digitalization, and that this is transforming not only the financial instruments used, but also the infrastructure of investment itself. Although there is a general trend of contraction in international investment flows, the increasing importance of the digital economy and data-based investment demonstrates that capital is changing direction.

Crypto-assets emerge as one of the most significant elements of this transformation. Although regulations such as MiCA and Law No. 7518 in Türkiye have placed the legal definition and classification of these assets within a certain framework, the nature of crypto-assets remains function-based and fragmented. This means that the same asset may be subject to different regulatory regimes depending on the purpose for which it is used, and this does not fully eliminate legal uncertainty.

When considered from the perspective of cross-border financial transactions, it is apparent that crypto-assets play a complementary role in certain areas rather

than constituting a structure capable of replacing the existing system. Stablecoins, in particular, offer practical advantages in terms of transfer costs and transaction speed. However, because such assets cannot fully satisfy the basic functions of a monetary system, such as singleness, flexibility, and integrity, they cannot be placed at the centre of that system. By contrast, the tokenization-based unified-ledger approach introduced by the BIS appears to offer a more integrated and sustainable model for transforming financial infrastructure into a programmable structure.

In the case of Türkiye, it is evident that the regulatory approach to crypto-assets has changed dramatically within a short period. At the first stage, a restrictive policy was followed in relation to payment systems, whereas Law No. 7518 and the CMB regulations later established a structure based on licensing and supervision. This model does not seek to prohibit crypto-assets entirely, but rather to manage risks within a framework of systematic control. At the same time, it remains equally clear that regulatory gaps persist in areas such as tax transparency, international data sharing, and decentralized finance practices.

The issue of using crypto-assets as company capital is one of the most outstanding questions in the current system. The absence of a clear and established framework on this matter in Turkish law and in international regulations means that such a practice would involve serious uncertainty in practice. In particular, limitations in valuation reliability, legal admissibility, and regulatory approval restrict the use of crypto-assets as direct capital elements at this stage. However, the development of tokenization processes and the spread of digital capital instruments indicate that this field may undergo transformation in the medium and long term.

The principal conclusion that may be drawn from this study is that crypto-assets are positioned not as alternatives capable of replacing the existing international investment system, but rather as instruments that are changing that system and complementing it in certain respects. However, this transformation is not a process in which technological innovation alone is decisive. The clarification of legal regulations, the standardization of accounting practices, and the continuation of institutional trust underpinning the financial system will all be decisive for its sustainability.

As a result, while crypto-assets currently play a limited but growing role in the financial system, they also have the potential to occupy a more central position in the financial architecture of the future. For this reason, both academic studies and regulatory policies should adopt a dynamic rather than a static perspective, capable of adapting to a rapidly evolving process of change. Therefore, while crypto-assets may not yet be able to function fully as stable instruments within

international investment frameworks, their emerging role represents a developing layer of finance that may become more significant in the future.

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