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The applicability of property law rules for crypto assets: considerations from civil law and common law perspectives

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ABSTRACT
Crypto assets and their legal qualification hold an important place in the international legal arena. There are many public and private law aspects of crypto assets that require clarification. The first difficulty lies in defining what a crypto asset is. There are many different taxonomies of crypto assets, and these vary globally. Another challenging area which demands attention is whether crypto assets bear the features of objects of 'property' in private law. The answer to this question is important because it affects various areas of law, such as tax law, securities law, insolvency law, contract law, even conflict of laws. This paper focuses on whether and how property law rules should be applied to crypto assets and how the legal nature of crypto assets is embarked upon and handled differently in Common Law and Civil Law Countries.

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KEYWORDS Crypto assets; tokens; property; ownership; corporeality; tangibility

1. Introduction

It has been more than a decade since the Bitcoin protocol was launched, and still there are many questions that call for legal clarification. The legal regime applicable to initial coin offerings and decentralized autonomous organisations (DAOs), the legal nature of crypto currencies, and the validity of smart contracts are examples of these legal uncertainties. Another example calling for legal clarification is the nature of crypto assets. There is no uniform understanding of what a crypto asset is. There are not many clear guidelines or legal definitions. There have been many attempts – on national and international levels – to fulfill this aim but there are not many outcomes yet. There are ongoing debates and developments in countries with civil law systems (especially those in the European Union) and those with common law systems.

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In addition to the legal definition problem, many countries are also struggling with the property character of crypto assets. They are trying to reach a conclusion as to whether crypto assets qualify as objects of property rights. It is very common to hear that someone has become the 'owner' of a token after a blockchain transaction, but does this literally mean that crypto asset transfers on the blockchain influence the property law regime? Given that they do not fall within the traditional definition of 'property' or 'objects of property law', can they be possessed, owned, transferred, sold, gifted, stolen, and/or securitized?[1] It goes without saying that every country has a divergent approach to the concept of property and property law rules. Some jurisdictions have already found ways to formally recognize this new category of property while others have rigid property law regimes and find it difficult to accommodate crypto assets.

The property problem has become even more prominent after the emergence and increase in the transaction volumes of non-fungible tokens (NFTs). The use of NFTs has the potential of representing securities, industrial assets, and real estate, hence exceeding the borders of digital art. Some contend that NFTs are the future of digital property.[2] Because of this promise, many people are deploying funds to the NFT market[3] and it becomes even more inevitable now that property law issues will be brought before the courts frequently.[4]

Civil law countries, especially EU countries, have a huge volume of transactions regarding crypto assets.[5] The European Commission proposed a draft regulation on 'crypto assets' which ignited debates as to how they should be understood and applied.[6] The regulation mainly focuses on the issuance of crypto assets and the provision of crypto-asset services with

[1]See JG Allen, 'Property in Digital Coins' (2019) 8 *European Property Law Journal* 64; S van Erp, 'Ownership of Digital Assets?' (2016) 5 *European Property Law Journal* 73.

[2]C Thompson, 'The Untold Story of the NFT Boom', *New York Times Magazine* (12 August 2021) <www.nytimes.com/2021/05/12/magazine/nft-art-crypto.html> accessed 15 December 2022.

[3]JAT Fairfield, 'Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property' (2022) 97(4) *Indiana Law Journal* 1261, 1279.

[4]In the recent Call for Evidence published by the UK Law Comission, it was stated that although NFTs have characteristics differentiating them from other tokens, it was not necessary to take a different approach with regard to their property character. According to the UK Law Commission NFTs do not 'create novel legal issues that are distinct from crypto-tokens more broadly'. UK Law Commission, *Digital Assets Consultation Paper* <https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/07/Digital-Assets-Consultation-Paper-Law-Commission-1.pdf> (28 July 2022) accessed 15 December 2022, 325.

[5]According to a report, Europe is the largest crypto market in the world accounting for 25% of global crypto activity: 'Europe becomes the world's largest crypto market as UK adoption surges' (28 September 2021) <www.cityam.com/europe-becomes-the-worlds-largest-crypto-market-as-uk-adoption-surges/> accessed 15 December 2022.

[6]After the vote in the European Parliament's Committee on Economic and Monetary Affairs (ECON), on 10 October 2022, Markets in Crypto-assets (MiCA) regulation is approaching the final stages of its legislative approval process. Think Tank European Parliament, 'Markets in crypto-assets (MiCA)' (29 November 2022) <www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)739221> accessed 15 December 2022.

the aim of providing legal clarity to the crypto asset industry. It provides a taxonomy of crypto assets, but it does not provide guidelines on their legal nature.

In most countries with civil law systems, there is no legislative instrument that directly defines or addresses the legal nature of crypto assets at a national level. The main problems for the civil law countries are classifying crypto assets within the existing framework of 'rights' and determining the legal nature of the relationship between a crypto asset and its bearer. How crypto assets and their transfers are going to be dealt with legally depends first on whether a crypto asset is a legal object, and if it is, what kind of a legal object it is.[7] Can crypto assets be regarded as objects of property? Can there be absolute or relative rights established on them? Or can they be classified as a claim, a security, or a negotiable instrument? Finally, can crypto currencies, being a type of crypto asset, be regarded as money or legal tender? In civil law countries there is a tendency to address these questions by resorting to and strictly adhering to traditional property law rules and concepts.

In common law countries, there are also uncertainties when it comes to the legal nature of crypto currencies and other crypto assets, especially from a private law perspective. A very common use is that when a crypto asset is transferred on the blockchain, the other party to the transaction, 'the recipient' (who has a control of a private key), becomes the 'owner'.[8] There have been doubts as to whether this usage is in accordance with property law rules. Yet despite this initial stage of hesitation, common law systems have handled the property issue in a more dynamic way. In three major cases (in the UK, Singapore, and New Zealand), court decisions have accepted that crypto assets can be conceptualized as (objects of) property.

This paper will examine which approach – common law or civil law – promotes the protection of the rights and interests of the parties, considering the characteristics of blockchain transactions and what the blockchain revolution aims to achieve. The paper will unfold in the following way: First, there will be some discussions on the term 'crypto asset'. Second, the concepts of 'property', 'property rights', and 'the applicability of property law rules' will be dealt with. Third, an overview of the legal framework in civil law countries will be provided, with a special focus on Switzerland, Germany, and Turkey as well as France, Liechtenstein, Italy, Austria, and the Netherlands. Fourth, an overview of the legal framework in common law countries will be presented with a focus on the USA, the UK, New

[7]HC von der Crone, FJ Kessler and L Angstmann, 'Token in der Blockchain – privatrechtliche Aspekte der Distributed Ledger Technologie' (2018) *Schweizerische Juristen Zeitung* 337, 338.

[8]M Lehmann, 'Who Owns Bitcoin? Private Law Facing the Blockchain' (2019) 21 *Minnesota Journal of Science, Law and Technology* 93, 101; D Fox, 'Cryptocurrencies in the Common Law of Property' in D Fox and S Green (eds), *Cryptocurrencies in Public and Private Law* (OUP Oxford, 2019), 139.

Zealand, and Singapore. Fifth, a synthesis of our findings from the countries that we focused on will be provided. Our paper will conclude with reflections on the approaches endorsed by both legal systems.

2. Terminology: what to understand by crypto assets?

It is a well-known phenomenon that blockchain technology is not limited to crypto currencies but supports the use of a broad range of applications. Blockchain has opened the doors to the creation, storage, tracking, and transferring of rivalrous, intangible property.[9] In recent years, a wide variety of virtual units of value has been created on the blockchain, namely, 'tokens'. Tokens are entries in a distributed ledger database that are exclusive and unique and cannot be reproduced.[10] Rights and assets are represented on the blockchain with the use of tokens. Real world or virtual assets can all be tokenized.[11] Blockchain users access, control, and dispose of their tokens through private keys, a unique string of computer code.[12] It should be highlighted that the private key itself is not the asset:

> The asset is a sequence of computer code to which all the computers that participate in the particular cryptocurrency have access, and which all the other participants recognise as having a value that they are willing to trade. They accord it a value not because it is underwritten by any tangible assets or any authority, but because the technology that it is a part of is trusted as being sufficiently robust and reliable.[13]

Some tokens are created by an initial coin offering, some by miners, and some by people who would like to tokenize their assets.[14] One should clarify that the term crypto assets can be used interchangeably with the term (crypto) tokens. Tokens and coins are both crypto assets.[15] In this paper, we will refer to them all as crypto assets.

[9]JAT Fairfield, *Owned: Property, Privacy, and the New Digital Serfdom* (Cambridge University Press, 1st edn 2017) 166.

[10]AJF Lukas, 'Blockchain Tokens from the Perspective of German Civil Law: An Updated View' (2020) <https://ssrn.com/abstract=3526887> accessed 15 December 2021, 4.

[11]P Çağlayan Aksoy and Z Özkan Üner, 'NFTs and Copyright: Challenges and Opportunities' (2021) 16(10) *Journal of Intellectual Property Law & Practice* 1115, 1117.

[12]J Bacon and others, 'Blockchain Demystified: A Technical and Legal Introduction to Distributed and Centralised Ledgers' (2018) 25(1) *Richmond Journal of Law and Technology* 1, 84.

[13]G Cooper, 'Virtual Property: Trusts of Cryptocurrencies and Other Digital Assets' (2021) 27(7) *Trusts &Trustees* 622, 624.

[14]RM Garcia-Teruel and H Simon-Moreno, 'The Digital Tokenization of Property Rights. A Comparative Perspective' (2021) 41 *Computer Law & Security Review* 1, 2.

[15]*A cryptographic asset might be described as either a "token" or a "coin". The difference is based on the asset's functionality but, in practice, the terms can be used interchangeably, because no universally accepted definition of either exists. Currently, the term "coin" generally refers to a cryptographic asset that has the express purpose of acting solely as a medium of exchange, while the term "token" refers to an asset that gives the holder additional functionality or utility*. See, R Leopold and P Vollmann, 'Cryptographic Assets and Related Transactions: Accounting Considerations under IFRS' (December 2019) <www.pwc.com/gx/en/audit-services/ifrs/publications/ifrs-16/cryptographic-assets-related-

Crypto assets should be distinguished from digital assets.[16] Crypto assets are a type of digital asset that are created by platforms that build on top of other blockchains. Some digital assets use the distributed ledger technology while others do not.[17] The category of 'digital assets' is broader than that of 'crypto assets'. Digital assets are not new and not an outcome of the blockchain revolution since they refer to intangible assets created, stored, and traded digitally.

Crypto currencies are also not synonymous with crypto assets. They are both decentralized mediums of exchange and they both use cryptographic signatures; they both hold value. However, some crypto assets have economic value in themselves, which is based solely on trust in their tradability and their intrinsic value (so-called native tokens, e.g. crypto currencies).[18] Crypto currencies are a native, manmade representation of value whose movements are tracked on a blockchain record within a crypto-economic system.[19] Examples of crypto currencies include Bitcoin, Ether, Tether, and Cardano. Apart from the payment or exchange function, crypto assets can also represent physical assets, utility, or service. Crypto assets can be linked to legal objects (e.g. property, a claim, a membership right, or a book effect) in such a way that the transfer of the crypto asset on the blockchain is also accompanied by a transfer of the associated legal object.[20] All in all, it can be concluded that crypto assets constitute a broader category.

There is no unified global understanding or categorization of crypto assets. According to a report published by the OECD, *despite a plethora of literature and regulatory action on DLT-based assets, it appears that there is not a shared understanding among jurisdictions*.[21] It is important to have a common system of categorization since *it provides a unified view and enables better understanding, communication, and management of a diverse*

transactions-accounting-considerations-ifrs-pwc-in-depth.pdf> accessed 15 December 2021. Also see Deloitte, 'Are Token Assets the Securities of Tomorrow?' (2019) <www2.deloitte.com/content/dam/Deloitte/lu/Documents/technology/lu-token-assets-securities-tomorrow.pdf.> accessed 15 December 2022, 8.

[16]The property rights in digital files such as electronic documents, e-mails, photographs and the like have already been an issue of debate even before the emergence of crypto assets. It is generally accepted that digital files should not be treated like mere information which is not regarded as property. In contrast with pure information, digital files are more readily definable and identifiable by third parties and separable at least in theory. JD Michels and C Millard, 'The New Things: Property Rights in Digital Files' (2022) 81(2) *Cambridge Law Journal* 323, 329, 332 354.

[17]JG Allen, 'Cryptoassets in Private Law' in Iris H-Y Chiu and Gudula Deipenbrock (eds), *Routledge Handbook of Financial Technology and Law* (Routledge, 2021) 309.

[18]S Zogg, 'Bitcoin als Rechtsobjekt- eine zivilrechtliche Einordung' (2019) *Recht Zeitschrift für juristische Weiterbildung und Praxis* 95, 95.

[19]A Walch, 'Testimony Before the United States Senate Committee on Banking, Housing, and Urban Affairs Hearing on Cryptocurrencies: What are They Good for?' (27 July 2021) <www.banking.senate.gov/imo/media/doc/Walch%20Testimony%207-27-21.pdf> accessed 15 December 2021.

[20]Zogg (n 19) 95.

[21]OECD Regulatory Approaches to the Tokenisation of Assets, OECD Blockchain Policy Series, 2021 <www.oecd.org/finance/Regulatory-Approaches-to-the-Tokenisation-of-Assets.htm> accessed 15 December 2021, 30.

collection of entities or objects and facilitates the handling of new and evolving additions as they appear.[22] Legal taxonomy is also crucial in the sense that the stakeholders and participants can reach a level of clarification to find ways to mitigate risks and regulate this developing system.[23]

Since the crypto asset activities take place on a global level (cross-border transactions), it is important to reach globally accepted standards to reduce confusion and conflict. These standards are indispensable to achieving common goals of consumer protection, financial stability, interoperability, security, and responsible technological innovation.[24] Moreover, a unified system could enhance competition by developing a rule-based level playing field.[25] When there is no common system of categorization, the regulation and management of crypto assets becomes more difficult. If a consensus cannot be reached on the definition and classification of crypto assets, a well-functioning and harmonized regulatory framework cannot be established, which would result in a regulatory arbitrage.[26]

Although crypto assets are widely used in transactions in many countries, it can easily be seen that currently crypto asset issuers, service providers and markets are weakly regulated. This means that activities and practices can take place in the crypto asset ecosystem, that would not be allowed in traditional, regulated financial markets. However, there are some efforts worth mentioning. In the EU, the MiCA Proposal includes the definition of a crypto asset[27]: In Article 3 (a), a crypto-asset is described as a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology. This is an example of a broad definition of a crypto asset. It is worth mentioning that MiCA does not cover the legal nature of crypto assets in terms of property law.

In 2017, Belarus adopted a presidential decree which contains the definition of a (crypto) token. According to this act, a token is a record in

[22] JG Allen and others, 'Legal and Regulatory Considerations for Digital Assets' (Report for Cambridge Center for Alternative Finance) <www.jbs.cam.ac.uk/wp-content/uploads/2020/10/2020-ccaf-legal-regulatory-considerations-report.pdf> accessed 15 December 2022, 10.

[23] J Lee, 'Law and Regulation for a Crypto-Market Perpetuation or Innovation?' in D Fox and S Green (eds), *Cryptocurrencies in Public and Private Law* (OUP Oxford, 2019) 356. Also see, P Bains, A Ismail, F Melo and M Sugimoto, 'International Monetary Fund Fintech Notes Regulating the Crypto Ecosystem The Case of Unbacked Crypto Assets' <www.imf.org/en/Publications/fintech-notes/Issues/2022/09/26/Regulating-the-Crypto-Ecosystem-The-Case-of-Unbacked-Crypto-Assets-523715> accessed 15 December 2022, 1, 11.

[24] B Hemenway Falk and S Hammer, 'A Comprehensive Approach to Crypto Regulation' forthcoming in the *University of Pennsylvania Journal of Business Law*, Draft Working Paper, <https://ssrn.com/abstract=4245285 or https://doi.org/10.2139/ssrn.4245285> accessed 15 December 2022, 13.

[25] Lee (n 23) 358.

[26] JG Allen and RM Lastra, 'Towards a European Governance Framework for Cryptoassets' (2019) 110 SUERF The European Money and Finance Forum Policy Note, 1, 6.

[27] See Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937 (known shortly as 'MiCA'), which aims at establishing legal certainty in the European Union by classifying crypto assets and introducing guidelines for service providers and issuers dealing with crypto assets.

blockchain or other distributed information system that certifies that the owner of such token has a right to a certain object of civil right or which performs a function of crypto currency. According to Article 128 of the Civil Code of Belarus, objects of civil rights include tangible things (including money and securities), other property (including property rights), work and services, undisclosed information, results of intellectual activity including the exclusive rights to them (intellectual property), and non-tangible values. Considering the breadth of this list of objects together with the newly accepted definition of token, almost any object can be 'tokenized'. Consequently, disposal on these objects is subjected to the special legal regime of the token created by the presidential decree.[28]

In a call for evidence titled 'UK Regulatory Approach to Cryptoassets and Stablecoins' which represents the first stage in the government's consultative process with industry and stakeholders on the broader regulatory approach to crypto assets and stablecoins, crypto assets were defined. According to this consultation document, crypto assets were defined as *a digital representation of value or contractual rights that can be transferred, stored or traded electronically, and which may (though does not necessarily) utilize cryptography, distributed ledger technology or similar technology*.[29]

Parallel to the search for definition, a lot of effort is being put into trying to categorize crypto assets according to the function they fulfill.[30] If a crypto asset is used as a digital means of payment or exchange, it is generally named a 'payment token' or 'crypto currency'. If a crypto asset serves for an investment purpose, then it is named an 'investment token', 'equity token', or 'security token' depending on the characteristics of that specific token and the recognition by the country. Finally, if crypto assets grant the holders access to utilities or services, they are known as 'utility tokens'.[31] With the focus on stable coins, some make a taxonomy of crypto assets as unbacked crypto assets (Bitcoin, Ether, etc.), utility tokens that provide an access to a product or service, security tokens that provide rights like that of a security and stable coins (Binance USD, USD Coin etc.).[32]

[28]A Savalyev, 'Some Risks of Tokenization and Blockchainizaition of Private Law' (2018) 34 *Computer Law & Security Review* 863, 865.

[29]'UK regulatory approach to cryptoassets and stablecoins: Consultation and call for evidence', (Report published online on January 2021) <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/950206/HM_Treasury_Cryptoasset_and_Stablecoin_consultation.pdf> accessed 15 December 2022.

[30]For a taxonomy of tokens see Lee (n 23) 359.

[31]V Ferrari, 'The Regulation of Crypto-Assets in the EU-Investment and Payment Tokens under the Radar' (2020) 27(3) *Maastricht Journal of European and Comparative Law* 325, 327.

[32]P Bains, A Ismail, F Melo and M Sugimoto, Fintech Notes Regulating the Crypto Ecosystem The Case of Unbacked Crypto Assets, Note 2022/007 International Monetary Fund (2022) <www.imf.org/en/Publications/fintech-notes/Issues/2022/09/26/Regulating-the-Crypto-Ecosystem-The-Case-of-Unbacked-Crypto-Assets-523715> accessed 15 December 2022, 1, 11–12.

It should be noted that these taxonomies are not universally valid. Moreover, although crypto assets are categorized according to the functions they fulfill and the rights they provide their holders, it does not help pinpoint why it is legally challenging to position crypto assets in private law.[33] Likewise, *these tri-partite taxonomies do not always do justice to the technical and economic differentiators of the crypto asset in question, or the relevant legal landscape on top of which those regulations operate*.[34]

The world of crypto assets and their categorization has become even more complicated since the rise of non-fungible tokens in the beginning of 2021. As mentioned above, there are ongoing efforts to classify tokens and another criterion for classification is the 'fungibility' of the token. In contrast to fungible tokens (such as crypto currencies), which are interchangeable with or equal to another asset of the same category, non-fungible tokens are unique and cannot be replaced. The growing number and volume of NFT transactions has given rise to a number of issues, especially in the area of intellectual property law.[35]

Providing a regulatory framework for crypto assets has been difficult because every crypto asset is used for different purposes and has a different underlying asset. For instance, a crypto asset might represent a share, a bond, a commodity, goods and services, collectible items, or land. Because we are dealing with an evolving technology, most countries have endorsed a 'wait-and-see approach' to take further legislative action rather than creating a new legal regime for crypto assets. However, it is worth noting that due to the *the intangibility and centralization of the internet and digital and information technologies … property ownership as we know is under attack and fading fast*.[36] This means that the time allocated for the 'wait-and-see approach' has almost reached its limits.

3. The concepts of 'property', 'objects of property rights', and 'the applicability of property law rules'

When observed from an economic point of view, crypto assets can be used to make business transactions. They are regularly assigned a monetary value in the market. However, this fact alone is not enough to accept them as legal objects. Especially in the civilian tradition, only certain things – sometimes those that are explicitly enumerated by law – can be legal objects.

When discussing property rights such as the ownership of crypto assets, the concept of 'object of property' gains importance. The characteristics of property (i.e. which objects can be conceptualized as objects of property)

[33] Allen (n 17) 312.
[34] Allen and Lastra (n 26) 6.
[35] Çağlayan Aksoy and Özkan Üner (n 11) 1120 et seq.
[36] Fairfield (n 9) 13.

change from country to country. Some countries have a strict understanding of what things bear the characteristics of property; some are flexible. In common law countries, the question is whether crypto assets are property. The term property is used to describe both a thing (i.e. the thing itself is property) and a claim or entitlement to that thing. In civil law systems, the question becomes whether crypto assets are objects of property rights.[37] Therefore, the term property describes the relationship between a person and a thing (i.e. objects of property rights).[38]

In the next section, we will provide a framework of how the rules of property law are applied to crypto assets in both the civil law and the common law system. We will focus on how certain jurisdictions approach the concept of 'property'. However, it can be highlighted from the beginning that the main problem with accommodating crypto assets in property law is the lack of physicality (tangibility): Digital assets are comprised of abstractions of ones and zeroes, which exclude them from being *a prototypical image of property*.[39] If someone has an amount of Bitcoins, they actually only have a private cryptographic key and cryptographic keys are, in the end, information.[40] Having no physical boundaries, they cannot be possessed in the traditional sense.[41] Although they can form a part of a patrimony, they are not corporeal objects. This is why, most of the time, it is problematic to classify them as objects of property and apply the traditional rules of property to transactions done with crypto assets. The fact that the characteristics of different crypto assets vary from one to another does not help either. One cannot make the same assessment for crypto currencies (as payment tokens) as with security tokens or asset tokens.

There might be some hesitation as to why property rules are needed when we have a decentralized ledger, which functions precisely as the parties have designed in code. It should be borne in mind that code does not replace law, so the underlying blockchain technology does not exclude the application of legal rules when something goes wrong with the transaction.[42] *The*

[37] Allen (n 17) 313.
[38] Law Commission (n 3) 14.
[39] J Marinotti, 'Tangibility as Technology' (2021) 37 *Georgia State University Law Review* 671, 678.
[40] KFK Low & EGS Teo, 'Bitcoins and Other Cryptocurrencies as Property?' (2017) 9(2) *Law, Innovation and Technology* 235, 247. Information is not accepted as an object of property since it is not easy to link an information exclusively to somebody. However, the information in cryptocurrencies, as well as crypto assets, can be understood as something more than the information itself. Some authors claim that crypto coins, although they consist in information can be an object of property if they serve as a means of payment and stores of nominal value. Fox (n 8) 139.
[41] D Carr, 'Cryptocurrencies as Property in Civilian and Mixed Systems' in D Fox and S Green (eds), *Cryptocurrencies in Public and Private Law* (OUP Oxford, 2019) 177, at 186: *Possession is important because many property law (and some unjustified enrichment) rules rely upon an act or state of possession to be engaged. If there is to be no possession of incorporeal cryptocurrencies, then there are unlikely to be any questions of acquisitive prescription, possessory remedies or liabilities for the bona fide possessor applying to them*.
[42] M Lehmann, 'National Blockchain Laws as a Threat to Capital Markets Integration' (2021)16(1) *Uniform Law Review* 147, 156.

irreversibility of cryptocurrency transactions, in a purely technological sense, need not bar the reversal of their legal effect or the recognition that they are legally defective.[43] What happens if a crypto asset of any kind is transferred by one party to another by mistake or under duress? Or the crypto asset transfer contract was null and void due to incapacity? Who owns the transferred assets? How can a transfer be reversed in the case of a mistake or fraud? What happens in the case of death or bankruptcy of the crypto asset holder?[44] What are the legal consequences if the code is hacked, and the crypto assets are stolen?[45] The right of a token holder can be violated by anyone that steals tokens from the holder's wallet, which shows that crypto assets need to be protected universally.[46]

Although there can be some problems in practice, such as identifying the other party (to bring them to court) and finding the applicable law, legal rules are still applicable to resolve these kinds of disputes. It is obvious that the emergence of Bitcoin is based on an intention to create an autonomous system that is immune to legal interference.[47] However, the intervention of legal rules is inevitable. But which legal rules will be applied? Are traditional property law rules applicable to crypto asset related disputes? Is the right of a token holder an *erga omnes* right or a right *ad personam*?[48] Can we apply property law rules to maintain the *status quo ante*, like by pursuing *rei vindicatio*?

All these questions are answered both in common law countries and civil law countries by resorting to private law rules. Therefore, it is essential to determine the private law character of crypto assets.[49]

[43] D Fox (n 8) 141.

[44] Lehmann (n 8) 97.

[45] 'The DAO Attacked: Code Issue Leads to $60 Million Ether Theft' (News Article in Coin Desk, 2016) <www.coindesk.com/markets/2016/06/17/the-dao-attacked-code-issue-leads-to-60-million-ether-theft/ > accessed 15 December 2022.

[46] Savalyev (n 28) 868.

[47] D Fox (n 8) 140. 'In their technical operation, cryptocurrency systems seem designed to frustrate property law. Systems designed to obscure the claims of strangers to payment transactions, to eliminate the need for adjudication in payment transactions and to hide the real-world identity of the people behind them are not an easy object for traditional rules of property law'.

[48] Savalyev (n 28) 863.

[49] UNIDROIT has also established a Digital Assets and Private Law Working Group with the objective to develop a future legal instrument containing principles and legislative guidance to deal with the private law aspects of digital assets. In August 2022, the draft principles and comments were published. These Principles treat digital assets as having proprietary characteristics, without addressing whether they are considered 'property' under the other law of a State. (Principle 1: Scope). Principle 3(1) provides, as a matter of principle, that the law (as defined under Principle 2(4)) should provide that digital assets can be the subject of proprietary rights. All rules provided in these Principles are built on this premise. However, the principles acknowledge that the question whether digital assets can be the subject of proprietary rights has been controversial in several jurisdictions: 'As courts in multiple high profile cases have considered that digital assets are the subject of proprietary rights, and several authoritative authors have expressed that digital assets should be the subject of proprietary rights, *these Principles advise States to increase legal certainty on this issue and make explicit that digital assets can be the subject of proprietary rights*'. (emphasis added by author) UNIDROIT <www.unidroit.org/wp-content/uploads/2022/08/W.G.6-Doc.-2-Master-Copy-of-the-Draft-Principles-and-Comments-clean.pdf> (2022) accessed 15 December 2022.

The answer to these questions is not only crucial for defining the applicable remedies, but also when deciding which rules will be applied to bankruptcy proceedings. The clarity of the legal nature of crypto assets would also shed light on other fields of law, such as private international law, tax law, or capital markets law. Moreover, if crypto assets are to become one of the core elements of the digital economy, like smart contracts, a uniform approach regarding its legal regime is critical.[50] It is claimed that one of the main barriers before the regulation of smart contracts is the legal uncertainty surrounding the nature of crypto assets.[51]

4. Overview of the legal framework in civil law countries

> The "property problem", we think, has the potential to create significant divergences in practice in the legal treatment of crypto assets across Europe, even assuming common definitions.[52]

In the civilian legal tradition, legal objects are subjects of either absolute or relative rights. A crypto asset is only a legal object if it can be characterised as an object of an absolute or relative right.[53] Absolute rights can be asserted to everyone and must be respected and honored by all other legal subjects.[54] Relative rights, on the other hand, can be directed *only* to one or more determinate parties.[55] This means that only the persons who are under an obligation can violate relative rights. The most important and common relative right is the obligation.

The most significant absolute rights are real rights (*rights in rem*). Real rights are established on (objects of) property, and they can be invoked against everyone (*erga omnes*).[56] This is what makes them different from, for example, claims, which can only be asserted against someone who is under a relevant legal obligation. Ownership, which is the most comprehensive real right (*right in rem*), gives its holder the right to use, control, enjoy, and even destroy (dispose of) the object. Someone who has *a right in rem* can demand all other persons to refrain from interfering in the enjoyment of that right.[57] There are also limited real rights (*limited rights in rem*), such as usufruct, servitude, pledge, etc.

[50] Savalyev (n 28) 867.
[51] Sir Geoffrey Vos, 'End-To-End Smart Legal Contracts Moving from Aspiration to Reality' in Jason Grant Allen and Peter Hunn (eds), *Smart Legal Contracts: Computable Law in Theory and Practice* (Oxford University Press 2022) 54, 59.
[52] Allen and Lastra (n 26) 6.
[53] Von der Crone, Kessler and Angstmann (n 7) 339.
[54] B Graham-Siegenthaler and A Furrer, 'The Position of Blockchain Technology and Bitcoin in Swiss Law' (2017) Jusletter [47].
[55] E Bucher, *Das subjektive Recht als Normsetzungsbefugnis* (Mohr Siebeck, Tübingen 1965) 131–32.
[56] For a detailed analysis on rights *in rem* and how they are different from right *in personam* see, C Webb, 'Three Concepts of Rights, Two of Property' (2018) 38 *Oxford Journal of Legal Studies* 246.
[57] Savalyev (n 28) 866.

In the Civilian tradition, the principle of *numerus clausus* is endorsed both regarding the number and content of property rights and the objects related to those property rights.[58] This means that only the enumerated rights can be regarded as *rights in rem* and only a certain number of things can be objects of *rights in rem*. Therefore, it is challenging to include newly emerging concepts as objects of property rights. This challenge is not specific to crypto assets. It can also be seen in the emergence of intellectual property: In many countries, intellectual property law could not fit into the existing framework of objects of property law and had to develop as a separate legal area, next to, but distinct from property law.[59] As Sjef van Erp put it, *the creative products of the human mind just did not fit in the world of "real" things*.[60]

The main difficulty for civil law countries in conceptualizing crypto assets as objects of real rights is, the fact that crypto assets are intangible and lack corporeality. Crypto assets only exist as digital book entries in a virtually distributed ledger. They are not corporeally manifested or an incorporeal right. Therefore, crypto assets lie in the category of intangible/incorporeal objects.[61] They can be transferred between accounts and their transfer can be controlled by cryptographic keys. However, *controlling the transferability of a thing is not exactly the same as saying that there are property rights in that thing as traditional civilian property theory requires*.[62] Thus, many civil law countries have the tendency not to recognize purely intangible objects, such as crypto assets, as objects of real rights.[63] Consequently, it is problematic to establish ownership or *limited rights in rem* on crypto assets. There is another option to define them as a claim, but this view does not receive full support because the circle of creditors cannot be determined in the blockchain.

All in all, some civilian countries struggle to accommodate crypto assets in the realm of private law. Accordingly, crypto assets are a challenge to the traditional understanding of property rights. In this part of our study, we will give examples from some civil law countries which demonstrate this challenge.

[58]S van Erp, 'Ownership of Data The Numerus Clausus of Legal Objects' (2017) *Maastricht European Private Law Institute Working Paper* Nr. 2017/6 <https://ssrn.com/abstract=3046402> accessed 15 December 2022; Carr (n 41), 181.

[59]Van Erp (n 58) 239. CG Paulus, 'The German BGB: What Needs to Be Changed and Why' in M Graziadei and L Zhang (eds), *The Making of the Civil Codes* (Ius Gentium: Comparative Perspectives on Law and Justice, 104) (Springer, 2023) 249, 254.

[60]Van Erp (n 58) 239.

[61]M Bashkatov and others, 'A Comparative Analysis on the Current Legislative Trends in Regulation of Private Law Aspects of Digital Assets' (2019) University of Aberdeen School of Law Working Paper Series 004/19 <www.abdn.ac.uk/law/documents/A%20Comparative%20Analysis%20on%20Current%20Trends_%20working%20paper> accessed 15 December 2021, 2.

[62]Carr (n 41) 182.

[63]Allen and others (n 22) 21–22.

4.1. German law

In Germany a separate law or regulatory framework designated for crypto assets does not exist. Some crypto assets may fall under the laws regarding capital markets, banking, financial services, and anti-money laundering. Crypto assets are defined in the German Banking Act (Kreditwesengesetz-KWG) as financial instruments. In Section 1, para. 11, sentence 4 of KWG, crypto assets are defined as 'digital representations of a value that has not been issued or guaranteed by any central bank or public body and does not have the legal status of a currency or money, but is accepted by natural or legal persons as a means of exchange or payment or serves investment purposes on the basis of an agreement or actual exercise and which is transmitted electronically, can be stored and traded'. In Germany emphasis has been placed on the specific design of the tokens and therefore they should be assessed on an individual case-by-case basis.[64]

Germany has a very restrictive system regarding the definition of property.[65] According to §90 BGB titled *Concept of Thing* (in German: '*Sache*'), only corporeal 'things' are objects of property as defined by law. Incorporeal 'objects' (*Gegegenstände*) that are not 'things' cannot be the object of ownership.[66] Property should be individualizable and eligible for the exercise of legal power. One can conclude that rights can be established on physical objects, claims, and a limited number of immaterial goods, such as work, design, or inventions.

Crypto assets, on the other hand, consist of a data set. Since they have no physicality despite the storage of the transaction history and the private key on a data carrier, they do not have any material existence.[67] Therefore, German law does not allow for the classification of crypto assets as things. Since crypto assets are not things under § 90 BGB, a right of ownership cannot be established on them according to §903 BGB,[68] which defines the powers of the owner as *The owner of a* ***thing*** *may, to the extent that a statute or third-party rights do not conflict with this, deal with the thing at his discretion and exclude others from every influence*. Although they are not regarded as things under the law, they can still be treated as objects in contracts.[69]

[64]BaFin Notice of 20 February 2018 (WA 11-QB 4100-2017/0010), emphasising that terminology is not decisive.

[65]Paulus (n 59) 254: *Unfortunately, however, these drafters have chosen the narrowest translation of res and have, thus, by restricting things to corporeal objects such as a book or a real estate (but not a receivable, let alone an immaterial right), confined the applicability of the Sachenrecht (i.e., the German law of property), respectively, to regulating only such "things". Accordingly, the rules on property are reserved for corporeal things*.

[66]Allen (n 17) 315.

[67]L Shmatenko and S Möllenkamp, 'Digitale Zahlungsmittel in einer analog geprägten Rechtsordnung' (2018) 21 (8) *MMR Multimedia und Recht*, 495, 496.

[68]A Filmann, 'German Law Aspects of Crypto Assets' (2020) 10 *National Law Review* <www.natlawreview.com/article/german-law-aspects-crypto-assets> accessed 15 December 2021.

[69]F Wegener, 'Die Rechtsnatur von Krypto-Token – Einordnungsversuche im Zivilrecht' (2021) 1 *Cologne Technology Review and Law* 44, 45–46.

There are some views as to a teleological extension of §90 BGB which would extend its wording regarding the meaning and purpose of the norm. However, it is also underlined that crypto currencies – as well as crypto assets – still exist solely as virtual records of transactions in the blockchain.[70] Therefore, even a wide interpretation would not allow for crypto assets to be regarded as things in terms of §90 BGB.

As for crypto currencies, they are not recognized by the German state as money; neither the crypto currency itself nor its currency units can be owned.[71] According to prevailing opinion, crypto currencies do not constitute claims because they only serve currency purposes; they do not give their holders rights or claims, and they do not exist in an embodied form, such as cash.[72] Crypto currencies are not protected as intellectual property rights according to German law.[73]

Germany enacted the 'German Electronic Securities Act' (Gesetz zur Einführung elektronischer Wertpapiere – eWpG) on June 9, 2021, which is based on electronic securities in general and 'crypto negotiable documents' in particular. The law maker aimed to increase the attractiveness of the German capital market and competitiveness of Germany in the race to attract capital. The most striking aspect of the Law is that electronic negotiable documents are defined as 'things' in accordance with § 90 of the German BGB. Therefore, data is for the first time classified as a 'thing' under (§ 2 f. 3 eWPG), even though it is not corporeal (§ 2 f. 3 eWPG). Electronic securities transfers will be governed by the provisions of the BGB regarding property.[74] This also means that protection mechanisms regarding real rights can also be applied to crypto assets, especially in the event of bankruptcy.

Recently the president of BaFin (Germany's financial market regulator) stated that it was time for serious cryptocurrency regulation. He also underlined the importance of reaching not just a European solution but a worldwide solution.[75]

4.2. Swiss law

There is no exact definition of property in the Swiss Civil Code (Zivilgesetzbuch – ZGB). What constitutes property and what does not have been

[70] Shmatenko and Möllenkamp (n 67) 3.
[71] Ibid.
[72] A Weiss 'Zivilrechtliche Grundlagenprobleme von Blockchain und Kryptowährungen' (2019) *JuS* 1050, 1054.
[73] Weiss (n 72) 1054; Shmatenko and Möllenkamp (n 67) 3–4.
[74] Federal Financial Supervisory Authority, 'Now also in Electronic form: Securities' (31 August 2021) <www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2021/fa_bj_2107_eWpG_en.html> accessed 15 December 2022.
[75] Thomson Reuters, 'Germany Calls for Global Regulation of Crypto Industry' <www.reuters.com/markets/currencies/germany-calls-global-regulation-crypto-industry-2022-12-14/> (14 December 2022) accessed 15 December 2022.

shaped by the legal literature as well as by court decisions. The same is true for determining what can be regarded as an object of ownership, limited *rights in rem*, and possession.

According to Swiss law, for something to be classified as an object of property it has to be a physical (tangible) object that is separated (distinct) from other things and which can be physically and legally controlled.[76] From this definition, it can be understood that physical separability as well as having a separate economic value is important for being characterised as an object of property. Finally, physicality (or corporeality) is seen as the central criterion for being regarded as an object of property and is fulfilled when there is a tangible object.[77] Some authors underline the fact that the Swiss Civil Code is predominantly leaning toward physically tangible goods.[78]

Regarding controllability, the blockchain infrastructure is sufficient to provide control over crypto assets. It is of common belief that crypto assets meet the requirement of physical separability since transactions with crypto assets are traceable and irreversible.[79] Thus, the problem in classifying crypto assets as objects of property is that they lack corporeality.

There are some objects that are accepted as chattel by the legislature although they do not carry the characteristics expressed above. According to Article 713 of the Swiss Civil Code, chattel ownership relates to movable physical objects and to forces of nature. Swiss law makers have also explicitly subjected other non-physical legal objects to the property law provisions, namely distinct and permanent rights recorded in the land register (Art. 655, Paragraph 2, Item 2, ZGB), mines (Art. 655, Paragraph 2, Item 3, ZGB), co-ownership shares in immovable property (Art. 655, Para. 2, Para. 4 ZGB), and – only for usufruct and pledge – transferable claims and other rights (Art. 745 ff., Art. 899 ff. ZGB).

Since the concept of 'property' is not defined in the Swiss Civil Code, there are some views in the literature that assert that the concept of property should be understood in a functional (and contemporary) way.[80] Functionality of the concept of property and the realities and needs of the digital economy call for the concept of property not to be interpreted narrowly. When one looks at the issue from a functional perspective, intangible

[76] S Wolf and W Wiegand, Vor Art. 641 ff. ZGB in T Geiser and S Wolf (eds), *Basler Kommentar Zivilgesetzbuch II, Art. 457–977 ZGB, Art. 1–61 SchlT ZGB* (Helbing Lichtenhahn Verlag, Basel 2019), [6]; RH Weber, 'Non-Fungible Tokens – A New Legal Phenomenon in the Crypto Universe' (2022) *Zeitschrift für Immaterialgüter-, Informations- und Wettbewerbsrecht* 487, 489.

[77] Wolf and Wiegand (n 76) [10].

[78] B Hürlimann-Kaup, 'Zahlung mit Bitcoins: Zahlung mit Sachen?' in Susan Emmenegger (ed), *Zahlungsverkehr* (Helbing Lichtenhahn Verlag, 2018) 139, 143.

[79] B Seiler and D Seiler 'Sind Kryptowährungen als Sachen im Sinne des ZGB zu behandeln?' (2018) sui-generis 149, 157; Graham-Siegenthaler and Furrer (n 54) [43].

[80] M Eckert, 'Digitale Daten als Wirtschaftsgut: digitale Daten als Sache' (2016) 10 SJZ 245; Seiler and Seiler (n 58) 159 et seq; Graham Siegenthaler and Furrer (n 54) [58].

objects can also qualify as property.[81] The law has already shown a tendency to accept things which have strong functional and structural similarities to physical objects as property.[82] But it should be borne in mind that property, being a technical term, cannot be expanded without limits by resorting to functionality.[83] Accordingly, an object has to fulfill either the basic criteria of 'property' or is to be treated as a 'property' due to special legislation.

In Swiss law, there is an ongoing debate as to whether digital data as well as crypto assets can be objects of property rights. Digital data are capable of being subjected to transactions and can be purchased, used, modified, sold, transferred, and destroyed, just like property.[84] It is without doubt that crypto assets have been objects of transactions for quite some time. Moreover, control over crypto assets can be executed by private keys exclusively, and the decentral, public nature of the ledger can create publicity.[85]

However, the prevailing opinion in Swiss law is that only three dimensional, physical objects can be regarded as property; therefore, crypto assets are not objects of property.[86] There are several reasons for this: First, although the law makers have decided that forces of nature are also subject to movable property law rules, they do not constitute an expansion of the term 'property'. They are only an analogical application of property law rules.[87] Second, the principle of publicity governing *rights in rem* cannot be realized with regard to crypto assets because, although public blockchains (and transactional history) are publicly visible, they do not have an effect on everyone.[88] It is not a complete public record of the legal effects of the transactions.[89] Moreover, while the blockchain can be seen, the actors in the transaction are normally pseudonymous and difficult to unmask. The blockchain transactional history demonstrates a transaction has occurred but does not provide information about the identity of the real-world parties to the transaction.[90] Therefore, it is doubtful whether

[81] Wolf and Wiegand (n 76) [6]; Graham Siegenthaler and Furrer (n 54) [43].
[82] Graham-Siegenthaler and Furrer (n 54) [55].
[83] Hürlimann-Kaup draws attention to the fact that with the principle of functionality, the condition of physicality is not waived; but additional criteria such as economic function, views of the society in general and ethical concerns also need to observed when deciding if something could legally be characterised as 'property'. Hürlimann-Kaup (n 79), 143.
[84] Eckert (n 80) 247.
[85] Seiler and Seiler (n 79) 149; Graham-Siegenthaler and Furrer (n 54) [69]; Carr (n 41) 180.
[86] H Bärtschi and C Meisser 'Virtuelle Währungen aus finanzmarkt- und zivilrechtlicher Sicht' in RH Weber and F Thouvenin (eds), *Rechtliche Herausforderungen durch webbasierte und mobile Zahlungssysteme* (Schulthess, Zurich, 2015), 139 et seq.; M Eggen, 'Was ist ein Token? Eine privatrechtliche Auslegeordnung' (2018) 27(5) *Aktuelle Juristische Praxis* 558, 561; Hürlimann-Kaup (n 78) 142; von der Crone, Kessler and Angstmann (n 7) 339 et seq.
[87] Zogg (n 18) 101 et seq.; Hürlimann-Kaup (n 78) 143.
[88] Wolf and Wiegand (n 55) [19c]. Also see von der Crone, Kessler and Angstmann (n 7) 339–40.
[89] Carr (n 41) 188.
[90] Ibid.

digital data, as well as crypto assets, can be classified as property in the sense of ZGB since they lack corporeality.[91]

Consequently, crypto assets do not carry the necessary characteristics of property and they cannot be held functionally equivalent with property.[92] Ownership and *limited rights in rem* cannot be established on crypto assets because real rights can only be established on tangible objects. This view is shared in a report prepared in 2018 by the Bericht des Bundesrates (Rechtliche Grundlagen für Distributed Ledger- Technologie und Blockchain in der Schweiz). In the report, it is mentioned that due to lack of corporeality, tokens are not objects and they cannot be owned.[93]

Under Swiss law, there are debates as to whether crypto assets can be defined as negotiable instruments. There are some authors who do not support this definition.[94] Some authors accept that crypto assets can be negotiable instruments,[95] whereas others propose an addition to be made to the Code of Obligations to ensure that the definition of negotiable instruments are widened to include crypto assets and that they will be subjected to the same legal regime as negotiable instruments.[96]

Finally, there are some views that support the possibility of accepting crypto assets as claims.[97] There is a system agreement in the DLT-based systems for holding and transferring crypto assets. This agreement regulates how each token is held and transferred. Therefore, a crypto asset represents the holder's claim to the recognition that he/she can use against all other participants in the system. This claim is therefore a legal object that can be qualified as an obligation.[98]

De lege feranda, some authors explained their hope that a supplement be made to Art 713 ZGB, that an exception like this provision is created,[99] or that data ownership is introduced into the law.[100] The realization of any of

[91]F Thouvenin, A Früh and A Lombard, 'Eigentum an Sachdaten, eine Standortbestimmung' (2017) 1 SZW 2017 25, 26; Graham-Sieganthaler and Furrer (n 39) [58]; Bärtschi and Meisser (n 65) 139 et seq; F Piller, 'Virtuelle Währungen – Reale Rechtsprobleme?' (2017) 12 *Aktuelle Juristische Praxis* 1426, 1429; M Hess and S. Lienhard, 'Übertragung von Vermögenswerten auf der Blockchain' (2017) *Jusletter* [39]; von der Crone, Kessler and Angstmann (n 8) 339; RH Weber, 'Überblick über die rechtlichen Rahmenbedingungen für webbasierte und mobile Zahlungssysteme' in RH Weber and F Thouvenin (eds), *Rechtliche Herausforderungen durch webbasierte und mobile Zahlungssysteme* (Schulthess, Zürich 2015) 30. Digital data can *de lege lata* be qualified as property *(res digitalis), see* Eckert (n 80) 249.

[92]Zogg (n 18) 102; von der Crone, Kessler and Angstmann (n 7) 339.

[93]Also see, 'Rechtliche Grundlagen für Distributed Ledger-Technologie und Blockchain in der Schweiz' (Bericht des Bundesrates, Bern, 14 December 2018) <www.newsd.admin.ch/newsd/message/attachments/55150.pdf> accessed 15 December 2021, 48–49.

[94]Von der Crone, Kessler and Angstmann (n 7) 341; Zogg (n 18) 107.

[95]RH Weber and S Iacangelo, 'Rechtsfragen bei der Übertragung von Token' (2018) Jusletter IT [12]; Eggen (n 64) 563.

[96]Hess and Lienhard (n 67) [57].

[97]Von der Crone, Kessler and Angstmann (n 7) 343.

[98]Cf Zogg (n 18) 103.

[99]Seiler and Seiler (n 58) 162.

[100]TG Albert 'Crypto Nation Switzerland – A Legal and Regulatory Overview on Recent Developments' (2018) 33(9) *Journal of International Banking Law and Regulation* 326, 327.

these alternatives was seen an opportunity for Switzerland in the global digital economy. With the enactment of the Federal Act on the Adaptation of Federal Law to Developments in Distributed Ledger Technology on September 25, 2020, which came into force in February 1, 2021, Swiss law makers chose an alternative route for crypto assets. The statute amends various other pieces of legislation such as the Code of Obligations, the Debt Collection and Bankruptcy Act and the Financial Market Infrastructure Act . A new type of security, titled 'the ledger-based security' (Registerwertrechte) in Art. 973d of the Swiss Code of Obligations was regulated. With this recent development, crypto assets are subjected to securities law instead of property law (Art. 973d Swiss Code of Obligations).[101] After DLT law came into force in Switzerland, the lack of a normative property order became less vital in practice. This is due to the fact that, on the transactional level, Art. 973f Swiss Code of Obligations allow for the transfer of crypto assets in the form of ledger-based security. Secondly, according to Art 242a Debt Enforcement and Bankruptcy Act, crypto assets can be surrendered from a bankruptcy estate.[102]

4.3. Turkish law

According to recent research published by Chainalysis, Turkey ranked 12th place in terms of crypto adoption.[103] Turkey, a country which is part of the civil law system and is based on codified laws, does not have any legislation specifically regulating the legal nature of crypto assets. However, a regulation prepared by the Central Bank of Turkey came into force in April 2021 (*Regulation on the Prohibition of Crypto Assets to be used in Payment*). The main aim of this regulation was to ban crypto assets from being used directly or indirectly as a method of payment or being exchanged for services.

The regulation is significant because it contains a (first-time) definition of a crypto asset. According to Article 3/1 of the Regulation, crypto assets are defined as *intangible assets created virtually using distributed ledger technology or a similar technology and distributed over digital networks*. In the same provision, it is explicitly stated that these assets do not include fiat money, deposit money, electronic money, payment instruments, securities, or other capital market instruments.[104]

[101]C Zellweger-Gutknecht and B Seiler, 'Country Report Switzerland' in P Maume, L Maute and M Fromberger (eds), *The Law of Crypto Assets A Handbook* (Beck, München, 2022) 475.
[102]Weber (n 76) 489.
[103]Chainanalysis, 'The 2022 Global Crypto Adoption Index: Emerging Markets Lead in Grassroots Adoption, China Remains Active Despite Ban, and Crypto Fundamentals Appear Healthy' (14 September 2022) <https://blog.chainalysis.com/reports/2022-global-crypto-adoption-index/> accessed 15 December 2022.
[104]R Cankat and OG Güçlütürk, 'Güncel Gelişmeler Işığında Türk Hukukunda Kripto Varlıkların Hukuki Niteliği' in EA Retornaz and OG Güçlütürk (eds), *Gelişen Teknolojiler ve Hukuk I: Blokzincir* (Oniki Levha, İstanbul, 2020) 219.

Crypto currencies – a subcategory of crypto assets – do not fall under the scope of electronic money. According to Law No. 6493 (2013), electronic money is defined as a

> Monetary value issued against funds accepted by the electronic money issuer, stored electronically, used to perform the payment transactions defined in this Law, and accepted as a means of payment by real and legal persons other than the electronic money issuer.

It is obvious in Turkish law that although crypto currencies have monetary value, they are not money because they are banned from being accepted as legal tender.[105]

It is challenging to establish the relationship between a crypto asset and its bearer under Turkish law, keeping in mind that legislation addressing this problem is missing. It is without a doubt that intellectual property rights or right of personality do not apply to crypto assets. The dominant view is that they are not negotiable instruments[106] or securities[107] either. The other possibility would be to define crypto assets as a claim, but it can be seen from the outset that this view is not accepted by many.[108] The only remaining option would be to accommodate crypto assets as 'property'.

Parallel to Swiss law,[109] the Turkish Civil Code does not include a definition of 'property'. However, based on other provisions of the civil code that indirectly reference what can be regarded as property, the legal doctrine has laid down some characteristics of property, namely, having an economic value, being available for the establishment of individual control, and having a distinct (separate) existence and physicality (tangibility).[110]

The challenging issue around crypto assets under Turkish law is, again, that they are not corporeal.[111] Therefore, it is difficult to define them as objects of property rights. Although intangible things (such as natural forces) are subjected to the same provisions as property under Turkish law, this exception is explicitly laid down in a special provision. According

[105]A Karamanlıoğlu, 'Son Gelişmeler Işığında Kripto Paraların Hukuki Niteliği ve Kripto Para Borsalarına Dair Tespit ve Öneriler' <https://law.khas.edu.tr/tr/son-gelismeler-isiginda-kripto-paralarin-hukuki-niteligi-ve-kripto-para-borsalarina-dair-tespit-ve#_ftn14> accessed 15 December 2022.
[106]Ibid.
[107]A Turanboy, 'Kripto Paraların Ortaya Çıkmaları ve Hukuki Nitelikleri' (2019) 35(3) Banka ve Ticaret Hukuku Dergisi, 47, 56.
[108]F Bilgili ve MF Cengil, 'Bitcoin Özelinde Kripto Paraların Eşya Niteliği Sorunu' (2019) <https://ssrn.com/abstract=3432713> accessed 15 December 2022.
[109]Turkey adopted the Swiss Civil Code in 1926. Although there have been some changes and a reform of the Turkish Civil Code in 2002, the main principles of the Swiss Civil Code are still adhered to. Thus, … *the bases have not changed and, though not translated now, they still carry the stamps of the translated laws of the 1920s*: see, E Örücü, 'A Legal System Based on Translation: The Turkish Experience' (2012) 6 (2) *Journal of Civil Studies* 445, 472. In this regard, also see, E Bucher, 'The Position of the Civil Law of Turkey in the Western civilization' (2011) 32 *Annales de la Faculté de Droit d'Istanbul* 7.
[110]AM Kılıçoğlu, *Eşya Hukuku* (Turhan, Ankara 2021) 209; AL Sirmen, *Eşya Hukuku* (Yetkin, 2019) 5 et seq.
[111]Bilgili and Cengil (n 108) 11.

to Article 762 of the Turkish Civil Code, *the subject of movable property is movable tangible things and* ***natural forces that are suitable for acquisition*** *and do not fall within the scope of immovable property*.

The dominant view in Turkish academic literature is that the concept of property should be interpreted narrowly.[112] This is followed by the conclusion that crypto assets cannot be regarded as property since they lack corporeality. However, there are some scholars who suggest that the concept of property *is not absolute or a priori; it is a concept that is relative, functional and flexible which can be shaped according to social and legal value judgments*.[113] This view leads to the conclusion that the concept of property, a dynamic concept, can be interpreted widely in accordance with developments in technology and changes in society. Therefore, the concept of property can be understood, considering technological and scientific developments, to include crypto assets as well.[114]

4.4. Examples from other civil law countries

Italy has enacted laws which define blockchain and smart contracts.[115] However, Italian law does not include a general definition of crypto assets or crypto currencies. Crypto assets are digital assets under the Italian Civil Code (Art. 810). The Court of Florence ruled in 2019 that crypto currencies stored on a crypto currency exchange are regarded as property, based on the definition of property used in the Italian anti-money laundering law and not mere data.[116]

In France there is a distinction between 'biens' (assets), 'choses' (things) and 'droits' (rights). A 'bien' can be a corporeal or incorporeal thing. Therefore, France has adopted a more inclusive understanding of assets that can be an object of property rights, which include intangible ones as well.[117] On May 22, 2019, France adopted Law no. 2019-486, commonly known as PACTE Law (Plan d'Action pour la Croissance et la Transformation des Entreprises, or the Action Plan for Business Growth and Transformation). The PACTE

[112]KB Kapancı, 'Özel Hukuk Penceresinden Blokzincir: "Sanal Para" Değerleri ve "Akıllı Sözleşmeler" Üzerine Değerlendirmeler' in EA Retornaz and OG Güçlütürk (eds), *Gelişen Teknolojiler ve Hukuk I: Blokzincir* (Oniki Levha, İstanbul 2020) 119; Turanboy (n 107) 57.

[113]R Serozan, *Eşya Hukuku I* (Filiz, 2014) 73.

[114]See, G Özdemir, 'Kripto Paraların Eşya Niteliği' (2021) 11(1) Süleyman Demirel Üniversitesi Hukuk Fakültesi Dergisi, 289, 306; Bilgili and Cengil (n 108) 20–21.

[115]See Article 8ter of Law Decree No. 135 of 14 December 2018 (Paragraph 1 and Paragraph 2).

[116]'Italian court rules that cryptocurrency is "property" and a "means of payment" The BitGrail case' (1 Octoberr 2019) <https://talkingtech.cliffordchance.com/en/industries/fintech/italian-court-rules-that-cryptocurrency-is--property--and-a--mea.html> accessed 15 December 2022.

[117]GL Gretton, 'Ownership and Its Objects' (2007) 71 *The Rabel Journal of Comparative and International Private Law* 802, 814; KFK. Low and M Hara, 'Cryptoassets and Property' in S van Erp and K Zimmermann (eds), *Edward Elgar Research Handbook on EU Property Law* (forthcoming), (8 May 2022), <https://ssrn.com/abstract=4103870 or https://doi.org/10.2139/ssrn.4103870> accessed 15 December 2022.

Law introduced changes in the Monetary and Financial Code (CMF). The CMF now includes an enumeration of digital assets and a definition of digital tokens. According to Article L552-2 of the CMF, a token is any *intangible property* representing, in digital form, one or more rights that may be issued, registered, retained, or transferred through a shared electronic recording device that makes it possible to identify the owner of that property directly or indirectly. Tokens are regulated as incorporeal assets (Art. 65 of Loi 486).

Unlike Germany, Austrian law has a very broad understanding of a 'thing' (*Sache*). According to §285 ABGB, everything that is different from a person and serves for the use of people is considered a 'thing'. Therefore, under Austrian Law, there is no doubt that crypto currencies and crypto tokens can be regarded as things (i.e. objects of rights). However, *the rights in rem*, according to the prevailing view, can only be established on corporeal objects. In the provisions of §§309, 530 ABGB, the understanding of intangible things seems to be reduced to intellectual property rights and claims. As a result, the application of property law rules to crypto assets also raises some questions in Austrian law.[118]

Liechtenstein property law also mimics the German understanding where only corporeal objects can be things. However, Liechtenstein was keen to take up a leading position in the blockchain realm, so instead of disrupting the property law system they created a 'parallel "autonomous regime"' to regulate property rights in tokens.[119] Liechtenstein's Token and TT Service Provider Act came into force in January 2020. The Act uses the term 'transaction systems based on trustworthy technologies (TT Systems)' for blockchain systems. According to this Act, a token[120] 'is a piece of information on a TT System which (1) can represent claims or rights of memberships against a person, rights to property, or other absolute or relative rights; and (2) is assigned to one or more TT Identifiers'. A token is basically a container which can hold rights and claims of all kinds.[121] The token definition is not based on any specific category of tokens but includes all tokens created or not yet created. This gives the law flexibility to include future tokens

[118]For detailed information see M Sulzer, 'Zivirechtliche Einordnung von Bitcoin und Diem' (2021) <https://epub.jku.at/obvulihs/download/pdf/6310174?originalFilename=true> accessed 15 December 2022, 30 et seq.

[119]Allen (n 17) 316.

[120]According to some authors, the term 'Token' under Liechtenstein law covers cryptoassets of any kind. See M Niedermüller and S Talic, 'Cryptoassets & Blockchain 2021', <https://niedermueller.law/wp-content/uploads/2021/01/2021_Cryptoassets-Blockchain_Liechtenstein.pdf> accessed 15 December 2022.

[121]According to, Bianca Lins and Sébastien Praicheux, any right to stocks, bonds, gold, and other precious metals, real estate, art (collections), patents, etc., can be tokenized. The authors believe that the token issuers are granted great freedom of design. See B Lins and S Praicheux, 'Digital and Blockchain-Based Legal Regimes: An EEA Case Study Based on Innovative Legislations – Comparison of French and Liechtenstein Domestic Regulations' (2021) 22 *Financial Law Review* 1, 5. Also see, A Layr and M Marxer, 'Rechtsnatur und Übertragung von "Token" aus liechtensteinischer Perspektive' (2019) 11 *Liechtensteinische Juristen-Zeitung* (LJZ).

without needing to re-regulate after the emergence of every new type of token. Liechtenstein has created a token transfer regime that is analogous to the law of property and creates legal certainty.

Despite being included in the list of countries following the civil law system, the countries enlisted above, would not face fundamental obstacles to accept incorporeal assets as objects of property. The Netherlands on the other hand, like Germany, has endorsed the understanding of 'thing' to only include tangible objects. Consequently, only corporeal things can be owned. Some other property rights, excluding ownership, can be established on intangible objects.[122]

5. Overview of the regulatory framework in the common law countries

Under common law, the recognition of intangible digital property caused debates even before the emergence of blockchain technologies. There were doubts regarding the application of traditional categories of property to digital assets, which are intangible in nature.[123] In common law countries, it was not fully clear for a long time if digital assets or crypto assets could be accepted as objects of property.[124] There has also been discussion on the necessity of formulating a separate category for digital assets and subjecting them to a new property regime.[125]

Some scholars have argued that not all digital assets are the same so it would be wrong to consider a property law application for all digital assets.[126] For instance, certain crypto assets, like crypto currencies, may satisfy the requirements of 'legal objects', while certain others, like NFTs, may not.[127] There have been views, increasingly endorsed by scholars, that crypto currencies carry the characteristics of property.[128]

> Unlike intellectual property, Bitcoins are rivalrous and non-owners can be easily excluded. Unlike 'choses in action' and contract rights, property rights over Bitcoins are indeed in rem and do provide a clear delineation of rights and duties. Thus bitcoins are an example of a new type of digital asset that provides an 'obvious means for a stranger to discover' the boundaries of their 'strict general duty not to deliberately [or recklessly] interfere'.[129]

[122]Sjef van Erp (n 58) 241. Also see TD Graaf, 'The Qualification of Bitcoins as Documentary Intangibles' (2019) 5 *European Review of Private Law* 1051, 1061.
[123]Marinotti (n 39) 678.
[124]Lehmann (n 3) 101–02.
[125]Marinotti (n 39) 680.
[126]According to Marinotti, *instead of asking whether all digital assets could be legal things within a hypothetically overhauled system of property law, we should be asking whether certain digital assets are already legal things within the existing categories of property law*, Marinotti (n 39) 681.
[127]Ibid, 721 et seq.
[128]D Fox (n 8) 141.
[129]Marinotti (n 39) 701.

In common law legal systems, the fact that certain new types of assets have (so far) not been regarded as legal objects is not as big a problem as in civil law. According to Sir Geoffrey Vos this is because continental European legal systems focus on an axiomatic definition of the types of things in which property types can exist. Some countries that belong to this system exclude intangible objects from the catalogue. Common law countries on the contrary, focus on the scope and content of property rights themselves.[130] Property and property law in general is largely based on case law, and accordingly, it is likely that a new understanding of property can be developed more easily. Especially in the last two years, there have been new cases and new initiatives to resolve this hesitation. In addition, it has been the recent tendency of the courts to apply general property law to crypto assets, which fall under the category of intangible goods.[131]

5.1. Law of the UK

The UK has reached a satisfactory level of legal clarity on the legal nature of crypto assets as well as the legal character of smart contracts. In 2019, the UK Jurisdiction Taskforce published ground rules on smart contracts and crypto assets.[132] Although these rules are not binding in any court in England or Wales, it was intended to give greater market confidence that English courts would take a pragmatic and commercial approach when presented with these issues. The Chancellor of the High Court expressed his hope that the legal statement would demonstrate the ability of common law in general and English law to respond consistently to new commercial mechanisms.[133] It did indeed, and these rules were accepted and recited in court decisions abroad as well. This is why this paper has included a broader analysis of the current situation in the UK.

In the UK the concept of property is not defined through legislation. However, in *National Provincial Bank v Ainsworth*, Lord Wilberforce announced the main characteristics of property.[134] In order to be regarded as property, something must be 'definable', 'identifiable by third parties', 'capable in its nature of assumption by third parties', and have some degree of 'permanence or stability'.

With these characteristics in mind, this question arises again: Are there enough indicia to characterise crypto assets as property according to English law?

[130]Sir Geoffrey Vos (n 51) 60.
[131]Zogg (n 18) 108.
[132]UKJT Legal Statement on Cryptoassets and Smart Contracts (November 2019) <https://35z8e83m1ih83drye280o9d1-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/6.6056_JO_Cryptocurrencies_Statement_FINAL_WEB_111119-1.pdf> accessed 15 December 2022.
[133]Ibid, 3.
[134]See, *National Provincial Bank v Ainsworth* [1965] AC 1175.

The UKJT Legal Statement recognizes the fact that crypto assets cannot be physically possessed and that they are purely 'virtual'.[135] Whether English law would treat a particular crypto asset as property ultimately depends on the nature of the asset, the rules of the system in which it exists, and the purpose for which the question is asked. However, in general, the UKJT is of the opinion that crypto assets have all the indicia of property. The publicity of transactions on the blockchain makes it possible to define and identify crypto assets. Control and exclusivity conditions are satisfied since only the private key holder can make transactions regarding the crypto asset. Because crypto assets are transferable between the participants in the blockchain, crypto assets are capable of assumption by third parties. Although there are some concerns regarding stability, such as the risk of forking, crypto assets are not more risky or less stable than other types of conventional assets.[136]

According to the UKJT, the novel or distinctive features of crypto assets – intangibility, cryptographic authentication, use of a distributed transaction ledger, decentralization, rule by consensus – do not disqualify them from being property. This a very important outcome because it is not easy to reach this conclusion with a narrow understanding of the term property. After it is accepted that crypto assets can be an object of property, the question becomes: what kind of personal property are crypto assets? One must consider that in English law there are two categories of personal property – 'things in possession' and 'things in action'. Tangible objects which can be physically possessed and are capable of being delivered are in the category of things in possession. Things in action include all things/rights which can be enforced by court litigation or action, such as a debt or contractual right. This includes,

> rights to debt of all kinds, and rights of action on a contract or a right to damages for its breach; rights arising by reason of the commission of tort or other wrong; and rights to recover the ownership or possession of property real or personal … Hence it was not difficult to include in this category things which were even more obviously property of an incorporeal type … .[137]

Forms of intellectual property, such as copyright, design rights, and trademarks, also fall in this category.[138]

There is a view that these two categories are exhaustive – that in order to be regarded as property, something has to qualify either as a thing in action or a thing in possession. In *Colonial Bank v Whinney*, Fry LJ commented, *All*

[135]UKJT Legal Statement (n 132) 7.
[136]UKJT Legal Statement (n 132) 15–16.
[137]WS, Holdworth 'The History of the Treatment of "Choses" in Action by the Common Law' (1929) 33(8) *Harvard Law Review* 997, 998.
[138]Bacon and others (n 12) 91.

personal things are either in possession or in action. The law knows no tertium quid between the two.[139]

Crypto assets do not have physical manifestation so they cannot be physically possessed or controlled. Therefore, according to the traditional understanding of property, crypto assets are not things in possession. However, there are some views that some characteristics of crypto assets, such as being accessible, controllable, transferable, and losable solely by the private key owner, make them resemble the functions of possession.[140]

Since crypto assets are not capable of being enforced by action – they do not constitute rights against a person – for some commentators they are not things in action either.[141] Some cryptoassets represent 'off-chain' value (tangible things or rights) and some do not. It would seem that crypto assets representing external value are more easily assimilated to the category of choses in action than those that do not.[142] Although crypto assets are intangible, they operate differently from bank money in the traditional sense.[143] Money held in a bank account is generally a right, evidenced in writing, against a counter-party. It is difficult to establish who the obligor and obligee is in a blockchain network.[144]

Can there be a third category of things? Can the category of things in possession be extended to include intangible possessions as well?[145] Or can things in action be understood broadly enough to include everything that is intangible?[146] The choice in the UK was between broadening the category of choses in action or creating a third category.[147]

The main problem here is deciding on the perimeters of the category of things in action.[148] There are some views that when a crypto asset represents a share in the company issuing the crypto asset, the crypto asset in fact represents a right which is significantly similar to an existing thing in action. Accordingly, a crypto asset might amount to a thing in action, especially

[139]*Colonial Bank v Whinney* (1885) 30 Ch D 261 (CA), 285.
[140]Bacon and others (n 12) 89.
[141]D Fox (n 9) 149. Michels and Millard (n 16) 323, 338. For detailed reasoning as to why it is difficult to classify crypto assets as things in action see, Allen (n 1) 80–81.
[142]Sir Geoffrey Vos (n 51) 61.
[143]Fox (n 8) 149.
[144]M Solinas, 'Investors' Right in (Crypto) Custodial Holdings: *Ruscoe v Cryptopia Ltd (In Liquidation)*' (2021) 84(1) MLR 155, 160.
[145]According to Low and Teo (n 40) 252, crypto assets can be included in the things in action: 'A Bitcoin could be conceived as the legal right of the holder to have the Bitcoin locked to their chosen … address on the blockchain', which gives the holder exclusive control.
[146]A Sanitt, 'What Sort of Property is a Cryptoasset?', <www.nortonrosefulbright.com/en/knowledge/publications/26ade77a/what-sort-of-property-is-a-cryptoasset> accessed 15 December 2022. Sanitt proposes to create a third category of personal property named 'things in command', which reflects the inescapable physical fact that dealing with a cryptoasset depends on the ability to give commands that will be accepted by the distributed consensus and lead to changes in the distributed ledger.
[147]Allen (n 17) 315.
[148]Ibid.

when the counterparty and right associated with the crypto asset can be determined clearly so that the obligation of the parties is clear-cut.[149]

In 2019, the UKJT was of the view that the way the category of things in action is understood would change how crypto assets are accommodated in English law:

> Our view is that if a cryptoasset does not embody a legally-enforceable right or obligation then it is neither necessary nor useful to classify it as a thing in action. If it is necessary to classify it at all, then a cryptoasset is best treated as being another, third, kind of property.[150]

As a result, crypto assets are property, but the category they belong to might change according to what the crypto asset embodies. The UKJT did not dismiss the possibility of a third category of property in 2019.

After the publication of this report, the High Court of England and Wales supported the approach taken by the report. In *AA v Persons Unknown* [2019] EWHC 3556 (Comm), Justice Bryan acknowledged the fact that the legal statement prepared by UKJT is not in fact a statement of the law. However, he found it relevant to consider the analysis in that Legal Statement as to the proprietary status of cryptocurrencies because it is a detailed and careful consideration. Moreover, he admitted that the analysis made in the legal statement is compelling and the reasoning should be adopted by the court.

> 55. Prima facie there is a difficulty in treating Bitcoins and other crypto currencies as a form of property: they are neither chose in possession nor are they chose in action. They are not choses in possession because they are virtual, they are not tangible, they cannot be possessed. They are not choses in action because they do not embody any right capable of being enforced by action. That produces a difficulty because English law traditionally views property as being of only two kinds, choses in possession and choses in action. (…)
>
> 59. Essentially, and for the reasons identified in that legal statement, I consider that a crypto asset such as Bitcoin are property. They meet the four criteria set out in Lord Wilberforce's classic definition of property in *National Provincial Bank v Ainsworth* [1965] 1 AC 1175 as being definable, identifiable by third parties, capable in their nature of assumption by third parties, and having some degree of permanence.

As can be seen from the excerpt of the decision, the High Court of England and Wales ruled that crypto assets were *prima facie* capable of

[149]Michels and Millard (n 17) 342, argue that a category-based approach with regard to digital assets causes uncertainty: *A more modern view would instead focus on the characteristics of the object in question to determine whether it is a good fit for property law. (…) Considering the characteristics of objects that can attract a property right is more fruitful than focusing on how to classify objects in a taxonomy of things*. According to the commentators, English courts should recognise property rights in digital assets whenever the assets in question meet the criteria of a characteristics-based test and there are good policy reasons for recognising a property right in a particular legal context, 343.

[150]See UKJT Legal Statement (n 132) 15–16.

being regarded as 'property' in English law. Some authors have criticized the legal reasoning of the decision, where the court reached the conclusion that bitcoins are intangible property but not choses in action.[151]

One should consider that control over a crypto asset merely creates a presumption of ownership, which can be rebutted. The UKJT Legal Statement also explains that the ledger cannot be treated as a definitive record of legal rights under common law unless a statute has given it a binding effect.[152] This is followed by doubts as to whether these legal statements are enough to grant holders of crypto assets comprehensive legal protection and an illustration that concrete legislation on the issue would have been more 'far-reaching'.[153]

Although crypto assets were seen as capable of being regarded as property in English law, there was still no express clarity or confirmation as to whether a third category of personal property beyond things in possession and things in action exists. On 28 July 2022, the UK Law Commission published a consultation paper which provisionally concludes that a 'third category' of personal property should be explicitly recognized.[154] According to the consultation paper, the third category of personal property would be called 'data objects'.[155] This new, third category would include crypto tokens but not objects from pure information[156] . Therefore, pure information would not attract property rights. This would allow for a nuanced and idiosyncratic approach to the legal characterization of new things such as crypto assets.[157] For the realization of a third category, the Law Commission sets out two options: It can either be through iterative, common-law reform or limited statutory intervention.

It should also be mentioned that in 2022 there was an increase in the global number of cases with regard to NFT disputes that confirmed the same view with regard to property rights. In *Osbourne v Persons Unknown and Ozone Networks t/a Opensea*, the High Court of England granted a

[151]KFK Low, 'Bitcoins as Property: Welcome Clarity?' (2020) 136 *Law Quarterly Review* 345, 349; K Low and M Hara (n 117).
[152]UKJT Legal Statement (n 132) 13.
[153]Lehmann (n 42) 157.
[154]UK Law Commission (No 256) Digital assets Consultation paper (28 July 2022) 51 <https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2022/07/Digital-Assets-Consultation-Paper-Law-Commission-1.pdf>.
[155]Acting on the existing common law principles and views from the academic commentators, the Law Commission suggests that digital assets should exhibit certain characteristics in order to be categorized as data objects. In order to be categorized as data objects, a thing should be composed of data represented in an electronic medium, (including in the form of computer code, electronic, digital or analogue signals), it should have an existence independently of persons and the legal system and it should be rivalrous. UK Law Commission (n 154) 76.
[156]In crypto assets there is a combination of pure information, technical frameworks, and social networks of human actors. This grants some digital assets characteristics or attributes that make them function much more like objects than mere records, information or data. UK Law Commission (n 154) 36.
[157]Michels and Millard (n 16) 324, argue that digital files should be considered in the third category of things, in line with crypto assets.

proprietary injunction over NFTs representing digital artworks. As well as affirming that NFTs are to be treated as property under English law (just like other crypto assets),[158] the court held that the lex situs of an NFT is the place in which the person or company who owns it is domiciled.[159]

5.2. US law

In the USA there is no uniform legal definition of crypto assets. It should also be mentioned that a consistent terminology does not exist regarding the assets that exist on the blockchain. Generally, the term 'digital assets' is used to define electronic records that are represented on the blockchain.[160] There are various federal and state regulators in the USA that have issued guidance regarding digital assets with a focus on crypto currencies.[161] In 2014, the Internal Revenue Service ruled that for federal tax purposes, crypto currencies are treated as property.[162] In *In re Hashfast Techs. L.L.C.*, the US Bankruptcy Court dealt with Bitcoins in terms of bankruptcy law but did not specifically decide on their categorization as property.[163]

There has been some regulatory activity at the state level regarding the legal nature of crypto assets. The state of Wyoming has amended its Uniform Commercial Code to recognize digital assets as objects of property rights. In 2019, Wyoming enacted a law that expressly recognizes digital assets, including crypto currencies, as intangible personal property.[164] Similarly, in 2021, Idaho passed a 'Digital Assets Act' by adding a new chapter (Chapter 53). According to 28-5302, a digital asset is defined as 'a means of representation of economic, proprietary, or access rights that is stored in a computer-readable format and is a digital consumer asset, a digital security, or a virtual currency'. A digital consumer asset is described as 'a digital asset that is used or bought primarily for consumptive, personal, or household purposes and includes, an open blockchain token constituting intangible personal property as otherwise provided by law; and any other

[158] *Osbourne v Persons Unknown and Ozone Networks t/a Opensea* [2022] EWHC 1021 (Comm), 13.
[159] Ibid, 15–16.
[160] In 2019, FINMA has endorsed the division of tokens as: Payment tokens, Utility Tokens, Asset Tokens and stable coins. FINMA, Supplement to the Guidelines for Enquiries Regarding the Regulatory Framework for Initial Coin Offerings (ICOS) (2019) <www.finma.ch/en/news/2019/09/20190911-mm-stable-coins/> accessed 15 December 2022.
[161] 'Digital and Digitized Assets: Federal and State Jurisdictional Issues' (American Bar Association Derivatives and Futures Law Committee Innovative Digital Products and Processes Subcommittee Jurisdiction Working Group) (2020) <www.americanbar.org/content/dam/aba/administrative/business_law/buslaw/committees/CL620000pub/digital_assets.pdf> accessed 15 December 2022.
[162] 'I.R.S. Notice 2014-21' (14 April 2014) <www.irs.gov/pub/irs-drop/n-14-21.pdf> accessed 15 December 2022.
[163] Order on Motion for Partial Summary Judgment, *Kasolas v Lowe* (In re Hashfast Techs LLC), No. 14-30725DM (Bankr. N.D. Cal. June 17, 2016); Amended Complaint at 5-6, In re Hashfast Techs LLC, No. 14-30725DM (Bankr. N.D. Cal. Feb. 17, 2015).
[164] W.S. SF0125, effective 1 July 2019.

digital asset that does not fall within subsection (3) or (4) of this section'. According to 28-5303 of the same Act, digital consumer assets are intangible property and shall be considered general intangibles only for the purposes of the UCC. Furthermore, virtual currency is described as intangible property and shall be considered money for the purposes of the UCC.

When the case law in the USA is observed, it is seen that in some contexts crypto currencies are categorized as money and in some contexts as commodity. This is not a problem *per se*, however, this provides a barrier towards understanding their general legal categorization.[165]

In the USA, a strict understanding of property does not exist. When the idea in the *First Victoria National Bank v United States* case is observed, a rather dynamic understanding of property is recognized:

> Property evolves over time. It can be described as the bundle of rights attached to things conferred by law or custom, or as everything of value which a person owns that is or may be the subject of sale or exchange. […] Both of these definitions contemplate the possibility that law or custom may create property rights where none were earlier thought to exist.[166]

Crypto currencies and crypto assets are not considered as things in action because they cannot be regarded as constituting a claim against other people.[167] Although crypto assets do not fit neatly into classical categories of property in the USA, there is a view that they can be accepted as a new kind of asset. The dynamic understanding of property allows for this. Bayern highlights the fact that these kind of difficulties regarding accommodation of these newly emerging concepts arise because of the strict attachment to conceptualism and the categorization that is created or preserved by the statutes. The author explains that although it is debatable whether crypto currencies are 'things' or 'movables' under the Uniform Commercial Code *(UCC § 2-105(2013))*, that was not foreseen when the UCC was drafted. However, the author draws attention to the fact that in common law, being stuck with these questions is futile: *It also matches the expectations of the parties to a cryptocurrency transaction, if it subjected to the same rules as tangible property*.[168]

Supporting this view, Fairfield states that the tangibility of an object is not indispensable for the characterisation of property and that *(t)angibility should not be strictly adhered to and property law should be recast as a*

[165]JG Allen, H Wells and M Mauer, 'Cryptoassets in Private Law: Emerging Trends and Open Questions from the First Ten Years' (1 August 2022). SMU Centre for AI & Data Governance Research Paper No. 06/2022, <SSRN: https://ssrn.com/abstract=4206250 or https://doi.org/10.2139/ssrn.4206250> accessed 15 December 2022

[166]*First Victoria Nat'l Bank v United States* 620 F.2d 1096 (5th Cir. 1980).

[167]S Bayern, 'Dynamic Common Law and Technological Change: The Classification of Bitcoin' (2014) 71 (22) *Washington and Lee Law Review Online* 22, 33.

[168]Ibid, 34.

protocol for "transmission, security and verification of information".[169] He also states that *(c)ryptocurrencies can be owned, thus be regarded as property. In order to ensure the protection and promotion of ownership of the digital assets, current property law needs to be reformed.*[170]

Parallel to Fairfield, Marinotti argues that tangibility should be seen as tool for establishing the boundaries of objects, but he goes on to argue that it is not the only tool: *… if the characteristics of an asset entails obvious bounds to both the owner's liberty right to use and the non-owner's duty not to interfere, then tangibility is not relevant, the asset is a legal thing.*[171] According to the author, the tangibility condition is neither a conceptual nor a doctrinal requisite for property law.

All in all, it can be concluded that under US law there is no categorical obstacle for accepting the property character of crypto assets. The features of blockchain technology are eligible for fulfilling the role of the tangibility criterion for an asset, which is necessary for being regarded as a legal thing that can be a subject of property.

The most important development in the USA with regard to the property character of crypto assets came in 2022, when the American Law Institute and the Uniform Law Commission's 'Uniform Commercial Code and Emerging Technologies Committee' (the 'ULC') adopted changes to the United States Uniform Commercial Code ('UCC').[172] The proposed amendments include a new UCC Article 12 that governs transactions in a subset of digital assets called 'controllable electronic records'(CERs). CERs include, certain types of virtual currencies, stable coins and nonfungible tokens. The new article would govern the transfer of property rights in certain intangible digital assets that have been or may be created in the future using new technologies.[173] The main purpose of the reform is to recognise that concepts of personal property under the UCC can apply to certain intangible assets that are created using novel technologies.[174]

[169]JAT Fairfield, 'Bitproperty' (2015) 88(4) *Southern California Law Review* 805, 854.
[170]Ibid, 874.
[171]Marinotti (n 39) 703.
[172]ULC Approves ALI Joint Project on UCC and Emerging Technologies (15 July 2022) <www.ali.org/news/articles/ulc-approves-ali-joint-project-ucc-and-emerging-technologies/> accessed 15 December 2022.
[173]R Laity and DG Bird, 'UCC Article 12 – A Sensible Framework for Secured Transactions Involving Cryptocurrencies or Other Digital Assets' <www.blg.com/en/insights/2022/12/ucc-article-12-a-sensible-framework-for-secure-transactions-involving-cryptocurrencies> accessed 15 December 2022.
[174]XF Ménard, AJ Lom and R Browndorf, 'Bringing the UCC into the Digital Age: Review of the 2022 UCC Amendments and Controllable Electronic Records' (1 November 2022) <www.nortonrosefulbright.com/en/knowledge/publications/8d95e2ed/bringing-the-ucc-into-the-digital-age-review-of-the-2022-ucc-amendments> accessed 15 December 2022.

5.3. New Zealand law

New Zealand has accepted that digital assets can be conceptualized as property. In *Ruscoe v Cryptopia Ltd. (in Liquidation)*, the High Court held that crypto currencies, as digital assets, are a form of property and that they can be held on trust,[175] this being the first decision in the Commonwealth in which a court has offered a comprehensive analysis of the issue.[176] While deciding the case, the New Zealand High Court relied on case law from common law jurisdictions as well as the principles accepted in the Legal Statement on Crypto Assets and Smart Contracts prepared by the UK Jurisdiction Taskforce.

According to Section 2 of New Zealand's Companies Act, 1993, property is defined as *property of every kind whether tangible or intangible, real or personal, corporeal or incorporeal, and includes rights, interests, and claims of every kind in relation to property however they arise*. Given this rather broad definition, the High Court held that 'crypto currencies' are a form of property.

While reaching this outcome, the court took into account the famous English case of *National Provincial Bank Ltd. v Ainsworth* [1965] AC 1175 (HL), where property characteristics are laid down as being definable, identifiable by third parties, and capable of assumption by third parties and having a degree of permanence or stability.[177] The court ruled that crypto currencies constitute an identifiable subject matter since they are 'sufficiently distinct to be capable of then being allocated uniquely to an account holder on that particular network' with the use of public keys. The High Court found that crypto assets are identifiable by third parties since crypto assets can be disposed of only using private keys. Therefore, the private key owner has the power to exclude others. According to the High Court, crypto assets are capable of assumption by third parties, and they have permanence and stability considering that they are based on blockchain technology.

The High Court also made a distinction between pure information and digital assets. There has been a tendency in common law countries not to accept information as property.[178] However, departing from this view, the court affirmed the position that cases involving digital assets should be distinguished from ones involving pure information and that cryptocurrencies should not be regarded as pure information but as digital assets.[179]

[175] *Ruscoe v Cryptopia Ltd (in Liquidation)* [2020] NZHC 728.
[176] Solinas (n 144) 167.
[177] It is worth mentioning that the High Court of New Zealand also interpreted *Colonial Bank v Whinney* where it is mentioned that there can only be two categories of property. The Hight Court of New Zealand came to the conclusion that, the dictum did not mean a narrow category of property and did not prevent cryptocurrencies being treated as property; at most it might mean they would have to be classified as a 'thing in action'. *Ruscoe v Cryptopia Ltd (in Liquidation)* [2020] NZHC 728, [124].
[178] Solinas (n 144) 161. In this regard, also see Allen (n 1) 67.
[179] *Ruscoe v Cryptopia Ltd (in Liquidation)* [2020] NZHC 728 [126]-[133].

This functional approach to property taken by the judge in *Ruscoe v Cryptopia Ltd.* has been praised in the academic literature as well. Thus:

> In short, Gendall J provides a new roadmap for making use of the functional approach to finding novel forms of property, one that can be used not only in relation to cryptocurrency, but also in respect of other novel forms of personal intangible property.[180]

5.4. Singaporean law

Singapore has a general tendency to embrace and facilitate the use of crypto currencies. The Singapore International Commercial Court recently decided a case (*B2C2 Ltd. v Quoine Pte Ltd.*)[181] where the court was asked to determine whether Bitcoins qualified as 'property' under Singaporean law. The case was about the property issue in relation to trades in crypto currencies between customers of a crypto exchange, involving (among other things) a possible breach of trust. Here, Thorley LJ held that while crypto currencies *'are not legal tender in the sense of being a regulated currency issued by government, they do have the fundamental characteristic of intangible property as being an identifiable thing of value*'. The Court, by referring to the test from English case law (*National Provincial Bank v Ainsworth*) concluded that 'cryptocurrencies' met all the requirements of being *definable, identifiable by third parties, [and] capable in its nature of assumption by third parties and have some degree of permanence or stability*.

The Singapore Court of Appeal reached an opposite conclusion regarding the creation of a trust. However, the court stated that *(t)here may be much to commend the view that cryptocurrencies should be capable of assimilation into the general concepts of property. There are, however, difficult questions as to the type of property that is involved.*[182] The Court of Appeal also referred to a number of Commonwealth decisions, as well as the UK Jurisdiction Taskforce's (UKJT) Legal Statement on Crypto assets and Smart Contracts; all concluded that crypto assets could, in principle, be treated as property.

6. Tangible or intangible, *that* is the question?

In most countries following the civilian tradition, tangibility of objects has become a conceptual or doctrinal requisite. The general understanding in civil law countries is that intangible objects can only be subjected to property law rules in exceptional and specific cases, mostly defined by law. In the

[180]P Babie and others, 'Cryptocurrencies as Property: *Ruscoe and Moore v Cryptopia Limited (In Liquidation)* [2020] NZHC 728 (2020) University of Adelaide Law Research Paper No 2020-33, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3578264> accessed 15 December 2022, 12.
[181]*B2C2 Ltd v Quoine Pte Ltd* [2019] SGHC(I) 03.
[182]Quoine Pte Ltd v B2C2 Ltd [2020] SGCA(I) 02, [144].

civilian tradition, rights *in rem* are established on 'things', taking its foundations from the Roman Law concept of '*res*'.[183] *Res* is separable from and distinct from the right *in rem*, which corresponds to tangible property. Property law rules in the civilian tradition are established with tangible things in mind. This has led to the result that in the civilian tradition, property law concepts have been applied in a traditionally restrictive way. When we talk about the transfer of a crypto asset, there is an object which can be transferred into the control or power of another person, but legally is not 'res'. Therefore, from a legal perspective, the acquisition of a cryptoasset is not ownership of a res. It is rather an acquisition of control of a tradeable commodity, i.e. a uniquely generated item of information.[184] The endorsement of the principle of *numerus clausus* regarding legal objects also prevents virtual assets from fitting into the framework of property law. In these countries there has been a tendency to look for a precise legal basis to subject crypto assets to property law rules.

A strict approach to crypto assets would neglect the rise of virtual reality. There is a huge category of assets developing next to traditional physical assets (like land or movable property). Crypto assets are not less attractive than ordinary securities. Therefore, they should not be treated differently in terms of being regarded as an object of property rights. It is possible, however, that the regulators might prohibit some types of crypto assets and encourage others taking into account who the issuer is, the intended and the actual use of the crypto asset and the risk it poses to consumers and the financial or monetary system.[185]

Moreover, it should be remembered that civil law countries have had the experience of accommodating some intangible/incorporeal objects in property law. Considering the rise and widespread application of crypto assets, there are some property lawyers who opt for the application of property law concepts in a more flexible way. Some commentators from the civil law countries note that civil law tradition is '*sometimes even more willing to adapt to the new virtual reality than common law practitioners might expect*'.[186] This approach sometimes requires the wide or flexible interpretation of the concept of property to include intangible crypto assets and sometimes it requires a paradigm shift. We believe that, although there are views departing from the traditional restrictive approach, until a bespoke regulatory regime is adopted for crypto assets, the civilian courts will hesitate about the accommodation of crypto assets under property law. The more restrictive civilian approach prompts more responsive legislative intervention.

[183]Carr (n 41) 179.
[184]Ibid, 184.
[185]Sir Geoffrey Vos (n 51) 60.
[186]van Erp (n 58) 253 et seq.

Case law and new legislative acts and proposals on crypto assets in common law countries show that they endorse a more flexible approach, and that common law can adapt more easily to technological innovations. Common law is known for the ability to stretch traditional definitions and concepts and adapt to new business practices and rapid-evolving sectors. Therefore, it is easier for novel kinds of intangible assets to be regarded as property and thus the creation of a new property understanding with case law.

There is another reason why intangibles are more easily accommodated in the common law. This is due to the fact that, common law systems are accustomed to the idea of including intangibles in the category of *choses in action* which constitutes personal property.[187] As a result, intangibles have also found their place in property law. In fact, if all intangible property were accepted as *choses in action*, crypto assets could be easily accommodated within the law of property. There was never much doubt as to the recognition of crypto assets as property – even before the decisions rendered in the past few years.[188] The problem for common law systems about crypto assets is deciding whether they can be included in the category of *choses in action*.[189]

The High Court, in *AA v Persons Unknown & Ors, Re Bitcoin* [2019] EWHC 3556 (Comm), has even implied that an intangible thing can be property although it is not included in the category of *choses in action*. This shows the ability of common law to endorse the property character of something that is intangible. The court can decide if this new category of things can be included in the category of *choses in action* via wider or flexible interpretation or even decide if there can be a third category of property. Whereas it is a conventional notion in common law to accept that the concept of property evolves over time, in civil law countries, especially those following the Germanic tradition, this would cause a paradigm shift.

Finally, although the common law systems prove to be more flexible, accommodating a full range of crypto assets, which includes tokens as well as cryptocurrencies, might require a clearer framework.[190] There are still uncertainties in the common law system regarding the precise legal nature of the property rights associated with crypto assets. *Because there is no centralised issuer of the cryptocurrency unit, it is very difficult to identify, in legal terms, where the asset is, or to define exactly what it is that the purchaser actually "has"*.[191] Therefore, providing an explicit regulatory framework would reduce uncertainties arising from transactions concerning crypto assets

[187]KFK Low and E Mik, 'Pause the Blockchain Revolution' (2019) 69 *International and Comparative Law Quarterly* 135, 148.
[188]Low (n 117) 352.
[189]Allen (n 17) 315.
[190]UK Law Commission (n 38) 75.
[191]Cooper (n 13) 624.

and make clear that property law rules would be applicable to the disputes arising from these transactions. The recent developments in the US and the UK mentioned above show that these countries are keen on formulating a clearer regulatory framework. Time will show if in other countries too this will be done by judicial innovation or amendment of the basic provisions of the codes defining property, or by enacting special legislation that creates a separate regime.[192] But as Fairfield notes, the *extension of property principles to digital assets is … inevitable.*[193]

We believe that the Consultation Paper in the UK which foresees the explicit recognition of a third category will have important impacts in the common law world. The Law Commission does not demonstrate a preferred option with regard to how this new category will be recognized.[194] However, they discuss in detail the problems with regard to relying on the courts to reform the law.[195] They state that first, some courts might feel unable to depart from existing law unless there is a parliamentary intervention. Second, the facts and arguments about a crypto asset case before the courts might be limited:

> there is not always an opportunity for the courts to consider law reform of the whole legal landscape together at once in a holistic way. This reduces the ability for a single court to unilaterally engage in a law reform process that ensures that the law in its entirety is changed in a way which will best accommodate new things while maintaining law that works very well for conventional things.

Third, common law development is likely to be more incremental.[196] It is striking that the UK Law Commission has implied not waiting for the common law incremental development by courts and opted for the establishment of legal certainty and clarity in an explicit manner.[197]

The adaptability of common law countries and their ability to reach a solution in a more flexible way is not enough to bring solutions to a problem caused by crypto asset transfers having an international scope. They are still reflecting a national way of thinking which provides national solutions. They are, in a way, transposing certain principles and methods from other

[192]Allen and others (n 22) 23.
[193]Fairfield (n 4) 243.
[194]UK Law Commission (n 38) 100.
[195]Ibid, 101–05.
[196]Compare, Fox (n 9) 14: 'The common law grows by a process of principled analogy between the old and the new. Incremental responses to a practical innovation have been the driver of all common law development'.
[197]Michels and Millard (n 16) 355, evaluate if courts should extend property rights to cover digital files or whether this is best left to the parliament: *On the one hand the policy considerations are complicated and cover many legal contexts. (…)This suggests the problem might benefit from the legislator's careful consideration. On the other hand, enacting new legislation is a time-consuming process. Courts can adress issues as the need arises. Flexibility is ssen as a strength of the English common law.*

fields of law to a new phenomenon.[198] Crypto assets, on the other hand, do not create national problems due to the underlying distributed ledger technology. We therefore agree with the view that it is *high time to adopt globally or at least regionally uniform rules before every country develops its own, idiosyncratic rules governing the blockchain*.[199]

7. Conclusion

The law always follows developments in technology. A technological innovation occurs, starts to create problems, and the law tries to resolve these problems by coming up with a fair solution. This is not something specific to the complex structure of blockchain technologies and crypto assets. As a result of the novelty of the distributed ledger technology, most countries in the world are trying to find a way to deal with transactions made on the blockchain. At the moment, both common law and civil law countries are doing their best to define crypto assets and decide how to treat crypto asset transfers that did not result as the parties intended.

De lege feranda, we believe that crypto assets should be regarded as legal objects that can be owned even though they lack corporeality. After the emergence of metaverse and the NFTs in 2021, and new DeFi use cases, we are experiencing an accelerating pace in the development and adoption of distributed ledger technologies. Taking into account the projections that the time for Web 3.0 that is based on the blockchain technology has come and it will in fact become the foundation for the metaverse, it is not difficult to see how important it is that the legal systems provide legal clarity. Therefore, it is imperative that all legal systems reconsider their property law rules to provide legal clarity, and this should be done promptly. Private property law rules can and should be adjusted to include objects that are not corporeal[200] – especially those permanently recorded on a secure and distributed ledger.

As demonstrated by the UK and USA in 2022, trying to fit these new assets into the existing legal and regulatory rules by analogy and extension, although efficient, will not be a long-term solution. It has become obvious that the property law rules in force today were not designed with crypto-functions in mind.[201]

If the recognition of crypto assets as objects of property can be done on an international level, this would serve the purpose of blockchain even better and overcome the problems arising from the conflict of law rules.[202] At

[198]Lehmann (n 42) 172.
[199]Ibid.
[200]Also see Allen (n 2) 76.
[201]Lee (n 23) 358.
[202]Lehmann (n 42) 175; M Lehmann, 'National Blockchain Laws as a Threat to Capital Markets Integration' (2021) *Uniform Law Review* 1, 28.

least the states can define the concept of property and set minimum standards by providing remedies against hacking, theft, and deletion of crypto assets such as claims for damages and reverse transactions. National laws can also decide on the precise content of property.[203] Sticking to a traditional understanding of property law rules undermines the needs of the virtual economy and risks having technology-coded rules, instead of legal systems, govern transactions.

Although the pace in the civil law world is slower and would require 'doing some violence to long-settled understandings', there is a consensus that crypto asset transactions and relevant remedies need to be regulated. Time will show if this adaptation of laws will be done by the use and adaptation of existing property laws.[204] With international organizations that also focus on the issue, like the UNIDROIT, uniform application of property concepts to crypto assets can be even faster than expected.

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[203]Lehmann (n 202) 29.
[204]Carr (n 41) 198.