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Should Crypto-Asset Regulation Be Technology-Neutral?

Bruno Mathis

1 Introduction

Almost every legislative project or public consultation on crypto assets that comes out in the world defends the principle of technological neutrality. Where does this principle come from? How is it applied when crypto-asset regulation is drafted?

On the face of it, the question of whether crypto-assets regulation should be technology-neutral appears to be an oxymoron: crypto assets are technology-specific. But it is no more so than “Should ICT Regulation be Technology-Neutral,” as Professor Koops wondered.¹ Technological neutrality of regulation is not a novel issue: the theme dates back to the advent of the Internet.² It developed with the legal issues of electronic communications³ and property rights over digital works.⁴ In the financial sector, the concept was restricted to the meaning of interoperability rules aimed at levelling the playing field.⁵

1 Bert-Jaap Koops, “Should ICT Regulation be Technology-Neutral,” in Bert-Jaap Koops et al. (eds), *Starting Points for ICT Regulation: Deconstructing Prevalent Policy One-liners* (The Hague: TMC Asser 2006), 77–108.

2 See Chris Reed, “Taking Sides on Technology Neutrality” (2007) 4 Script-ed 264.

3 See for instance Ian Hosein and Alberto Escudero, “Understanding Traffic Data and Deconstructing Technology-neutral Regulations” (*CiteSeerX*, 7 March 2002) <<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.475.5291&rep=rep1&type=pdf>>.

4 See Dan L. Burk and Mark A. Lemley, “Is patent law technology-specific?” (2002) 17 *Berkeley Technology Law Journal* 1157, 1157–1208.

5 See Paola Lucantoni, “Strumenti digitali e finanza,” in Fabrizio Maimeri and Marco Mancini (eds), *Quaderni di Ricerca Giuridica: della Consulenza Legale, Le nuove frontiere dei servizi bancari e di pagamento fra PSD 2, criptovalute e rivoluzione digitale* (Banca d'Italia 2019), vol. 87, 291–310.

The issue is important because crypto assets,⁶ and the technology that allows them to circulate, are difficult to apprehend and their legal qualification is thorny. First, it took a crypto asset, Bitcoin,⁷ born in 2008, to somehow reveal the potential of the blockchain, its underlying technology, from 2014. Bitcoin was emulated, inspiring alternative coins (altcoin), and then other crypto assets emerged, performing equivalent functions without necessarily using blockchains. Today, the term “crypto asset” is commonly defined as a cryptographically secured digital representation of value of contractual rights that uses some type of blockchain and can be transferred, stored or traded electronically. The blockchain challenged again the principle of technological neutrality of law, while some defended, on the contrary, a *lex cryptographia*,⁸ or that law should at least treat the blockchain as an “infrastructural commons.”⁹

The following vogue for stablecoins and security tokens questioned how financial law in particular could be neutral to these instruments. Because the term of blockchain is technical and looks narrow, the expression of Distributed Ledger Technology (DLT) appeared in 2016 and has gradually established itself since then.¹⁰

It is as difficult to identify the common properties of crypto assets as their distinctive properties with existing legal objects. Lawmakers rightfully fear the opening of Pandora’s box in positive law. Still, over the last three years, legislative and regulatory initiatives have been multiplying with respect to crypto assets all over the world. The vast majority of these initiatives set technological neutrality as their objective, however fuzzy the concept.

This chapter is structured as follows. Section 2 describes and analyses the limits of the three arguments that lie at the heart of this principle – future-proofing, impartiality and functional equivalence –, then considers other hidden motivations. Section 3 discusses the implications of that principle in the writing of legal definitions and rules, and for Private International Law (PIL).

6 For more details, see Fabian Schär and Aleksander Berentsen, *Bitcoin, Blockchain, and Crypto-assets: A Comprehensive Introduction* (MIT Press 2020).

7 Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System” (*Bitcoin*, 31 October 2008) <<https://bitcoin.org/bitcoin.pdf>>.

8 Aaron Wright and Primavera de Filippi, “Decentralized Blockchain Technology and the Rise of Lex Cryptographia” (*SSRN*, 25 July 2017) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664>.

9 Georgios Dimitropoulos, “The Law of Blockchain”, 95 *Washington Law Review* 1117 (2020).

10 Mark Walport, “Distributed ledger technology: beyond blockchain” (*UK Government Office for Science*, 19 January 2016) <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf>.

2 The Case for Technology-Neutrality

The technology-neutrality principle is based on three arguments, which are not mutually exclusive.

2.1 *Future-proofing*

The future-proofing argument seeks to protect against the risk of change or obsolescence. Under this criterion, common law would be intrinsically neutral to technology if, as the UK Jurisdiction Taskforce maintains, “English law, as a well-developed flexible common law system, [...] is well able to adapt to deal with fast-changing technologies.”¹¹

According to the Landau Report, which served as a doctrinal basis for the introduction of crypto assets in French law, “imposing standards to players and technology today would paralyze progress.”¹² These would be technology-specific and therefore premature. On the contrary, provisions capable of standing innovations over time would bring legal certainty. The concern is shared by the Permanent Bureau of the Hague Conference on Private International Law (HCCH)¹³ and UNIDROIT,¹⁴ which both seek to develop future-proof principles in their respective areas.

On one occasion, German regulator BaFin implied that its national law was already future-proof. The regulator had sanctioned an individual for trading Bitcoin on the ground Bitcoin was a unit of account (*Rechnungseinheit*) within the meaning of a law adopted 10 years before. Its reasoning was that the unit of account was legally defined as a financial instrument, and because the trader did not have the corresponding banking licence, he operated illegally. But a

11 UK Jurisdiction Taskforce of the LawTech Delivery Panel, “Public consultation - The status of crypto-assets, distributed ledger technology and smart contracts under English private law” (*The LawTech Delivery Panel*, May 2019) <[https://www.enyolaw.com/downloads/ukjt-consultation-cryptoassets-smart-contracts-may-2019%620\(1\).pdf](https://www.enyolaw.com/downloads/ukjt-consultation-cryptoassets-smart-contracts-may-2019%620(1).pdf)> accessed 31 May 2022.

12 Jean-Pierre Landau & Alban Genais, «Les crypto-monnaies - Rapport au Ministre de l'Économie et des Finances» (4 July 2018), 45 <https://www.economie.gouv.fr/files/files/2019/Rapport_LandauVF.pdf?v=1570634503>.

13 Hague Conference on Private International Law, “Developments with respect to PIL implications of the digital economy, including DLT” (HCCH, 4 November 2020, §2 <<https://assets.hcch.net/docs/8bdc7071-c324-4660-96bc-86efba6214f2.pdf>>.

14 International Institute for the Unification of Private Law, “Digital Assets and Private Law Working Group: First Session (remote), Rome, 17–19 November 2020” (UNIDROIT, March 2021), §32 <<https://www.unidroit.org/english/documents/2021/study82/wg01/s-82-wg01-04-e.pdf>> accessed 31 May 2022.

court of appeal contested that interpretation because “the wording of the law is not open to an interpretation according to which bitcoins that only appeared after the enactment of the law could be subsumed under the concept of a unit of account.”¹⁵ Future-proofing is not writing a blank cheque on the future. It cannot be presumed beyond what the legislator can reasonably imagine at the time of drafting the law.

In 2009, the European Union adopted its second directive on electronic money,¹⁶ which stated that the definition of electronic money “should be wide enough to avoid hampering technological innovation and to cover not only all the electronic money products available today in the market but also those products which could be developed in the future.”¹⁷ Some crypto players then applied for a licence to operate as an electronic money institution to issue payment tokens backed by a reserve of *fiat* money. Yet, in 2020, the European Commission preferred to introduce the “e-money token,” for that purpose, in its proposal of a regulation on markets in crypto assets (MiCA).¹⁸ A broad, future-proof, definition does not guarantee that pressure will not build over time to bring greater legal certainty to a specific technology.

2.2 *Impartiality*

The argument of impartiality is to protect against the risk of discrimination between economic actors with respect to their technical choices. As the saying goes, “regulation should not pick winners and losers.” For the Financial Action Task Force (FATF), the global money laundering and terrorist financing watchdog, “the requirements applicable to virtual assets, as value or funds, to covered [virtual assets] activities, and to [virtual assets services providers] apply irrespective of the technological platform involved.”¹⁹ For the EU Commission, “Union financial service legislation should not favour a particular technology.”²⁰

15 Kammergericht Berlin (4. Strafsenat) (KG Berlin), *Urteil vom 25.9.2018* – (4) 161 Ss 28/18 (35/18) (ECLI:DE:KG:2018:0925.4.35.18.00). (Criminality of trading bitcoins).

16 Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC, [2009] OJ L267/7.

17 *Id.*, Recital 8.

18 Proposal for a Regulation of The European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, [2020] COM/2020/593 final (“MiCA”).

19 Financial Action Task Force, “Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers” (FATF, 21 June 2019), 9 <<https://www.fatf-gafi.org/media/fatf/documents/recommendations/RBA-VA-VASPs.pdf>>.

20 MiCA (n 17), Recital 6.

The principle applies to consensus mechanisms, protocols, smart contracts and platforms (Ethereum, Tezos, Ripple, etc.). To start with, it should be indifferent whether the platform has chosen or not a blocks-based architecture. Likewise, there should be no discrimination against crypto players based on whether their distributed ledger is public (or permissionless), rather than private (or permissioned), as long as they meet their security or know-your-customer (KYC) obligations by other means.

Impartiality is not just a question of competition between crypto players. The German government puts DLT on the same level as conventional technologies. According to its preliminary report on the regulatory treatment of electronic securities and crypto tokens, “rules on electronic securities will be technologically neutral, *i.e.* the use of blockchain technology will not be privileged in any way, especially in view of the high current energy needs of public blockchain technologies and their negative effects on the climate.”²¹ As for the UK Treasury, it stresses that what it calls “stable tokens” could be designed using other types of technology than DLT, and require a crypto asset classification that is technology-“agnostic.”²²

2.3 *Functional Equivalence*

The argument of functional equivalence refers to the adage “same business, same risks, same rules” or to the principle of “substance over form,” that underlies US federal law. According to this idea, it would neither be appropriate to legislate on Bitcoin alone, if the same concepts apply to alternative coins (*altcoins*), nor on security tokens if they have the same function as book-entry securities.

The principle of functional equivalence applies more easily to the category of investment tokens, in which the token can be seen as a vehicle for the alternative booking of the security in the account. It is implicit in the commentary on the Luxembourg bill opening up the circulation of securities to the blockchain, according to which “these new methods of managing securities

21 Bundesministerium der Finanzen, “Key-issues paper on the regulatory treatment of electronic securities and crypto tokens – Allowing for digital innovation, ensuring investor protection” (Bundesministerium der Finanzen, 7 March 2019), 2 <https://www.bundesfinanzministerium.de/Content/EN/Downloads/Financial-Markets/2019-03-25-electronic-securities-and-crypto-tokens-key-issues-paper.pdf?__blob=publicationFile&v=4>.

22 HM Treasury, “UK regulatory approach to crypto-assets and stablecoins: Consultation and call for evidence” (*HM Treasury*, 7 January 2021), 6 <<https://www.gov.uk/government/consultations/uk-regulatory-approach-to-cryptoassets-and-stablecoins-consultation-and-call-for-evidence>>.

accounts constitute alternatives to the methods of dematerialisation that practice and the law already know.”²³ The OECD also draws this parallel, noting that “Tokenisation can be seen as merely replacing one digital technology (electronic book-entries in securities registries of central securities depositories) with another (cryptography-enabled dematerialised securities based on DLT-enabled networks), therefore raising no issues in jurisdictions with a technology-neutral approach to regulation.”²⁴ One author sees legacy information systems or centralised-ledger technology (CLT), as an alternative architecture to DLT.²⁵

Functional equivalence can be assessed at the level of each processing step. The European Central Bank stated that “the same technology-neutral rules and legal provisions shall therefore apply, to the extent possible, to the issuance, bookkeeping and use of these tokens as they apply to the financial assets they represent.”²⁶ It also applies to support functions. The French Treasury pointed out that for many players, the law applicable to data management, security and interoperability requirements, or even customer knowledge (KYC), do not seem to need to be specified in the law and should not therefore be specifically defined with regard to the blockchain.²⁷

However, applying a functional equivalence principle to security tokens is tricky, as the European Commission half-recognises: “although existing EU *acquis* regulating trading and post-trading activities strives to be technologically neutral, existing regulation reflects a conceptualisation of how financial markets currently operate, clearly separating the trading and post-trading

23 Fernand Etgen, «Projet de loi portant modification de la loi modifiée du 1er août 2001 concernant la circulation de titres» (*Le Gouvernement du Grand-Duché de Luxembourg*, 28 September 2018), Doc. No. 7363 <<https://data.legilux.public.lu/file2/2019-10-14/800>>.

24 Organisation for Economic Co-operation and Development (OECD), “The Tokenisation of Assets and Potential Implications for Financial Markets” (*The OECD Blockchain Policy Series 2020*), 8 <<https://www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.pdf>> accessed 31 May 2022.

25 Alain Rocher, “Réglementation & blockchain : le défi de la neutralité technologique” (2020) *Revue Banque* No. 849.

26 ECB Crypto-Assets Task Force, “Crypto-Assets: Implications for financial stability, monetary policy, and payments and market infrastructures (Occasional Paper Series No. 223)” (*European Central Bank*, 14 May 2019), 9 <<https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op223-3ce14e986c.en.pdf>>.

27 DG Trésor, “Synthèse de la consultation publique sur la transmission de certains titres financiers au moyen de la technologie «blockchain» (*Ministère de l'Économie*, 31 August 2017) <<https://www.tresor.economie.gouv.fr/Articles/2017/08/31/synthese-de-la-consultation-publique-sur-la-transmission-de-certains-titres-financiers-au-moyen-de-la-technologie-blockchain>>.

phase of a trade life cycle.”²⁸ Thus, even if it “strives” to, European financial regulation may not be so technologically neutral in retrospect. More specifically, seeking functional equivalence for security tokens implies that the long-standing postulate of a necessary functional split between trade execution and trade settlement is still valid for these securities. One respondent to the Swiss consultation on the subject put it more bluntly: that the national Financial Market Infrastructures Act “is in no way technology neutral [...] and the structure with trading venues, CCPs and CSDs is not God-given, but the result of technologies available so far.”²⁹

2.4 *Hidden Motivations*

The argument of technological neutrality is occasionally used as a pretext. On the one hand, it helps to dodge politically sensitive issues, in particular that of Bitcoin, which no legal text calls by name. As it represents 65% of the capitalisation of cryptocurrencies,³⁰ a specific legal recognition could have been considered for it. But this would have led to strong opposition from central bankers.³¹ Conversely, central bankers made theirs the expression of “central bank digital currency,” where the word “digital” was conveniently preferred to “crypto,” in a particularly accomplished form of technological neutrality. It allows them to look good after having been very critical of cryptocurrencies, and to have full leeway in their own technological choices.

On the other hand, the argument helps to hide the possible embarrassment of the legislator caused by the technicality of the subject. Opting for wordings as least technical as possible helps the writer to stay in his comfort zone

28 European Commission, “Public consultation an EU framework for markets in crypto-assets” (*Better Finance*, 19 March 2020), 97 <<https://betterfinance.eu/wp-content/uploads/Better-Finance-formal-response-markets-in-crypto-assets.pdf>>.

29 Wenger & Vieli, „Stellungnahme zur Vernehmlassung betreffend Bundesgesetz zur Anpassung des Bundesrechts an Entwicklungen verteilter elektronischer Register“ (*Wenger & Vieli*, 27 June 2019), 560/589 on <https://www.fedlex.admin.ch/filestore/fedlex.data.admin.ch/eli/dl/proj/6019/15/cons_1/doc_5/de/pdf-a/fedlex-data-admin-ch-eli-dl-proj-6019-15-cons_1-doc_5-de-pdf-a.pdf>.

30 CoinMarketCap, “Today’s Cryptocurrency Prices by Market Cap” (*CoinMarketCap*) <<https://coinmarketcap.com>> accessed 29 June 2023.

31 As evidenced by the qualification of Bitcoin as the “evil spawn of the financial crisis” by a member of the executive board of the ECB, in November 2018. Claire Jones, “ECB official dubs bitcoin ‘evil spawn of the financial crisis’” (*Financial Times*, 15 November 2018) <<https://www.ft.com/content/92c4737e-e8ed-11e8-885c-e64da4c0f981>>.

and avoid public challenge. Professor Gautrais sees the quest for technology-neutrality as a “salvationist martingale”³² to apprehend technological change.

Market regulators are also tempted to dodge the issue. The (British) Financial Conduct Authority (FCA) explains that “historically, the FCA’s philosophy has been one of ‘technology neutrality’ *i.e.* not to regulate specific technology types, only the activities they facilitate and the firms carrying out these activities.” That claim allows it to hide that - like any other regulator - it has not built up sufficient technical expertise to provide guidance, specifically on the difficult question of the monitoring of on-chain transactions for anti-money laundering purposes. The Agency for Digital Italy (AGID), for its part, referring to smart contracts rather than specifically to crypto assets, suggests a “particular caution in relation to indications or options that could compromise the necessary neutrality technology of the rules to be adopted.”³³ The parliament had imprudently introduced the smart contract into national contract law³⁴ and given the Agency three months to provide guidelines.³⁵ The requirement of technological neutrality is used as a dubious but convenient explanation to avoid putting the blame on an overly ambitious legal provision.

3 Implications for Legislation

3.1 Naming Legal Objects

The appearance in 2016 of the term “distributed ledger technology” already marks the concern to define it as generically as possible. Indeed, the intrinsic benefits of blockchain, unforgeability and the absence of double-spending risks, can be obtained without transactions necessarily being recorded in the form of chains of blocks. However, DLT remains a technical term. It does not provide information on its function. The epithet “distributed” has been chosen to refer to the identical replication of a transaction on multiple computers, or “nodes,” to prevent any subsequent fraudulent alteration. However, it is difficult to apply to the Lightning Network, a variant of a blockchain that organises communication between only two nodes for the benefit of increased

32 Vincent Gautrais, *Neutralité technologique : rédaction et interprétation des lois* (Montréal: Éditions Thémis 2012), 268.

33 Mila Fiordalisi, “Blockchain, che fine hanno fatto le linee guida Agid?” (*Corriere Comunicazioni*, 18 June 2020) <<https://www.corrierecomunicazioni.it/digital-economy/blockchain-che-fine-hanno-fatto-le-linee-guida-agid/>>.

34 Decree-Law No. 135 of December 14, 2018 ratified by law of 19 February 2019, Urgent Provisions on Supporting and Simplifying Companies and Public Administration (D.L. No. 135), *Gazzetta Ufficiale* (G.U.), Dec. 14, 2018, art. 8 ter. al. 2 <<https://www.gazzettaufficiale.it/eli/id/2019/02/12/19A00934/sg>>.

35 *Id.*, al. 4.

performance. In any case, for want of a better definition, it will be the one retained by the European supervisory agencies in their simultaneous advice of 9 January 2019, and subsequently adopted by the Swiss Federal Council and the European Commission for their respective legislative projects.

Refining the definition of DLT remains hard, and may betray a lack of understanding of the technology. For instance, the EU Commission defines it as “a class of technologies which support the distributed recording of encrypted data.”³⁶ This is wrong. Though underlying data are secured by cryptographic means, recorded data are usually not encrypted.

The search for lowest common denominators leads to fuzzy definitions. For example, many information systems could be qualified as “shared electronic recording devices” (*dispositifs d'enregistrements électroniques partagés*), within the meaning of the French blockchain ordinance, without having anything to do with the blockchain. So-called “simple” uncertificated securities, in Switzerland, are no less registered than so-called “registered” uncertificated securities,³⁷ and, in Japan, what the law now calls “electronically recorded transferable rights” appears to be a description of existing dematerialised securities.³⁸ If the crypto asset, within the meaning of MiCA, is a “digital representation of value or rights which may be transferred and stored electronically, using distributed ledger or similar technology,”³⁹ why couldn't a traditional database qualify as a “similar technology” for that purpose?

The Principality of Liechtenstein is the jurisdiction that went furthest in its effort of conceptualisation. Its government noted that “the terms ‘virtual’ or ‘crypto’ describe a technological form and, for reasons of technological neutrality, are not appropriate to be used as an umbrella term in the context of

36 Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology, [2020] COM/2020/594 final, art. 2(1).

37 New arts. 973c and 973d of the Swiss Code of Obligations (Federal Act on the Amendment of the Swiss Civil Code (Part Five: The Code of Obligations) of 30 March 1911, SR 220), resulting from the Loi fédérale sur l'adaptation du droit fédéral aux développements de la technologie des registres électroniques distribués du 25 septembre 2020, FF 2020 7559.

38 Sygna, “Japan's Financial Services Agency (FSA) To Enforce New Crypto-Asset Exchange Regulations from 1 May 2020” (*Sygna*) <<https://www.sygna.io/blog/japan-crypto-asset-regulation-financial-services-agency-changes-psa-fiea-may-2020/>> accessed 29 June 2023.

39 MiCA (n 17), art. 3(1)(2).

this Law.”⁴⁰ The government preferred to define “trustworthy technologies.”⁴¹ Here again, the definition is questionable, for three reasons. Trust, or rather, confidence, is indescribable and cannot be decreed. It cannot be reduced to the unforgeability guaranteed by immutability, which itself depends on the consensus mechanism used. And generally speaking, the security of uses will depend less on technology than on the applications based on it.

The principle of technology neutrality also leads lawmakers to refrain from naming objects that are technology-specific. None of the legislative initiatives on crypto assets so far mentions the wallet or the blockchain address, for instance. To avoid naming it, the French lawmaker used a circumlocution: “registration in a shared electronic registration device serves as account registration,”⁴² which leaves open a registration to *any* wallet in that shared electronic registration device.

Likewise, the private key is seldom mentioned, though its role is essential. This key, which could be stored on a hardware device (cold storage) or by software means (hot storage), gives access to crypto assets. It can be duplicated, giving equal access to more than one person, or cut up between multiple signatories, thereby defining who might have effective and exclusive control of underlying assets – or not. Governance of private keys does have effects in ownership and bankruptcy law.

3.2 *Designing Technology-Neutral Rules*

The technology-neutrality principle leads legislators and regulators to write as few rules as possible. The Chairman of the US Securities and Exchange Commission once epitomised his stance by saying: “I’m not going to change rules just to fit a technology.”⁴³ Other policy-makers seek minimal wordings. The French government managed few amendments to its national

40 Government of Liechtenstein, “Report and Application of the Government to the Parliament of the Principality of Liechtenstein Concerning the Creation of a Law on Tokens and TT Service Providers (Tokens and TT Service Provider Act; TVTG) and the Amendment of Other Laws (No. 54/2019)” (*Impuls Liechtenstein*, 7 May 2019), 12 <<https://impuls-liechtenstein.li/wp-content/uploads/2021/02/Report-and-Application-TVTG-extract.pdf>>.

41 Law of 3 October 2019 on Tokens and TT Service Providers (Token and TT Service Provider Act; TVTG), art. 2(1)(a): “Trustworthy Technology (TT): Technologies through which the integrity of Tokens, the clear assignment of Tokens to TT Identifiers and the disposal over Tokens is ensured.”

42 French Monetary Code, art. L211-3: “L’inscription dans un dispositif d’enregistrement électronique partagé tient lieu d’inscription en compte.”

43 Tim Fries, “SEC Chairman Jay Clayton: I’m not going to change rules just to fit a technology” (*The Tokenist*, 15 September 2019) <<https://tokenist.com/sec-chairman-jay-clayton-im-not-going-to-change-rules-just-to-fit-a-technology/>>.

law. Its “blockchain ordinance”⁴⁴ essentially equated the distributed ledger to a securities account in a couple of legislative provisions.

Some rules may look tautological or abstruse. For example, the EU-proposed pilot regime imposes that “the number of DLT transferable securities recorded on the DLT MTF equals the total number of such DLT transferable securities in circulation on the digital ledger technology at any given time.”⁴⁵ That particular rule actually means that in case the MTF manages customer individual attributions off-chain while storing aggregated crypto assets on a single omnibus wallet on-chain, then it must check that the sum of the former equals the latter. The obscure wording is here again due to a reluctance to define the wallet by its name.

The Swiss Federal Council felt that the technology-neutrality principle had its limits. To them, the introduction of a new DLT-specific market infrastructure constitutes “an appropriate derogation from the principle of technological neutrality. Such a technology-specific approach also has the added merit of leaving the regulation of existing capital market infrastructures unchanged.”⁴⁶ The European Banking Authority’s FinTech Knowledge Hub wants “to foster technological neutrality in regulatory and supervisory approaches on an ongoing basis.”⁴⁷ The implementation of the technology-neutrality principle thus reveals a cognitive bias: if the legacy legal framework is used as the basis for amendments, the new legal framework is rather skewed toward legacy technologies than actually neutral.

Applied literally, the technology-neutrality principle would leave some issues unaddressed. By this standard, Bitcoin, which is technology specific and has no functional equivalent, would remain unregulated. It would be difficult to punish ill-conduct on an unnamed object, like, for instance, urging Europe to fight against laundering through Bitcoin⁴⁸ while MiCA makes a point of not mentioning Bitcoin in its taxonomy of crypto assets. Not a word would describe

44 Ordonnance No. 2017-1674 du 8 décembre 2017 relative à l’utilisation d’un dispositif d’enregistrement électronique partagé pour la représentation et la transmission de titres financiers.

45 [2020] COM/2020/594 final (n 35), art. 4(2)(b).

46 Swiss Federal Council, «Message relatif à la loi fédérale sur l’adaptation du droit fédéral aux développements de la technologie des registres électroniques distribués (FF 2020 223)» (Swiss Federal Council, 27 November 2019), 40 <<https://www.fedlex.admin.ch/eli/fga/2020/16/fr>>.

47 European Banking Authority, “FinTech Knowledge Hub” (EBA) <<https://eba.europa.eu/financial-innovation-and-fintech/fintech-knowledge-hub>> accessed 7 November 2020.

48 Reuters Staff, “ECB’s Lagarde calls for regulating Bitcoin’s ‘funny business’” (Reuters, 13 January 2021) <<https://www.reuters.com/article/us-crypto-currency-ecb-idUSKBN29H1B1>>.

how to safekeep private keys. Suitability and appropriateness tests protecting investors would not be modified to address technology-specific risks. Investors would be recognised no rights over tokens created by a ‘fork’, a DLT-specific function. Simultaneous securities delivery against settlement would apply in whatever configuration, specifically *fiat* currency against security tokens, or payment tokens against book-entry securities. Refraining from drafting technology-specific provisions to deal with new operational risks may thus come at the expense of the requirements of financial security and investor protection.⁴⁹

Too much neutrality in regulation will confer as much discretionary power on supervisors or judges. As Professor Koops had concluded, “regulation should be as much technology-neutral as is compatible with sufficient legal certainty.”⁵⁰

Another risk is to forfeit DLT-specific benefits and jeopardise the profitability of investing in DLT. There would be no self-custody of security tokens as this does not exist for book-entry securities. They would be traded over trading venues born from a previous technology era and their transactions recorded by a central securities depository. Multiple interfaces between legacy and DLT-based technologies would have to be developed, for every single processing step, and raise as many interoperability issues. A large part of additional developments would have to be conducted off-chain, and investment firms, sole eligible operators, may not see a return on such an investment. Law may be indifferent to technology, but economics of DLT is not indifferent to law. If, to comply with law, DLT should cost the same as conventional IT, why invest in it?

3.3 *Implications for PIL*

The technology-neutrality principle already has its limits on PIL. In the EU, a person domiciled in a Member State may be sued in another Member State, among other cases, “in matters relating to tort, delict or quasi-delict, in the courts for the place where the harmful event occurred or may occur.”⁵¹ In some defamation cases, CJEU jurisprudence suggests that technology determines the place where a harmful event may occur: for a print publication,

49 See Bruno Mathis, “Régulation des crypto-actifs : la Suisse vise la neutralité technologique” (*HAL ESSEC*, 5 November 2020) <<https://hal-essec.archives-ouvertes.fr/hal-0299122/document>>.

50 Koops (n 1).

51 Regulation (EU) No 1215/2012 of the European Parliament and of the Council of 12 December 2012 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters, [2012] OJ L351/1, art. 7(2) (“Brussels I bis”).

where this publication is distributed,⁵² for an online one, where the victim has its centre of interests, generally its domicile.⁵³ Assessing connecting factors will be no easier for crypto assets, which are ubiquitous in nature. Where does harm occur when a flaw in a smart contract results in denied, or corrupt, transactions, or when a so-called oracle feeds that smart contract with fake data? While deducing the competent jurisdiction(s) from a breakdown of financial or social damages on a territorial basis may be feasible for online-publishing cases, it might be not for crypto-asset-related ones.

Should a country decide to liken the crypto asset to a tangible, as Germany recently did,⁵⁴ this does not make it easier to locate it, and comply with the traditional *lex rei sitae* principle. Security tokens are akin to securities, so their conflict-of-laws rules could be adapted from those applying to traditional securities. However most other crypto assets, especially Bitcoin and utility tokens, have no functional equivalents in the real world, so that principle is useless for them in the setting of *ad hoc* conflict-of-laws rules.

The UK's Financial Markets Law Committee (FMLC) was first to propose new connecting factors to determine the applicable law, such as the location of any original coder, operator or holder of the private key.⁵⁵ These factors are influenced by the underlying technology, especially the last one, which at least implies the use of an encryption mechanism. These are technology-driven, not technology-neutral proposals. Anyway, the wide variety of operational models makes it difficult to identify and prioritise connecting factors. In the case of an "exogenous" crypto asset, which has a connection with an asset outside the DLT, there might be too many factors to choose from. In the case of a Decentralised Autonomous Organisation (DAO), where any coder, operator or participant is anonymous by design, there might be none at all. The writing

52 Judgment of the Court of 7 March 1995, *Fiona Shevill, Ixora Trading Inc., Chequepoint SARL and Chequepoint International Ltd v Presse Alliance SA.*, Case C-68/93 (ECLI:EU:C:1995:61) ("*Shevill*").

53 Judgment of the Court (Grand Chamber) of 25 October 2011, *eDate Advertising GmbH and Others v X and Société MGN LIMITED*, Joined Cases C-509/09 and C-161/10 (ECLI:EU:C:2011:685); Judgment of the Court (Grand Chamber) of 17 October 2017, *Bolag-supplysningen OÜ and Ingrid IIsjan v Svensk Handel AB*, Case C-194/16 (ECLI:EU:C:2017:766).

54 Gesetz zur Einführung von elektronischen Wertpapieren vom 3. Juni 2021 (BGBl. I S. 1423), art. 1 §2(3). See also Bruno Mathis, «Les crypto-actifs en droit allemand : plus de questions que de réponses» (*Wolters Kluwer*, 2 March 2020) <<https://www.actualitesdudroit.fr/browse/tech-droit/blockchain/26194/les-crypto-actifs-en-droit-allemand-plus-de-questions-que-de-reponses>>.

55 Financial Markets Law Committee, "Distributed Ledger Technology and Governing Law: Issues of Legal Uncertainty" (FMLC, March 2018), §6.16 to §6.24 <http://fmlc.org/wp-content/uploads/2018/05/dlt_paper.pdf> accessed 31 May 2022.

of applicable law rules that tackle such diverse situations will therefore prove inevitably driven by technology. To start with, no rule could provide that the applicable law is that of a party whose location cannot be identified as a result of technology.

In an amended version of the proposal of a regulation on the law applicable to the third-party effects of assignments of claims,⁵⁶ the Council of the EU proposes to cover “claims arising from assets irrespective of the technology used for their issuance, transfer or storage, thus including claims arising out of crypto assets that are not financial instruments.”⁵⁷ This wording recognises the functional equivalence of electronic money as per Directive 2009/110/EC and e-money tokens as per MiCA, and is consistent with the future technology-neutral definition of the financial instrument, as set out by the proposed digital finance package.⁵⁸ The law applicable to the assigned claim would govern the third-party effects of the assignment of claims arising out of crypto assets.⁵⁹ However, the proposed regulation does not say what law would apply when the assigned claim not only arises out of a crypto asset, but is itself recorded on the DLT, linking anonymous participants,⁶⁰ that is, when the law of the assigned claim cannot be determined. It also excludes the assignment of claims represented by a book-entry,⁶¹ a term that reveals some technology legacy rather than technology neutrality. Applying the principle of technological neutrality in the drafting of every single legislative provision therefore seems as tricky for crypto assets as it is for other topics of PIL like defamation.

4 Conclusion

As noted in the introduction, it is striking to note that the question of technological neutrality is raised in countries which have started to legislate or,

56 Council of the European Union, Proposal for a Regulation of the European Parliament and of the Council on the law applicable to the third-party effects of assignments of claims, [2021] 2018/0044(COD), 9050/21.

57 *Id.*, § 16.

58 Proposal for a Directive of the European Parliament and of the Council amending Directives 2006/43/EC, 2009/65/EC, 2009/138/EU, 2011/61/EU, EU/2013/36, 2014/65/EU, (EU) 2015/2366 and EU/2016/2341, [2020] COM/2020/596 final, art. 6(1) adds to the definition of the financial instrument “including such instruments issued by means of distributed ledger technology.”

59 Council of the European Union (n 54), art. 4(2).

60 A crypto-asset may be lent, or pledged, on the DLT, its refund being executed by a smart contract when the loan expires.

61 *Id.*, art. 1(2)(g).

plans to legislate on crypto assets. But the intangible and ubiquitous nature of crypto assets is inescapable, and calls for adequate, technology-specific, responses in both public and private law.

Alternatively, all the jurisdictions adopting instruments dedicated to crypto assets would logically converge toward similar provisions. Technology-specific regulation should ease harmonisation of national laws and increase legal certainty of cross-border crypto-asset transactions. But harmonisation is not what is happening.⁶²

In theory, it is possible to enact technologically neutral laws within each country, or internationally harmonised crypto-asset specific laws, but less easy to achieve technological neutrality and international harmonisation at the same time. And in practice, neither one is likely.

62 Matthias Lehmann, "National Blockchain Laws as a Threat to Capital Markets Integration", 26, *Uniform Law Review*, 148.