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## Non-fungible tokens, tokenization, and ownership

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### ABSTRACT

The emergence of non-fungible tokens (NFTs) in the blockchain environment has prompted many intriguing questions for private law scholars around the world. A question as basic as whether NFTs can be owned has proven difficult in many countries. This is the first research question of our article, which focuses on NFTs created in the Ethereum system by utilizing standard ERC-721. Because these NFTs are identifiable and distinguishable from all other tokens, the notion of owning an NFT is not unthinkable. Yet no universal answer can be offered. Whether NFTs qualify as objects of ownership must be studied at the level of individual legal systems. We argue that NFTs can be owned under Finnish law, with the same probably applying to many other legal systems. Starting with this notion, we pose two further research questions. As the second research question, we ask what problems of a patrimonial law nature may arise in attempts to connect different kinds of rights, even irrevocably, to owning or holding an NFT. Creditor rights seem relatively easy in this respect because most legal systems allow prospective debtors to obligate themselves as they wish. We also study whether a limited liability company could issue an NFT as a share certificate with legal effects corresponding to those of a physical (paper) share certificate. While an affirmative answer could be justified in some legal systems, Finnish law makes it difficult to tokenize a company's shares other than in the framework of a settlement system within the meaning of the European Union's DLT Pilot Regulation. Even greater difficulties arise in attempts to connect the ownership of a (material) thing and of an NFT so that a person who owns a token also owns the thing. Our third and final research question addresses tokenization of digital art, which gives rise to some special questions. We ask what rights the transferee of an NFT can receive in connection with tokenization of digital art. Here, our main finding is that digital art can be meaningfully tokenized even though digital copies are not regarded as possible objects of ownership.

### 1. Introduction

The term 'non-fungible token' and its abbreviation 'NFT' have become generally known owing to, among other things, applications such as CryptoKitties and CryptoPunks. NFTs are thought to be suitable for many purposes because of their unique nature. For example, the [ethereum.org](https://ethereum.org) website suggests that the uses of NFTs include 'proving that you attended an event', 'certify[ing] that you completed a course', 'ownable items for games', 'digital art', 'tokenizing real-world assets', 'proving your online identity', 'gating access to content', 'ticketing',

'decentralized internet domain names', and 'collateral in decentralized finance'.<sup>1</sup>

In this article, we study NFTs from a private law perspective. Before setting the research questions, it is necessary to better understand what NFTs are. Technological background is of utmost importance here. As noted in legal literature, 'NFTs require a detailed technical explanation because the legal analysis may depend entirely on what the technology is doing'.<sup>2</sup>

While 'NFT' (abbreviated or in full) has become a commonplace term, its meaning is context-dependent and may thus vary. In scientific

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<sup>1</sup> 'Non-Fungible Tokens (NFT)' <<https://ethereum.org/en/nft/>> Accessed 25 April 2024. NFT applications in digital art and collectibles are probably best known to the public. See, eg, Abram Brown, 'Beeple NFT Sells for \$69.3 Million, Becoming Most-Expensive Ever' (*Forbes*, 11 March 2021) <[www.forbes.com/sites/abrambrown/2021/03/11/beeple-art-sells-for-693-million-becoming-most-expensive-nft-ever/](http://www.forbes.com/sites/abrambrown/2021/03/11/beeple-art-sells-for-693-million-becoming-most-expensive-nft-ever/)> Accessed 25 April 2024.

<sup>2</sup> Andres Guadamuz, 'The Treachery of Images: Non-Fungible Tokens and Copyright' (2021) 16 *Journal of Intellectual Property Law & Practice* 1367, 1368.

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literature as well as elsewhere, several different definitions have been adopted. Some of them are essentially technical. For example, NFT has been defined as ‘a unique, non-interchangeable cryptographic token of data that is stored on a blockchain’.<sup>3</sup> Other views on NFTs include ‘a unique digital identifier that is recorded on a blockchain and is used to certify ownership and authenticity’,<sup>4</sup> ‘a cryptographic record of ownership for a unique item that is encoded into a blockchain’,<sup>5</sup> and ‘assets that have been tokenized via a blockchain’.<sup>6</sup> One opinion is that ‘Blockchain-based NFTs (non-fungible tokens) are uniquely identifiable digital representations of physical or digital items’.<sup>7</sup>

What all these notions have in common is that they associate NFTs with blockchains. An oft-cited, concise definition of blockchain, one sufficient for the purposes of this article, is the following: ‘A blockchain is a distributed ledger with growing lists of records (blocks) that are securely linked together via cryptographic hashes.’<sup>8</sup> The most widely known blockchain application is Bitcoin, which is closely related to the origin and development of blockchain technology.<sup>9</sup> However, the most interesting system from the perspective of this article is Ethereum, another notable blockchain application. Considering the proliferation of real-life applications, Ethereum is the most important blockchain system in terms of NFTs.<sup>10</sup>

Blockchain is a form of distributed ledger technology (DLT), which has become a technological starting point for legal regulation in the European Union (EU). Examples include the recently adopted Regulation on Markets in Crypto-Assets (MiCA),<sup>11</sup> in which the notion of DLT in many respects resembles definitions of blockchain technology. Under Article 3 of the MiCA Regulation, DLT is ‘a technology that enables the operation and use of distributed ledgers’, while a distributed ledger is ‘an information repository that keeps records of transactions and that is shared across, and synchronised between, a set of DLT network nodes using a consensus mechanism’. Put simply, blockchains are distributed ledgers where data is arranged in blocks.

The significance of the MiCA Regulation for NFTs is reduced to some extent because it ‘does not apply to crypto-assets that are unique and not fungible with other crypto-assets’, as stated in Article 2(3). The

expression ‘not fungible with other crypto-assets’ must apparently be conceptually separated from uniqueness, so that a token may be unique but nevertheless fungible with other tokens (similarly to how banknotes can be regarded as fungible with each other, even though made unique by their serial numbers). In interpreting this provision, one should also pay attention to the preamble of the Regulation and in particular Recitals 10–11, which include general guidelines as well as concrete examples of crypto-assets excluded from the scope of the Regulation. The first-mentioned concrete examples are digital art and collectibles.

In this article, we adopt a definition of NFT based on technology and, more specifically, program code in the Ethereum system, that is, a smart contract. We understand NFT as *a token, created by utilizing standard ERC-721 or a technologically equivalent standard, which is identifiable and distinguishable from all other tokens*. As a result, our discussion is mostly limited to applications in the Ethereum system. Importantly, the definition is silent on the potential uses of NFTs, a feature well suited for the purposes of this article. Indeed, the tokens referred to in the definition may represent something, or may simply exist as digital objects with no added meaning, legal or otherwise. What they have in common is that they are individual objects, transferrable in the Ethereum system.<sup>12</sup>

NFTs that fit our definition are distinguishable from all other tokens due to an address or account which identifies a smart contract,<sup>13</sup> combined with a unique identifier created by the smart contract.<sup>14</sup> In contrast, in the case of fungible tokens, somewhat simplified, the smart contract holds information about the addresses and the number of tokens in each address. Unlike non-fungible tokens, fungible tokens are not unique. The most commonly utilized standard for that purpose is ERC-20, which enables a hash map connecting addresses to integer values representing the account balance.<sup>15</sup>

Regardless of whether a token is fungible or non-fungible, the smart contract and its functionalities are of the essence since the existence of tokens is based on a smart contract.<sup>16</sup> Because smart contracts can be coded in different ways,<sup>17</sup> it is also possible to create tokens that share

<sup>3</sup> Jagger Bellagarda and Adnan M Abu-Mahfouz, ‘Connect2NFT: A Web-Based, Blockchain Enabled NFT Application with the Aim of Reducing Fraud and Ensuring Authenticated Social, Non-Human Verified Digital Identity’ (2022) 10(21) Mathematics 3934, 1.

<sup>4</sup> ‘Non-Fungible Token’ <[https://en.wikipedia.org/wiki/Non-fungible\\_token](https://en.wikipedia.org/wiki/Non-fungible_token)> Accessed 25 April 2024.

<sup>5</sup> Matthew Sparkes, ‘Non-Fungible Tokens (NFTs)’ (*NewScientist*) <[www.newscientist.com/definition/nft-non-fungible-tokens/](http://www.newscientist.com/definition/nft-non-fungible-tokens/)> Accessed 25 April 2024.

<sup>6</sup> Rakesh Sharma, ‘Non-Fungible Token (NFT): What It Means and How It Works’ (*Investopedia*, updated 28 January 2024) <[www.investopedia.com/non-fungible-tokens-nft-5115211](https://www.investopedia.com/non-fungible-tokens-nft-5115211)> Accessed 25 April 2024.

<sup>7</sup> Florian Idelberger and Péter Mezei, ‘Non-Fungible Tokens’ (2021) 11(2) Internet Policy Review 1, 2.

<sup>8</sup> ‘Blockchain’ <<https://en.wikipedia.org/wiki/Blockchain>> Accessed 25 April 2024.

<sup>9</sup> Satoshi Nakamoto, ‘Bitcoin: A Peer-to-Peer Electronic Cash System’ <<http://bitcoin.org/bitcoin.pdf>> Accessed 25 April 2024.

<sup>10</sup> See, eg, Guadamuz (n 2) 3; Diana Ambolis, ‘All About the Relationship Between Ethereum and NFTs and the 7 Amazing Use Cases’ (*Blockchain Magazine*, 15 February 2024) <<https://blockchainmagazine.net/ethereum-and-nfts-use-cases/>> Accessed 25 April 2024.

<sup>11</sup> Parliament and Council Regulation (EU) 2023/1114 of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 [2023] OJ L150/40 (MiCA Regulation). A crypto-asset is understood in the MiCA Regulation as ‘a digital representation of a value or of a right that is able to be transferred and stored electronically using distributed ledger technology or similar technology’ (Art 3). The term ‘crypto-asset’ may have different meanings elsewhere in legislation as well as in other texts, so it must always be interpreted in context. The same is true more generally, including for the terms ‘virtual asset’, ‘cryptocurrency’, and ‘virtual currency’.

<sup>12</sup> We are not arguing that everyone should adopt this definition or that it fits all contexts. Still, it is not easy to successfully complement the technical starting points so as to include use-related elements in a definition of NFT. To begin with, it would be difficult to find expressions for all possible ways of utilizing NFTs, especially for those not yet known. Furthermore, it seems undeniable that NFTs do not have to represent anything. Finally, if such terms as ‘tokenization’ and ‘digital representation’ are to be used, they should be explained.

<sup>13</sup> In the Ethereum system, an account (or an address) containing a smart contract is called a Contract Account (CA), which is one of the system’s two account types. The other type, called an Externally Owned Account (EOA), contains no smart contracts and is controlled by private keys (similarly to an ordinary Bitcoin account). See, eg, Imran Bashir, *Mastering Blockchain: Distributed Ledger Technology, Decentralization, and Smart Contracts Explained* (2nd edn, Packt Publishing 2018) 288–89; Jitendra Chittoda, *Mastering Blockchain Programming with Solidity: Write Production-Ready Smart Contracts for Ethereum Blockchain with Solidity* (Packt Publishing 2019) 27–30; Muddasar Ali and Sikha Bagui, ‘Introduction to NFTs: The Future of Digital Collectibles’ (2021) 12(10) International Journal of Advanced Computer Science and Applications 50, 51.

<sup>14</sup> Ali and Bagui (n 13) 54–55; Bellagarda and Abu-Mahfouz (n 3) 6–7; Katharina Garbers-von Boehm, Helena Haag and Katharina Gruber, *Intellectual Property Rights and Distributed Ledger Technology with a Focus on Art NFTs and Tokenized Physical Artworks* (European Parliament 2022) 13–14 <[www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL\\_STU\(2022\)737709\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2022/737709/IPOL_STU(2022)737709_EN.pdf)> Accessed 15 August 2023 (doi: 10.2861/962898).

<sup>15</sup> For a more detailed explanation, see Chittoda (n 13) 193–94.

<sup>16</sup> From a technical perspective, it is not surprising that tokens themselves have sometimes been described as smart contracts. See, eg, Chris Dannen, *Introducing Ethereum and Solidity: Foundations of Cryptocurrency and Blockchain Programming for Beginners* (Apress 2017) 97.

<sup>17</sup> Solidity, the most important programming language for smart contracts in the Ethereum system, enables all tasks a computer is capable of. Therefore, Solidity is a Turing complete programming language. See, eg, Dannen (n 16) 50; Bashir (n 13) 21, 289; Chittoda (n 13) 18, 42.

features of both fungible and non-fungible tokens. If the purpose is to deal with both fungible and non-fungible tokens under one and the same smart contract, then standard ERC-1155 may be a workable option.<sup>18</sup>

Although NFTs are a relatively recent phenomenon,<sup>19</sup> they have quickly come to the attention of legislators, courts of law, and legal scholars around the world. A question as basic as *whether NFTs can be owned* has proven difficult in many countries. This seemingly simple question is also the first research question of the present article and is discussed in detail in Section 2. If NFTs can be owned, it seems, at least at first glance, that they qualify as objects of rights more generally. However, for simplicity, this article only focuses on ownership. We omit, for example, discussion of the use of NFTs as security for credit.<sup>20</sup>

Generally speaking, nothing in the characteristics of NFTs seems to suggest that the notion of owning an NFT would be unthinkable. Each NFT is distinguishable from all other NFTs, in principle in much the same way as each car is distinguishable from all other cars. In addition, transfers and other dispositions of an NFT typically require knowing a private key,<sup>21</sup> which may involve factual control comparable to possession of a tangible (corporeal) movable object. As a general rule, executing a transaction in the Ethereum system or some other similar system requires a signature which involves the relevant private key.<sup>22</sup>

However, these general considerations alone do not settle the question whether NFTs are accepted as objects of ownership and whether the answer to the question depends on conditions being met. Vitality, the concept of ownership presupposes a legal system (legal order). Indeed, ownership derives its existence and content from the legal norms of a particular legal system, which in practice means national law.<sup>23</sup> Therefore, one must ask: *what kind of solution is most justified considering the legal system in question?* Different sources of law, such as legislation and court decisions, as well as legal literature, must be taken into account in the manner typical of that legal system. In short, the question

<sup>18</sup> On this ‘multi-token standard’, see, eg, Ali and Bagui (n 13) 53. See also <<https://ethereum.org/en/>> Accessed 15 August 2023, which includes descriptions of standards ERC-721 and ERC-20 as well.

<sup>19</sup> ERC-721, ie, ‘Ethereum Request for Comments 721’ was proposed by William Entriken, Dieter Shirley, Jacob Evans and Nastassia Sachs in 2018. See ‘ERC-721 Non-Fungible Token Standard’ <<https://ethereum.org/en/developers/docs/standards/tokens/erc-721/>> Accessed 15 August 2023.

<sup>20</sup> See, eg, *ELI Principles on the Use of Digital Assets as Security: Report of the European Law Institute* (European Law Institute 2022) <[www.europeanlawinstitute.eu/projects-publications/completed-projects/use-of-digital-assets-as-security/](http://www.europeanlawinstitute.eu/projects-publications/completed-projects/use-of-digital-assets-as-security/)> Accessed 15 August 2023.

<sup>21</sup> A smart contract in a way allocates tokens to addresses or accounts. Knowing the private key associated with an address enables executing functions in the smart contract, through which the smart contract records a token to another address. ERC-721 includes several functions to enable these transfers, and by using the ‘approve’ function it is even possible to allow another address to transfer an NFT from the initial address. See, eg, Chittoda (n 13) 227–31; Bellagarda and Abu-Mahfouz (n 3) 6–7.

<sup>22</sup> In the Ethereum system, as in many other similar systems, the signature is based on the Elliptic Curve Digital Signature Algorithm (ECDSA). See, eg, Bashir (n 13) 290; Chittoda (n 13) 15. As a matter of design, it is also possible that a transaction may require multiple signatures. In that case, several private keys are needed. While this can be beneficial in some regards, it entails additional risks, which must be noted. Eg, instead of requiring four signatures from four stakeholders, it could be safer to require three signatures from four stakeholders. Otherwise, losing one private key would make transactions impossible. See, eg, Chittoda (n 13) 288–89.

<sup>23</sup> See Matthias Lehmann, ‘National Blockchain Laws as a Threat to Capital Markets Integration’ (2021) 26 *Uniform Law Review* 148. Lehmann notes (at 149) that ‘there is no such thing as an owner or ownership outside a specific national law’.

must be answered at the level of *individual legal systems*. Insofar as EU Member States are concerned, EU law must naturally also be taken into consideration. So far, though, EU law has not taken a position on the status of blockchain-based tokens under patrimonial law,<sup>24</sup> at least not systematically.<sup>25</sup>

Even though the eligibility of NFTs as objects of ownership must eventually be assessed at the level of individual legal systems, we aim to discuss the matter at a relatively general level, concretizing the discussion at suitable points with illustrations from individual legal systems. The law of our home country, Finland, is often referred to for this purpose, but is also used as a perspective to observe solutions adopted elsewhere.

Once we have discussed in Section 2 the eligibility of NFTs as objects of ownership, we move on to our second research question in Section 3. The second research question concerns tokenization. It focuses on situations where an attempt is made to legally enhance an NFT so that *the owner or holder of that NFT would have a claim (receivable), an ownership right, or other right separate from the NFT*. Here, we only discuss those legal systems that have taken the position that NFTs can be objects of rights, at least in some sense. The second research question can be phrased as: *what problems of a patrimonial law nature may arise in attempts to connect different kinds of rights, even irrevocably, to owning or holding an NFT?*

Our purpose is not to take a position on how the notion of tokenization is best defined. The term ‘tokenization’ may have been used in different meanings, while the starting points have probably been quite similar. For example, tokenization has been described as ‘a method of converting rights in an on-chain digital asset that, operated in a blockchain, remotely controls an off-chain real asset’.<sup>26</sup> It has also been described as ‘a method that converts rights to an asset into digital tokens that can be bought, sold, and traded on blockchains’.<sup>27</sup>

Whether tokenization is valid and effective as a matter of patrimonial law must be studied separately. For example, consider tokenization of real estate or real estate transactions. To understand the legal effects of tokenization, if any, one must know the system of ownership in the country in question. If ownership of real estate is connected to a register kept by the authorities, it seems difficult to argue that the owner of a token intended to represent real estate in the Ethereum system must also be the owner of real estate. Similarly, difficulties arise if transfer of ownership of real estate is subject to form requirements which cannot be fulfilled by transferring a token.

<sup>24</sup> The term ‘patrimonial law’ refers to classic core areas of private law, such as the law of obligations and property law. In this context, the term ‘patrimony’ is used as a general term for assets belonging to a person (without taking a position on whether those assets are also regarded as the person’s property, since the term ‘property’ may have a narrower meaning in a given legal system).

<sup>25</sup> Eg, the MiCA Regulation focuses on other matters. As noted in Art 1(1), the Regulation ‘lays down uniform requirements for the offer to the public and admission to trading on a trading platform of crypto-assets other than asset-referenced tokens and e-money tokens, of asset-referenced tokens and of e-money tokens, as well as requirements for crypto-asset service providers’. See Rosa M Garcia-Teruel and Héctor Simón-Moreno, ‘The Digital Tokenization of Property Rights: A Comparative Perspective’ (2021) 41 *Computer Law & Security Review* 105543, 3. It should be noted that the EU has no general authorization to legislate in the area of private law. Rather, it needs a legal basis for each enactment. An often-used legal basis is Art 114 of the Treaty on the Functioning of the European Union, which establishes competence for ‘measures for the approximation of the provisions laid down by law, regulation or administrative action in Member States which have as their object the establishment and functioning of the internal market’. Art 114 was also used in the case of the MiCA Regulation.

<sup>26</sup> Cristina Argelich Comelles, ‘Smart Property and Smart Contracts Under Spanish Law in the European Context’ (2022) 30 *European Review of Private Law* 215, 226.

<sup>27</sup> George Sazandrishvili, ‘Asset Tokenization in Plain English’ (2020) 31 *Journal of Corporate Accounting & Finance* 68, 68.

NFTs have drawn attention due to applications in art, among other things. This leads to our third and final research question, which is: *what rights can a transferee of an NFT receive in connection with tokenization of digital art?* Again, we build on the presumption that NFTs are eligible as objects of ownership. As discussed in Section 4 below, digital art gives rise to special questions, such as whether copies of a work of art can be owned similarly to tangible objects, or how the relationship between tokenization and copyright should be understood. The answers to these questions also suggest how the phenomenon of art NFTs should be understood and analyzed from the perspective of patrimonial law.

In answering the research questions, we employ the methods of doctrinal legal research or ‘legal dogmatics’. We engage in interpretive legal dogmatics where necessary. Still, the main part of our research belongs to theoretical legal dogmatics, understood as the branch of legal dogmatics that maintains and develops the general doctrines of law.<sup>28</sup>

The Ethereum system, to which our discussion is mostly limited, involves a global decentralized blockchain. In connection with NFT arrangements, it is at times difficult to know which legal system governs the private law questions that may arise, such as those covered by our research questions. Indeed, it is possible that a private law question may concern or affect persons based in different countries or may have otherwise meaningful cross-border connections. Determining the applicable law (legal system) in these situations belongs to a special field of law and doctrine known as ‘private international law’ (or ‘conflict of laws’), which is excluded from the scope of this article. It should be noted, though, that private international law questions concerning digital assets have proved particularly difficult and are probably best resolved by way of international cooperation.<sup>29</sup>

The article proceeds as follows. Section 2 focuses on whether NFTs can be owned. This question is answered through discussion of preliminary considerations on actual and conceivable objects of rights (2.1), the Finnish notion of ownership (2.2), the concept of acquisition (2.3), and the legal position of a purported owner (2.4). Section 3 examines potential problems in attempts to connect different kinds of rights to owning or holding an NFT. The discussion moves from general matters of tokenization (3.1) to special questions in tokenization of creditor rights (3.2), share certificates (3.3), and ownership of material objects or ‘things’ (3.4). Section 4 addresses special questions in tokenization of digital art. Section 5 summarizes the main findings.

## 2. NFTs as objects of ownership

### 2.1. Preliminary considerations

National legal systems recognize various objects in which a person may have rights in the patrimonial law sense. Examples include physical things, which are often specifically addressed in legislation. One of the best-known laws to do so is the German Civil Code,<sup>30</sup> whose general part defines the concept of thing, *Sache* (section 90), as well as sub-concepts for it. Different kinds of intangible objects are also generally recognized. For example, literary and artistic works can be objects of copyright in countries around the world, as can be seen in the list of parties to the 1886 Berne Convention, which is still today the most important convention in copyright matters. Besides objects such as copyright-protected works, patent-protected inventions, and trademark-

<sup>28</sup> See, eg, Kaarlo Tuori, *Critical Legal Positivism* (Routledge 2016) 155, 228, 284, 290. While we illustrate our discussion with comparative observations, we do not pursue comparative knowledge typical of comparative law, and hence do not employ the methods of comparative legal research.

<sup>29</sup> See, eg, the recently started ‘Joint Project on Law Applicable to Cross-Border Holdings and Transfers of Digital Assets and Tokens’ of the Hague Conference on Private International Law (HCCH) and UNIDROIT <[www.hcch.net/en/news-archive/details/?varevent=921](http://www.hcch.net/en/news-archive/details/?varevent=921)> Accessed 15 August 2023.

<sup>30</sup> Bürgerliches Gesetzbuch (BGB), Ausfertigungsdatum: 18.08.1896.

protected marks, we can think of, say, limited liability companies, which are accepted nearly universally as legal persons with the idea that their shares are objects that can be owned, at least in some sense.

Private law scholars have recently faced the question how blockchain-based objects should be understood from the perspective of patrimonial law. Discussions have often started from Bitcoin, which is understandable considering that bitcoin and other native virtual currencies marked the first phase in the development of blockchain technology.<sup>31</sup> Native virtual currencies are still regarded as important in practice, despite the proliferation of various other forms of crypto-assets, such as NFTs for different uses. The question has been asked in several countries, and in the context of several legal systems, whether native virtual currencies or different crypto-assets more generally can be regarded as property.<sup>32</sup>

We need not systematically study those discussions since our focus is on NFTs. Besides, it is not always easy to determine the prevailing view in a given country. When assessing views presented in different countries, it is important to note that legal systems differ considerably in terms of what is accepted as property, property right, or the object of property.<sup>33</sup>

To be sure, just as the conditions for regarding something as property vary between legal systems, so do the legal consequences of fulfilling those conditions. For example, the UK Jurisdiction Taskforce addressed the questions ‘What is property, and why does it matter’ with the starting point that property conceptually entails protection against everyone (‘in principle proprietary rights are recognised against the whole world’).<sup>34</sup> Whether crypto-assets can be property depends on the characteristics of property in a given legal system and on crypto-assets matching those characteristics.<sup>35</sup>

As noted in the Introduction, nothing in the characteristics of NFTs seems to suggest that it would be unthinkable to accept NFTs as objects

<sup>31</sup> Unlike in this article, the term ‘token’ is often used in the context of native virtual currencies as well. It should be noted that, eg, ether is not based on smart contracts and thus differs from NFTs and other tokens created by smart contracts. See, eg, Haya R Hasan, Khaled Saalah, Ammar Battah, Mohammad Madine, Ibrar Yaqoob, Raja Jayaraman and Mohammed Omar, ‘Incorporating Registration, Reputation, and Incentivization into the NFT Ecosystem’ (2022) 10 IEEE Access 76416, 1. To emphasize the difference, some authors use the term ‘coin’ to separate native virtual currencies from tokens. See, eg, Chittoda (n 13) 189.

<sup>32</sup> See, eg, Kelvin FK Low and Ernie GS Teo, ‘Bitcoins and Other Cryptocurrencies as Property?’ (2017) 9 Law, Innovation and Technology 235; UK Jurisdiction Taskforce, ‘Legal Statement on Cryptoassets and Smart Contracts’ (November 2019) 9–30 <<https://technation.io/lawtechukpanel/>> Accessed 15 August 2023; Matteo Solinas, ‘Investors’ Rights in (Crypto) Custodial Holdings: Ruscoe v Cryptopia Ltd (in Liquidation)’ (2021) 84 Modern Law Review 155, 158–61; Robert Stevens, ‘Crypto is not Property’ (2023) Draft, final version forthcoming in Law Quarterly Review <<https://ssrn.com/abstract=4416200>> Accessed 15 August 2023.

<sup>33</sup> See, eg, Garcia-Teruel and Simón-Moreno (n 25) 4–5; Marta Ballesteros, Matthieu Wemaere, Leonie Reins, Virginie Rouas, Arne Riedel, Michael Mehling et al, *Legal Nature of EU ETS Allowances: Final Report* (European Commission 2019), 39–40, <<https://data.europa.eu/doi/10.2834/014995>> Accessed 15 August 2023 (doi: 10.2834/014995).

<sup>34</sup> See UK Jurisdiction Taskforce (n 32) 11–12. From this point of view, the question of fulfilling the conditions for being regarded as property is closely related to whether native virtual currencies or other forms of crypto-assets involve rights effective against everyone, at least in some sense. Discussion has also taken place more directly in terms of the distinction between ‘rights *in rem*’ and ‘rights *ad personam*’. See, eg, Alexander Savelyev, ‘Some Risks of Tokenization and Blockchainization of Private Law’ (2018) 34 Computer Law & Security Review 863.

<sup>35</sup> Eg, the UK Jurisdiction Taskforce has followed this approach, concluding that the characteristics of property are met in the case of crypto-assets, and that no reasons call for disqualifying these assets from being property. See UK Jurisdiction Taskforce (n 32) particularly 12, 15–17 and 9–11, which show with what kinds of crypto-assets in mind the report was written.

of ownership. It is also clear that NFTs may have monetary value. This value is not necessarily derived from a real-world object connected to the token in one way or another. Indeed, some people may be willing to pay even for NFTs whose value, if any, is intrinsic to the token itself as a blockchain-based object, similarly to the value of bitcoin and ether.<sup>36</sup>

The systems of patrimonial law in different countries are often rather flexible in that they can be adapted and developed to respond to changes in social and technological circumstances. For example, in Finland it is customarily thought that each field of law has its own general doctrines, and they are not set in stone. As explained in the Introduction, the task of maintaining and developing general doctrines belongs to theoretical legal dogmatics. In terms of content, general doctrines comprise concepts and principles typical of the field of law in question.<sup>37</sup>

In Finland, it is fully conceivable that potential objects of rights are not limited to traditional objects, but may include new kinds of objects, such as NFTs or crypto-assets more generally. Eligibility as objects of rights, or at least objects of ownership, requires sufficient support from sources of law in the legal system concerned, such as legislation or court decisions. The question whether NFTs can be accepted as objects of ownership cannot be answered separately from the question what exactly would follow from that acceptability in the legal system concerned.

Some countries have already enacted *special legislation* on how different virtual currencies or tokens are to be treated from the perspective of private law. Examples include the Liechtenstein Tokens and Trusted Technology Service Providers Act (TVTG),<sup>38</sup> whose part II (*Zivilrechtliche Grundlagen*) addresses private law starting points. Apparently, the prevailing view before this Act was that virtual currencies and tokens were not accepted as objects in the legal sense.<sup>39</sup> The Act was intended to change this, but at the same time the purpose was to draw a conceptual distinction to physical things and ownership of physical things.<sup>40</sup> Under Article 2(1) of the TVTG, the term 'token' is

defined as information on a Trusted Technology System (VT-System) that (1) may represent claim or membership rights against a person, rights in things, or other absolute or relative rights, and (2) is associated with one or more Trusted Technology Identifiers (VT-Identifikatoren). The definition is remarkably broad.<sup>41</sup> When the TVTG was being enacted, a token was understood as a container representing a right,<sup>42</sup> while the definition in Article 2(1) has been described in legal literature by the notion of 'token container model'.<sup>43</sup>

## 2.2. NFTs as objects of ownership in Finland

Rights and their objects are usually separated from each other rather clearly in Finnish legal literature. The concept of the right of ownership is often used in a narrow sense, whereby *only movable or immovable things can be objects of that right*. While the concept of a thing (Finnish *esine*, Swedish *sak*) has no general definition in legislation, it is usually understood as an individually defined *material* object which can be subject to human legal power. In contrast, the concept of property (Finnish *omaisuus*, Swedish *egendom*) is defined at the level of rights, meaning that *property consists of patrimonial rights*. Accordingly, property includes, for example, the right of ownership and rights of use of a thing, receivables and other claims, and intellectual property rights.<sup>44</sup>

More concretely, objects such as real estate (particular pieces of land) and cars are not property according to the prevailing view in Finnish patrimonial law literature. In contrast, ownership of these objects is property. In many countries, though, the concept of property differs from that adopted in Finland. In a country as close to Finland as Sweden, the prevailing view appears to regard objects such as real estate and cars as property, while the concept of property also covers rights such as copyright and creditors' rights against debtors.<sup>45</sup> It is also common in many countries that colloquial use of the term 'property' differs from its stricter legal meaning.<sup>46</sup>

In the context of Finnish law, too, we have to consider whether NFTs can be objects that can be owned similarly to movable things, at least as a starting point. If the right of ownership is understood in the traditional

<sup>36</sup> Tokens can be classified into intrinsic and extrinsic based on whether real-world objects or values are connected to tokens (as is the case with extrinsic tokens). Other classification criteria are also used. See, eg, Garbers-von Boehm, Haag and Gruber (n 14) 12–13, where division into currency, utility, and security tokens is mentioned first, followed by division into intrinsic and extrinsic tokens and finally division into fungible and non-fungible tokens. The MiCA Regulation distinguishes between asset-referenced tokens, e-money tokens, and other tokens, including utility tokens. See, in particular, Recital 18 and Art 3(1).

<sup>37</sup> Tuori (n 28) 174. It is also possible to regard juridical theories typical of the field of law as part of general doctrines.

<sup>38</sup> Gesetz vom 3. Oktober 2019 über Token und VT-Dienstleister (Token- und VT-Dienstleister-Gesetz; TVTG). A relatively large amount of legislation on blockchain-based tokens has been passed around the world in recent years, and it is somewhat difficult to form a whole picture of how this legislation affects private law, directly or indirectly. Clearly, some countries more than others have attempted to cover questions of a private law and patrimonial law nature. Besides the Liechtenstein TVTG, another oft-cited example of legislation interesting from the perspective of private law is the Belarus presidential decree 'On the development of the digital economy' No 8 of 21 December 2017. See, eg, Savelyev (n 34), 865–66; Garcia-Teruel and Simón-Moreno (n 25) 3.

<sup>39</sup> Thomas Nägele and Patrick Bont, 'Tokenized Structures and Assets in Liechtenstein Law' (2019) 25 *Trusts & Trustees* 633, 634.

<sup>40</sup> Bericht und Antrag der Regierung an den Landtag des Fürstentums Liechtenstein betreffend die Schaffung eines Gesetzes über Token und VT-Dienstleister (Token- und VT-Dienstleister-Gesetz; TVTG) und die Abänderung weiterer Gesetze, Nr. 54/2019. See, in particular, 62–64. The purposes are evident from the expressions used in the TVTG. Certain expressions specific to this Act have been used, while expressions referring to ownership of physical things have deliberately been avoided in some places. Eg, Art 4 provides that a token is deemed to be an asset located in Liechtenstein, 'im Inland befindliches Vermögen', if Liechtenstein law is applicable pursuant to Art 3. See Lehmann (n 23) 156. Lehmann notes that the term 'Vermögen', which he translates as 'patrimony', 'leaves the precise legal characterization of crypto assets open but guarantees nevertheless their exclusive attribution to the holder'.

<sup>41</sup> Art 2(1) also defines 'Trusted Technologies', 'Trusted Technology Systems', and 'Trusted Technology Identifier' ('VT' stands for *vertrauenswürdig* *Technologien*).

<sup>42</sup> Bericht und Antrag Nr. 54/2019 (n 40) 58–59, where it is stated that 'empty' containers, too, are possible and relevant in practice, eg cryptocurrencies with no real value as collateral, such as bitcoin.

<sup>43</sup> See, eg, Nägele and Bont (n 39) 636; Thomas Nägele, 'Registration Requirements According to the TVTG (aka the Token Act/Blockchain Act)' (2020) 26 *Trusts & Trustees* 564, 565.

<sup>44</sup> See Leena Kartio, *Esineoikeuden perusteet* (2nd edn, Kauppakaari 2001) 63, 114, 187; Janne Kaisto and Jarno Tepora, *Esineoikeus eurooppalaistuvassa Suomessa* (Lakimiesliiton kustannus 2012) 175–77. The concepts of thing and the right of ownership resemble their German counterparts (see, in particular, ss 90 and 903 of the German Civil Code), which is unsurprising in the light of the considerable influence of German law, besides Scandinavian law, on the development of Finnish patrimonial law. German solutions, in turn, have roots in Roman law. See, eg, Garbers-von Boehm, Haag and Gruber (n 14) 22, where ss 90 and 903 of the German Civil Code are pointed out as examples of provisions that reflect the Roman law tradition in that 'ownership refers to a physical object'. For a broader comparative perspective, see George L Gretton, 'Ownership and Its Objects' (2007) 71 *Rabels Zeitschrift für ausländisches und internationales Privatrecht* 802.

<sup>45</sup> See, eg, Torgny Håstad, *Sakrätt avseende lös egendom* (6th edn, Norstedts Juridik 2000) 29–42; Göran Millqvist, *Sakrättens grunder* (7th edn, Norstedts Juridik 2015) 35–40; Torgny Håstad, Erika P Björkdahl, Margareta Brattström and Laila Zackariasson, *Civilrättens grunder* (2nd edn, Iustus 2020) 57–59.

<sup>46</sup> See, eg, Law Commission, 'Digital Assets as Personal Property: Short Consultation on Draft Clauses' (February 2024) 4 <<https://lawcom.gov.uk/document/digital-assets-as-personal-property-draft-clauses/>> Accessed 25 April 2024.

narrow way, NFTs cannot be objects of that right because they are not material objects and hence not things. However, this does not entail that NFTs could not be objects of a right equivalent to the right of ownership. Indeed, it is common in Finland to speak of, for example, owning shares and claims, although these objects are not material either.<sup>47</sup> Moreover, the term ‘ownership’ is sometimes used in a considerably broader sense than that limited to material objects.<sup>48</sup>

At first glance it may seem that one cannot justify equating NFTs with things as material objects. This is because Ethereum-based and, more generally, distributed ledger technology-based NFTs boil down to the content of a distributed electronic information system. The same is true of all blockchain-based native virtual currencies and smart contract-based tokens. Understandably, it has been discussed in different countries whether crypto-assets should be excluded from the concept of property because they are, in essence, information.<sup>49</sup>

Nevertheless, legal reasoning does not operate solely on the basis of what something is from the perspective of natural science or technology. From the legal point of view, it is also possible to recognize relevant objects by way of *simplified conceptualizations*. Both lawyers and non-lawyers around the world speak of, for example, funds in a bank account, although this kind of ‘materializing conceptualization’ is inaccurate. As is commonly known, those funds are a debt owed by a bank, while a positive account balance indicates the amount of that debt. Still, a materializing conceptualization of bank money has in effect been accepted in legislation or case law in many countries. Finland may serve as an example, as discussed in Section 2.4 below. Even if the conceptualization has not been accepted to the same extent everywhere, its feasibility can be proved by the fact that it has been used in some countries without insurmountable conceptual and systemic problems or other issues. Compelling reasons may also exist to conceptualize NFTs as potential objects of ownership, considering the sources of law, economic aspects, and common parlance. For example, a piece of statutory law may use ownership terminology in connection with NFTs and protect the owner of an NFT similarly to an owner of a movable (material) thing.

When we say, for example, that a particular piece of land or a particular vehicle belongs to someone, we think of ownership of that piece of land or that vehicle. The same applies to NFTs. Since NFTs are technically identifiable and distinguishable from each other, they can easily be legally conceptualized as objects. In contrast, ether, bitcoin, and the like are more difficult in this respect. One possible

conceptualization is that all assets associated with an address together form a single object.<sup>50</sup> A suitable point of comparison among more traditional objects could be a quantity of oil kept in a container, which is generally accepted as an object of ownership in different legal systems.<sup>51</sup> The majority of fungible tokens could probably be viewed in this way, regardless of whether they are created in the Ethereum system or some other environment.

No legislation in Finland takes a direct stand on whether NFTs can be owned. However, many pieces of legislation concern property in general and highly likely apply to different kinds of crypto-assets as well. For example, the Guardianship Services Act (442/1999) states that minors lack the capacity to make decisions about their property, unless otherwise provided by law. This undoubtedly also applies to all virtual currencies, NFTs, and other tokens whose economic significance is such that a restriction of capacity is needed in order to protect the economic interests of minors.

When considering whether crypto-assets can be regarded as property, it is indeed important to keep in mind that the term ‘property’ or equivalent is typically used in legislation in different countries. From this perspective, the key question is *in what sense different provisions in legislation and statements in court decisions refer to property*.<sup>52</sup> In some countries, legislation may be relatively consistent in that the terms used have the same meaning in all or nearly all connections. Finland, in contrast, exemplifies countries whose private law legislation is rather fragmentary, has gaps, and has not been codified in order to promote systemic clarity.<sup>53</sup> Accordingly, even if the term ‘property’ in one Finnish provision encompasses NFTs and other crypto-assets, it cannot be excluded without further examination that another provision may use the same term in a narrower sense. The same is true of case law. Regardless of how crypto-assets are characterized at general level, from the Finnish perspective it is essential to ask, separately, in what sense the term ‘property’ is used in individual instances in legislation and case law.<sup>54</sup>

From the Finnish point of view, the question whether NFTs or crypto-

<sup>50</sup> Teemu Juutilainen and Janne Kaisto, ‘Co-ownership as a Solution to Commingling: A Finnish Perspective’ (2024) 32 *European Review of Private Law* 109, 114. At the end of the day, assets are associated with addresses. However, grounds may exist to conceptualize them around accounts, too, depending on the architecture of the system. To prove this, let us take a closer look at the Ethereum system, the system of interest in our article. As a starting point, a blockchain contains records of transactions which essentially determine the transfers possible from the addresses in the system. However, the Ethereum system also utilizes accounts. Put simply, EOAs and CAs are objects in the Ethereum system, but they are used in a data structure (World State) outside the actual blockchain. In this data structure, every address is connected to an account, which contains information on the address. One of the variables of the object ‘account’ is ‘account balance’, which indicates the balance on the account. Due to the connection between the account and the address, the balance conveys information on the address as well. Even though account balances themselves are not recorded in the blockchain, they affect the block hash, which is part of a block in the blockchain. For more details, see the Ethereum Yellow Paper, ie, Gavin Wood, ‘Ethereum: A Secure Decentralised Generalised Transaction Ledger’ (Berlin Version, 23 October) <<https://ethereum.github.io/yellowpaper/paper.pdf>> Accessed 15 August 2023.

<sup>51</sup> In Germany, eg, quantities of oil are regarded as fungible things (*vertretbare Sachen*) under s 91 of the Civil Code. In Finland, too, quantities of oil are eligible as objects of ownership, provided that they meet the general characteristics of a thing. Things of this kind are today usually referred to as bulk things. See Kartio (n 44) 63; Kaisto and Tepora (n 44) 188–89.

<sup>52</sup> See UK Jurisdiction Taskforce (n 32) 11–12.

<sup>53</sup> See, eg, Teemu Juutilainen, ‘Finnish Private Law: Statutory System Without a Civil Code’ in Julio César Rivera (ed), *The Scope and Structure of Civil Codes* (Springer 2013) 155.

<sup>54</sup> See Janne Kaisto and Eelis Paukku, ‘Emission Allowances and Carbon Credits as Property: A Finnish Perspective’ (2023) 12 *European Property Law Journal* 148, 154–57.

<sup>47</sup> See, eg, Kartio (n 44) 187–88.

<sup>48</sup> Examples of this way of speaking are also found in Finnish legislation. See, eg, the Enforcement Code (705/2007), c 5, s 3, which addresses ownership of property sold at auction.

<sup>49</sup> See, eg, UK Jurisdiction Taskforce (n 32) 16–17; cf Stevens (n 32) 9–11. The authors end up in different conclusions in the context of the same legal system. Unlike Stevens, the UK Jurisdiction Taskforce does not ‘consider that cryptoassets are disqualified from being property on the ground that they constitute information’. In the TVTG, the use of the concept of ownership was avoided, among other reasons, because tokens technically only represent information or an entry in a Trusted Technology System and have no physical nature. See Bericht und Antrag Nr. 54/2019 (n 40) 62.

assets more generally can be regarded as property may not necessarily be apposite. It seems more apt in terms of the conceptual system to ask whether NFTs as such can be objects of rights. In this article we focus on ownership, but other rights may of course give rise to further questions. For example, if an NFT can be owned, it is relevant to ask whether the owner has the power to create a security right in the NFT.

Even considering that concrete questions of interpretation must be dealt with separately, it is relatively easy to argue that *NFTs are objects that can be owned under Finnish law*.<sup>55</sup> As discussed in more detail in Section 2.4 below, the legal position of the owner of an NFT in many respects resembles that of the owner of an immovable or movable (material) thing. This is significant in the context of Finnish patrimonial law, where the focus is often more on legal positions than on rights. Indeed, rights may be understood as auxiliary concepts or ‘names’ given to legal positions on the grounds of expediency.<sup>56</sup>

We speak of owning and ownership of NFTs in the following, also because this is practical as a technique of presentation. However, it should be kept in mind that the traditional narrow definition of the right of ownership is still used in Finnish legal literature and has some merits, especially in terms of conceptual precision. Arguably, it would be more cautious to stick with tradition and avoid speaking of a right of ownership in the case of NFTs, for it is unclear whether the legal position of the owner of an NFT corresponds to that of the owner of a material object in all respects.

### 2.3. To whom does an NFT belong?

If an object can be owned, it is also relevant to ask how a person can become the owner of the object. It seems natural to start with the premise that *one can become the owner of an NFT in the same way as with other objects*. This leads us to the concept of acquisition. In order to recognize the owner of an NFT, we need to know the basics of the general rules determining the facts that make a person an owner.

To begin with, it seems reasonable to presume that if the owner of an NFT dies, ownership of the NFT passes similarly to ownership of any other object. Likewise, the owner of an NFT can transfer ownership of the NFT through, say, sale, exchange, or gift. Yet, as is well known, legal systems differ from each other in basic questions regarding transfer of ownership. Consider transfer of ownership of a movable object *inter vivos*. In some legal systems, transfer of ownership requires, at least as a rule, transfer of possession.<sup>57</sup> In others, the so-called consensual system prevails, meaning that transfer of possession is not necessary for ownership to pass. Finnish law exemplifies the consensual system.

<sup>55</sup> It is hardly justified to regard a private key, which as such is only information, as an object of ownership. If an NFT or other crypto-asset itself is regarded as the object of ownership, then the associated private key is at least primarily related to factual control and transferability in the technical sense. However, the alternative view according to which owning a crypto-asset means actually owning a private key has also been noted in legal literature, especially in conceptualizing Bitcoin. See, eg, Low and Teo (n 32) 247–48; Stevens (n 32) 9–11.

<sup>56</sup> See, eg, Simo Zitting and Martti Rautiala, *Esineoikeuden oppikirja: Yleinen osa* (5th edn, Suomen Lakimiesliiton Kustannus 1982) 12; Kaisto and Tepora (n 44) 241.

<sup>57</sup> See, eg, s 929 of the German Civil Code. Transfer of possession, *traditio*, was associated with transfer of ownership already in Roman law. See, eg, George Mousourakis, *Fundamentals of Roman Private Law* (Springer 2012) 131–34; Craig Anderson, *Roman Law Essentials* (2nd edn, Edinburgh University Press 2018) 52–53.

Hence, in Finland, if person A wishes to sell a movable object to person B, transfer of ownership can be brought about by the sale itself.<sup>58</sup> The starting point with respect to immovable objects is similar. Under chapter 1, section 1 of the Code of Real Estate (540/1995), title to real estate is acquired by sale, trade (exchange), gift, or other conveyance, as provided in the Code. Separate provisions (other statutes) apply to acquisition of real estate by inheritance, will, distribution of matrimonial assets, expropriation, or otherwise not by conveyance. Acquisition of title to real estate must be registered, but this registration is declarative instead of constitutive by nature.<sup>59</sup> A person registered as the owner is not necessarily the owner. Rather, the owner is the person with the latest acquisition.

Although transfer of possession and registration of title are separated from passing of ownership, they strengthen the legal position of a transferee. For example, section 22(1) of the Promissory Notes Act (622/1947) applies to negotiable documents and addresses transferee’s position in relation to transferor’s creditors. Under this section, transfer of a negotiable promissory note is not binding on the transferor’s creditors unless the transferee has taken possession of the promissory note (*constitutum possessorium* is not accepted). This provision is one of the exceptions to the main rule that transfer of possession or registration of title is not needed for a transferee to be protected against the transferor’s creditors. In turn, where the main rule applies, transfer of possession or registration of title may strengthen a transferee’s legal position in relation to other third parties, such as competing transferees.

It is clear that one can become the owner of an NFT in Finland, for example, through inheritance under the Inheritance Code (40/1965) or through transfer *inter vivos*. Disposing of NFTs by will (testament) is also undoubtedly possible, as long as it is done in accordance with the law. The main rule, found in chapter 10 of the Inheritance Code, states that a will must be made in writing and in the simultaneous presence of two witnesses.

From the perspective of the concept of acquisition, the person who has the latest legal acquisition of an object can be defined as the owner. It is highly unlikely that under Finnish law a person who manages to hack the information of a private key, and uses the private key to transfer an NFT to an address in their exclusive control, would be regarded as the owner of the NFT. That is, an NFT does not necessarily belong to a person who knows the private key needed (as a technical rather than legal requirement) to execute transfer of the NFT. Put differently, legal ownership must be conceptually distinguished from ‘internal ownership’ in the Ethereum system, a distinction that probably deserves more recognition in the design of functionalities in the Ethereum system as well as in other similar blockchain systems.

From the perspective of Finnish patrimonial law, it is important to distinguish between ‘technical’ transfers of an NFT inside the Ethereum system from transfers of ownership of an NFT in the legal sense. This distinction should be kept in mind when studying a transfer disposition (expression of intent to transfer). As a starting point, it can be presumed that executing a technical transfer implies the intention to transfer ownership of the NFT to another, unless the transferor is transferring factual control of the assets to an address in the transferor’s own factual control. However, a transfer disposition can also be made orally or in a

<sup>58</sup> Janne Kaisto and Tapani Lohi, ‘Transfer of Ownership by Unilateral Juridical Act’ (2013) 21 *European Review of Private Law* 573, 573–77. Put simply, it suffices that the parties agree on the passing of ownership. Yet, it may also be possible for the owner to transfer ownership by way of unilateral transfer disposition. See Janne Kaisto and Tapani Lohi, *Johdatus varallisuusoikeuteen* (2nd edn, Talentum 2013) 176.

<sup>59</sup> Government Proposal 120/1994, 88; Matti Ilmari Niemi, ‘Electronic Conveyancing of Real Property in Europe: Two Models, the English and the Finnish One’ in Luz M Martínez Velencoso, Saki Bailey and Andrea Pradi (eds), *Transfer of Immovables in European Private Law* (CUP 2017) 27–29; Argelich Comelles (n 26) 218.

physical (paper) or electronic document, to cite just a couple of examples.<sup>60</sup> The relevant private key can be passed at the same time. Yet, if the transferor still knows the private key, the transferor retains the ability to execute a technical transfer, which poses a risk to the transferee.<sup>61</sup>

A technical transfer in the Ethereum system may originate from an action by a smart contract in the blockchain. A case like this involves no physical person directly expressing their will to transfer a token. According to our understanding, a person may become the owner of an NFT even if the token is technically transferred by a smart contract in the Ethereum system or some other similar system. This is comparable to a person buying snacks or soda cans from a vending machine and becoming the owner of the bought items. Ordinarily, it would be possible to identify (even if with some difficulty) physical persons, owning the machine or otherwise connected to it, who intend to transfer ownership of items to buyers. The same applies to smart contracts, at least to some extent. Going back far enough, we could find physical persons, possibly representing another physical person or a legal person, who are using smart contracts so as to execute legal transactions.

#### 2.4. Legal position of the owner of an NFT

Generally speaking, it makes sense to regard an object as an object of ownership only if the legal position of the purported owner includes features that are generally regarded as features of ownership. Yet, in Section 2.2, we adopted the view that an NFT can be owned in Finland. This is largely due to the fact that many questions that arise in connection with NFTs are answered under Finnish law in ways that justify speaking of owning an NFT.

One of the most important questions from the systemic point of view is *whether a person in factual control of an NFT has the duty to transfer the NFT to another person's control on the basis that the latter person owns the NFT*. A corresponding question is related to possession of (material) things. For example, section 985 of the German Civil Code states explicitly that the owner may require the possessor to surrender the thing. Finnish statutory law has no corresponding provision, but an owner is undoubtedly entitled to possession of an owned thing in Finland as well.<sup>62</sup>

In some legal systems, it may be difficult to accept 'repossession' claims concerning an NFT in the absence of special rules on NFTs. The reason may be that rules on (material) things are not deemed applicable,<sup>63</sup> while a claim of that kind is deemed unenforceable without

<sup>60</sup> In these cases, it is possible to speak of an off-chain transfer, as a distinction from an on-chain transfer. See, eg, UK Jurisdiction Taskforce (n 32) 14–15; Jake Frankenfield, 'Off-Chain Transactions: Definition, Advantages, Vs. On-Chain' (*Investopedia*, updated 24 August 2021) <[www.investopedia.com/terms/o/offchain-transactions-cryptocurrency.asp](https://www.investopedia.com/terms/o/offchain-transactions-cryptocurrency.asp)> Accessed 15 August 2023. Even though the authors do not focus on NFTs in particular, the distinction between on-chain and off-chain transfers (or transactions) applies to them as well. To be sure, the terms 'off-chain' and 'on-chain' can be used in different ways. In this article, we have started from the notion of transfer under Finnish patrimonial law and studied the transfer of NFTs in the Ethereum system from that perspective.

<sup>61</sup> See also UK Jurisdiction Taskforce (n 32) 14–15.

<sup>62</sup> See, eg, Kartio (n 44) 191–92; Kaisto and Tepora (n 44) 249–50.

<sup>63</sup> Eg, the 'repossession' claim under s 985 of the German Civil Code is understood to concern only things, which are by the definition of s 90 material (corporeal) objects. See, eg, Christoph Karl Sliwka, *Herausgabeansprüche als Teil des zivilrechtlichen Eigentumsrechts? Die rei vindicatio und funktionsäquivalente Ansprüche des Eigentümers gegen den Besitzer im französischen, englischen und deutschen Recht* (Logos Verlag 2012), 391–93. Because an NFT is not a thing in the said sense, the German Civil Code provisions concerning the owner of a thing are not applicable to NFTs, at least not directly. See also Garbers-von Boehm, Haag and Gruber (n 14) 22–23, where main focus is on s 903 of the German Civil Code.

clear legislative support. In Finland, where legislation is fragmentary compared to many continental European countries, such a formal approach would not be justified. For example, in the case of hacking, it seems rather clear that the original owner of an NFT may, invoking ownership, require the hacker to return the NFT to the owner's factual control. A somewhat more difficult question is whether this kind of claim can be successfully made even if the hacker is *bankrupt*, that is, subject to collective liquidation-type insolvency proceedings. Here, a central provision is chapter 5, section 6 of the Bankruptcy Act (120/2004), under which third-party property in possession of the debtor does not belong to the bankruptcy estate if it is separable from the debtor's property. In that case, the third-party property must be given to its owner, or to a person designated by the owner, on conditions whose fulfilment the bankruptcy estate is entitled to require.

This provision can probably be interpreted to mean that NFTs, too, can be third-party property held by the debtor. What particularly supports this interpretation is that, according to the preparatory works for the provision, examples of that kind of property include *funds in a bank account*.<sup>64</sup> It is thus clear that, in a bank account holder's bankruptcy, funds in the account may belong to a third party in such a way that is effective against the bankruptcy creditors. It would not make sense to treat very differently situations where an NFT is in factual control of someone other than its owner. The example of funds in a bank account shows that chapter 5, section 6 of the Bankruptcy Act uses the terms 'possession' and 'property' in a rather broad sense.

In order for an NFT to be returned to factual control of its rightful owner,<sup>65</sup> the private key necessary for the NFT's technical transferability must be known. In legal literature, the factual significance of a private key may have sometimes been seen as a matter that considerably complicates accepting 'proprietary' claims regarding crypto-assets, even as a matter of principle.<sup>66</sup> The impossibility of returning factual control without a private key may undoubtedly cause practical problems, although some such problems rather result from difficulties in identifying the person in factual control of the crypto-asset in question. However, similar problems may arise in connection with material objects (things),<sup>67</sup> though this is not thought to undermine the justification of 'repossession' claims as a matter of principle. The factual significance of a private key is not a compelling reason to object to 'repossession' (or 'return-of-control') claims concerning NFTs or crypto-assets more generally. Indeed, these claims have been viewed favourably in case law

<sup>64</sup> Government Proposal 26/2003, 74. There it is also stated that a third-party owner is not protected under c 5, s 6 in case the funds are not separable (identifiable) from the debtor's other funds. Yet it is noted that in some cases funds, eg, transferred to the debtor's bank account by a third party, may be identifiable.

<sup>65</sup> If a hacker, using their own private key, technically transfers an NFT to an address given by the rightful owner (not necessarily the same address whose private key was revealed through hacking), this arrangement does not constitute an acquisition. In other words, the technical transfer is *vindicatio*, not *condictio*. This does not imply that rules on unjust enrichment could not be applicable in some situations. See Dariusz Szostek, *Blockchain and the Law* (Nomos Verlagsgesellschaft 2019) 86–87, where the matter is discussed from the point of view of unjust enrichment.

<sup>66</sup> See, eg, Savelyev (n 34) 867–68, with some openness for interpretation on this point.

<sup>67</sup> If a robber takes a necklace from a pedestrian and hides it under a certain rock in a large forest with a plan to pick it up later, it is very unlikely that the necklace could be returned to its rightful owner's possession. Even so, the robber can, if identified and found, be required to return the necklace, and be ordered by a court to do so. To be sure, the owner may have further rights as a result of the incident.

in several countries.<sup>68</sup>

A person in factual control of an NFT, but without the latest legal acquisition, may execute a technical transfer of the NFT with the intention to make the transferee the owner of the NFT. For example, the person may have got to know the relevant private key through hacking and then used it to transfer the NFT to another account. If NFTs are accepted as objects of ownership, it should be a clear starting point that the hacker lacks the competence to legally transfer the NFT. Indeed, legal systems around the world generally start with the notion that a person who does not own an object cannot transfer that object as its owner so as to be owned by another person.<sup>69</sup>

Under Finnish law, it is clear that a non-owner lacks the competence to legally transfer an NFT. Notwithstanding this lack of competence, a transferee may become owner of the NFT under the rules on *good faith (bona fide) acquisition*. If protection of good faith is in principle available, the particular conditions for enjoying that protection must be examined separately. Finnish law contains no special rules on good faith protection concerning crypto-assets, and the question of the conditions is to some extent open. A detailed discussion of the conditions would not advance the aims of this article, so we refrain from doing so.<sup>70</sup> Suffice it to note that good faith protection is excluded at least in situations where the transferee knew or ought to have known of the transferor's lack of competence to legally transfer the NFT. This is the case even if the NFT has ended up in the transferor's factual control. In the absence of the transferor's factual control, functionally equivalent to possession, good faith protection is also likely to be excluded.

If an NFT has been technically transferred on-chain, one may ask whether the NFT remains the 'same object' as it was before the technical transfer. For example, the UK Jurisdiction Taskforce, though discussing crypto-assets other than NFTs, answered a similar question in the negative. This resulted in them rejecting – with respect to the types of crypto-assets discussed – the traditional general principle according to which a non-owner lacks the competence to transfer and thus cannot confer ownership on another person. Due to the creation of a new object, so the argument goes, the situation is not analogous to a transfer of a tangible object such as a painting, but rather to a bank payment.<sup>71</sup>

This view seems quite original,<sup>72</sup> and is better suited to native virtual currencies than to NFT-type crypto-assets. At least Ethereum-based NFTs are created technically in such a way that they can aptly be regarded as the same object, even though as a result of a technical transfer their transferability is connected to another account. Under Finnish law, sufficient grounds exist for considering that an NFT remains the same object after a technical transfer. The requirement of sameness may be fulfilled in connection with bank payments as well, so the question of good faith protection is also relevant when a bank payment is made

<sup>68</sup> See, eg, *AA v Persons Unknown & Ors* [2019] EWHC 3556 (Comm); *Ruscoe v Cryptopia Ltd (in Liquidation)* [2020] NZHC 728; and especially *Osbourne v Persons Unknown & Anor* [2022] EWHC 1021 (Comm), which concerned NFT-type crypto-assets. Apparently in all these judgments crypto-assets were regarded as property at least in some sense.

<sup>69</sup> See, eg, UK Jurisdiction Taskforce (n 32) 14; Bericht und Antrag Nr. 54/2019 (n 40) 63.

<sup>70</sup> In future studies, it is important to consider that a transfer disposition (expression of intent to transfer) can also be made off-line, as explained in Section 2.3 above. Assessment of good faith protection under Finnish patrimonial law could prove particularly difficult in these cases.

<sup>71</sup> UK Jurisdiction Taskforce (n 32) 14.

<sup>72</sup> See Lehmann (n 23) 160. If the 'object identity' of crypto-assets was considered to change as a result of a technical transfer, the question would arise as to whether the original owner could be regarded as the owner of the crypto-assets in factual control of the transferee on the ground that those assets could be deemed to have replaced the original assets. However, many legal systems are quite dismissive of the surrogate doctrine, at least as a general starting point. See, eg, Sliwka (n 63) 392, where it is noted with respect to (material) things that German law does not recognize a general notion of surrogate.

using funds belonging to another person.<sup>73</sup>

From the perspective of 'repossession' (or 'return-of-control') claims, bankruptcy protection, and transfers without the competence to legally transfer, it can be concluded that *it is justified under Finnish law to start with the notion that NFTs can be owned*. This conceptual starting point also helps to analyze relevant legal questions. Indeed, it is important to note that many questions related to ownership of material objects (things) can be posed at least in almost the same way in connection with NFTs and crypto-assets more generally. In the absence of special rules on crypto-assets, answers must often be sought from the way in which the legal system treats other objects of ownership, such as tangible movables. Even a cursory analysis shows that many NFT-related questions must be answered quite similarly to corresponding questions related to tangible movables.

### 3. Giving NFTs additional legal meaning

#### 3.1. Starting points and specified research questions

The possibility to tokenize various kinds of objects with the help of blockchain-based solutions has recently received a great deal of attention. The notion of tokenization may have been understood differently in different contexts, at least in terms of details. Of course, the meaning of tokenization depends on what is meant by token. This article focuses on non-fungible tokens, which were defined in the Introduction as tokens created by utilizing Ethereum standard ERC-721 or a technologically equivalent standard. When reading different kinds of texts, one should keep in mind that legal scholars may not necessarily use terms and concepts in exactly the same way as, for example, those writing from the perspective of technology or economics.

The attention received by tokenization is due to the potential, expected benefits. For example, Saurav K Dutta has listed four main advantages of tokenization, namely (1) greater reach, (2) increased ease of transaction, (3) greater liquidity, and (4) transparency of records.<sup>74</sup> He notes that tokenization of assets involves 'digital presentation to prove ownership of real assets'.<sup>75</sup>

In this section, we focus on tokenization where the intention is to give NFTs additional legal meaning so that *the owner of an NFT would also have a right of ownership, a claim (receivable), or other right separate from the NFT itself*. From the legal point of view, the idea of connecting objects and rights involves nothing new as such. Suffice it to refer to the history of various kinds of physical documents incorporating rights.<sup>76</sup> In this light, NFTs are merely a new technological medium.<sup>77</sup>

If a token can be owned, then tokenization, in the meaning discussed here, results in a kind of dualism. Owning a token must be systematically separated from the right represented by the token.<sup>78</sup>

Even though our perspective on tokenization is rather limited to begin with, we have to focus on a small number of possible situations to enable discussion at a meaningful level of detail. We have selected the following three questions for closer examination, mainly in the light of

<sup>73</sup> In this situation, good faith protection follows the principles of the Promissory Notes Act (622/1947), s 14, which concerns negotiable promissory notes. This is based on Finnish Supreme Court decision KKO 1998:45. On negotiable promissory notes, see Section 3.2 below.

<sup>74</sup> Saurav K Dutta, *The Definitive Guide to Blockchain for Accounting and Business: Understanding the Revolutionary Technology* (Emerald Publishing 2020) 81–82.

<sup>75</sup> *Ibid.*

<sup>76</sup> See, eg, Jacob J Rabinowitz, 'The Origin of the Negotiable Promissory Note' (1956) 104 *University of Pennsylvania Law Review* 927. For further examples, see Juliet M Moringiello and Christopher K Odinet, 'The Property Law of Tokens' (2022) 74 *Florida Law Review* 607, 615–27.

<sup>77</sup> See Szostek (n 65) 127, where it is noted, focusing on tokens in general, that a token 'is nothing more than a new medium of a legal instrument'.

<sup>78</sup> See Savelyev (n 34) 867; Argelich Comelles (n 26) 228.

Finnish law. (1) Can a natural or legal person obligate themselves to effect some performance to the owner or holder of an NFT? (2) Can a limited liability company issue an NFT as a share certificate with legal effects corresponding to those of a physical (paper) share certificate? (3) Can the owner of a (material) thing connect ownership of a thing to an NFT so that ownership of the thing belongs to the owner of the NFT?

### 3.2. Tokenizing creditor rights

A generally accepted starting point in legal systems is that persons can make promises so as to create obligations for themselves, defining the content of those obligations themselves. Promises can also be connected to objects. Examples include a promise to provide a service to the owner of a certain thing. A promise may be expressed in several alternative ways. For example, a person may give another person a document containing a promise to pay 10,000 euros to the possessor of the document at a certain point in time. Legal systems typically have special provisions on this type of payment promises. In Finland, a central piece of legislation is the Promissory Notes Act (622/1947), whose chapter 2 contains provisions on negotiable promissory notes, defined under section 11(1) as promissory notes payable to the possessor (bearer) of the promissory note or to a person specified in the promissory note or another person designated by that specified person.

In legal systems accepting freedom of will as a starting point, it should be rather clear that *a debtor can, as a rule, commit to effecting some performance to the owner of a blockchain-based token*. The token in question could, for example, be some kind of *utility token*, which has often been analyzed starting with the notion that the issuer of a token is a debtor in relation to the owner of the token.<sup>79</sup> Utility tokens are also covered by the MiCA Regulation, whose Article 3(1) defines a utility token as ‘a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer’. These tokens apparently usually involve debt relations, which are central in *electronic money tokens* as well.<sup>80</sup>

If it is generally possible to obligate oneself to effecting some performance to the owner of a token, a holder of a token, or an owner holding a token, then the same is undoubtedly true of NFTs, which may often be particularly useful in terms of achieving the goals pursued. It follows from the starting point of freedom of will that a promise can be given in several alternative ways. On the one hand, it is possible to imitate physical documents so that an NFT contains information similarly to a paper document to which a promise is connected. On the other hand, a promise can be given in a way that is technically entirely unconnected with an NFT, such as by announcing on a generally accessible website that the holders of certain NFTs enjoy certain creditor rights. In an intermediate solution, an NFT contains a reference through which one can access the source of information, either directly or through an additional link.<sup>81</sup>

It is yet another question how different kinds of legal problems are dealt with. For example, a debtor acting in good faith may effect performance to a person who has received factual control of the relevant

<sup>79</sup> See, eg, Savelyev (n 34) 864, 867. Savelyev understands utility tokens as ‘tokens which are intended to provide digital access to an application or service’.

<sup>80</sup> See, in particular, the MiCA Regulation, Art 49, where it is stated among other things that e-money token holders ‘shall have a claim against the issuers of those e-money tokens’. Art 3(1) defines an electronic money token or e-money token as ‘a type of crypto-asset that purports to maintain a stable value by referencing the value of one official currency’.

<sup>81</sup> The standard ERC-721 includes several ‘view’ functions, which among other things enable identifying the link to a token’s metadata. See, eg, Chittoda (n 13) 241–24; Bellagarda and Abu-Mahfouz (n 3) 6–7; William Entriken, Dieter Shirley, Jacob Evans and Nastassia Sachs, ‘ERC-721 Non-Fungible Token Standard’ (*Ethereum Improvement Proposals*, 24 January 2018) <<https://eips.ethereum.org/EIPS/eip-721>> Accessed 15 August 2023.

NFT through hacking. Chapter 2 of the Finnish Promissory Notes Act contains provisions aimed at resolving problems that resemble this, but it is not entirely clear to what extent those provisions can be applied by way of analogy to NFT arrangements, also considering that the Act is directly applicable only to monetary debts. As a rule, the Act protects a debtor in good faith even if the person in possession the negotiable document is not entitled to receive the payment.

Generally speaking, it would seem apt to *afford NFTs similar legal treatment as to physical documents insofar as NFTs are used to pursue similar goals as physical documents*. In Finland as well as in other EU Member States, this solution receives at least principle-level support from the Electronic Commerce Directive,<sup>82</sup> whose Article 9 requires Member States to ‘ensure that their legal system allows contracts to be concluded by electronic means’. Similar legal treatment can also be connected with *the principle of technology neutrality*, which is adopted generally in EU legislation. It is good to note that even the MiCA Regulation is not really in contradiction with technology neutrality, although it focuses on a particular technology, namely, distributed ledger technology applications.<sup>83</sup>

### 3.3. Tokenizing share certificates

Shares, as commonly understood, relate above all to limited liability companies, which are generally recognized as legal persons. For example, under the Finnish Limited Liability Companies Act (624/2006, hereinafter ‘LLCA’), chapter 1, section 2(1), a limited liability company is a legal person distinct from its shareholders and established by registration. Share certificates are often issued for shares in a company, but usually this is not necessary. Under chapter 3, section 9 of the LLCA, under certain circumstances the board of directors must issue share certificates at a shareholder’s request, unless the shares have been incorporated into the domestic or a foreign book-entry system.<sup>84</sup> In the domestic book-entry system, share certificates are functionally represented by book entries, which means – under the Act on the Book-Entry System and Settlement Activities (348/2012), chapter 1, section 3 – shares or other objects incorporated in the book-entry system.<sup>85</sup> Under the same provision, the (domestic) book-entry system means an information system entity consisting of book-entry accounts and related lists referred to in the Act on Book-Entry Accounts (827/1991), while a foreign book-entry system means the system of a European Economic Area Member State or a third country corresponding to the (domestic) book-entry system.

When share certificates are issued, they have great significance for patrimonial law. For example, chapter 3, section 13(1) of the LLCA is built on the idea that exchange of shares occurs through exchange of share certificates. This provision starts with the notion that certain provisions on negotiable promissory notes in chapter 2 of the Promissory

<sup>82</sup> Parliament and Council Directive 2000/31/EC of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (Directive on electronic commerce) [2000] OJ L178/1.

<sup>83</sup> See the MiCA Regulation, Recital 9 and Art 2(4), where the scope of the Regulation is significantly limited by excluding certain crypto-assets that fall within the scope of other regulation. Excluded are, eg, financial instruments as defined in EU legislation. For the avoidance of doubt, NFTs created utilizing standard ERC-721 are not necessarily ‘crypto-assets that are unique and not fungible with other crypto-assets’ within the meaning of Art 2(3). For recent national legislation enabling the issuance of debt instruments by way of blockchain or distributed ledger technology, see the German Act on Electronic Securities (Gesetz über elektronische Wertpapiere (eWpG), Ausfertigungsdatum: 03.06.2021), especially ss 1, 4, and 16–23.

<sup>84</sup> See the LLCA, c 3, s 14a(4).

<sup>85</sup> Under the Act on the Book-Entry System and Settlement Activities, c 4, s 1, no share certificate, debt instrument, or other such physical certificate relating to the existence and content of a right is issued for a book entry, and book entries are not numbered.

Notes Act are also applicable to transfers and pledges of share certificates. In turn, the Act on Book-Entry Accounts contains provisions on book-entry accounts in the domestic book-entry system and on the legal effects of entries in those accounts.

It was a clear starting point in drafting the LLCA that *share certificates issued for shares are physical documents*. Under chapter 3, section 10, a share certificate can only be issued to a specified person, and the information that a share certificate must contain is subject to various requirements. This information includes, for example, the company's trade name and business identity code, and the serial numbers of the shares or, alternatively, the number of shares and the serial number of the share certificate. In addition, the share certificate must be dated and signed by the board of directors, or a person authorized by the board of directors, though the signature may be printed or reproduced in a comparable manner.

It is not entirely clear whether chapter 3, section 9 of the LLCA could be interpreted to mean that the board of directors could issue an NFT as a certificate for a share. LLCA provisions, which have clearly been drafted with physical documents in mind, provide solid grounds for answering in the negative.<sup>86</sup> Even if it were considered possible in principle to issue a share certificate in NFT format, it could be rather difficult to see to it that an NFT share certificate fulfils all the requirements regarding the content of a physical share certificate. The corresponding content could be regarded as a necessary precondition for approving a share certificate in NFT format. However, even if the corresponding content could be arranged, the most plausible interpretation of chapter 3, section 9 is that *the board of directors has no right or duty to issue other than physical share certificates*.

Even so, one may ask whether tokenization could be enabled *in the company's articles of association*. An affirmative answer is supported by chapter 1, section 9 of the LLCA, under which the shareholders may include provisions on company operations in the articles of association. However, provisions contrary to a mandatory provision of the LLCA or other act, or contrary to appropriate conduct, must not be included.

The possibility of connecting a share to an NFT-based system depends in practice on whether a provision to that effect in the company's articles of association is regarded as being contrary to a mandatory provision of an act. Among the benefits of tokenization discussed in Section 3.1 above, those related to facilitating exchange can be regarded as the most significant. For example, tokenization of shares could be advantageous to a newly established company.<sup>87</sup>

If the shares of a company have not been incorporated into a book-entry system, then chapter 3, section 15(1) of the LLCA requires the board of directors to keep a register of the shares and their holders (shareholder register), indicating, among other things, the name and address of each shareholder. The possibility of deviating from this requirement in the articles of association appears to be excluded, as is the case with public access to the shareholder register under chapter 3,

section 17, which requires that the shareholder register must, as a rule, be kept accessible to everyone at the head office of the company. Under chapter 3, section 15(4), the shareholder register must be kept in a 'reliable manner', a requirement that can probably be met in the case of an electronically kept register as well.

Articles of association provide a way to affect, at least to some extent, the types of objects to which share ownership is technically connected. First, shares can be incorporated into the domestic or a foreign book-entry system, which requires, under chapter 3, section 14a of the LLCA, provisions in the articles of association. Incorporation into a book-entry system entails that the board of directors has no right or duty to issue share certificates for shares. It also affects keeping the shareholder register.<sup>88</sup>

Second, under chapter 3, section 14d of the LLCA, which was enacted in early 2023, what the LLCA provides on shares incorporated in a book-entry system is also applicable when a company's shares are incorporated in a settlement system within the meaning of the EU Distributed Ledger Technology Pilot Regulation (hereinafter 'DLT Pilot Regulation').<sup>89</sup> The DLT Pilot Regulation is closely related to the MiCA Regulation, since both legislative proposals formed part of the Digital Finance Package, adopted by the European Commission on 24 September 2020.<sup>90</sup> It is clear under the current chapter 3, section 14d of the LLCA that *a company's shares can be connected, by provisions in the articles of association, to distributed ledger technology, that is, in practice, blockchain technology*. Under Article 2 of the DLT Pilot Regulation, DLT settlement system means 'a settlement system that settles transactions in DLT financial instruments against payment or against delivery, irrespective of whether that settlement system has been designated and notified in accordance with Directive 98/26/EC, and that allows the initial recording of DLT financial instruments or the provision of safekeeping services in relation to DLT instruments'.<sup>91</sup> Under Article 5 of the DLT Pilot Regulation, DLT settlement systems are subject to requirements applicable to securities settlement systems under Regulation (EU) 909/2014,<sup>92</sup> unless exemptions apply.

It is thus possible for the articles of association to prescribe that a company's shares belong to a book-entry system or to a settlement system within the meaning of the DLT Pilot Regulation. The latter must

<sup>88</sup> For details, see the LLCA, c 3, s 15; the Act on Book-Entry Accounts and Settlement Activities, c 4, s 3.

<sup>89</sup> Parliament and Council Regulation (EU) 2022/858 of 30 May 2022 on a pilot regime for market infrastructures based on distributed ledger technology, and amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU [2022] OJ L151/1. Under Art 2, Distributed ledger technology or DLT means 'a technology that enables the operation and use of distributed ledgers', while distributed ledger means 'an information repository that keeps records of transactions and that is shared across, and synchronised between, a set of DLT network nodes using a consensus mechanism'. These definitions are the same as in the MiCA Regulation.

<sup>90</sup> See Commission, 'Digital Finance Strategy for the EU' (Communication) COM (2020) 591 final; Commission, 'Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology' COM (2020) 594 final. The Digital Finance Package, whose legislative actions have now mostly been completed, also included a proposal on digital operational resilience for the financial sector (COM (2020) 595 final) and a proposal to amend or clarify certain provisions in existing EU financial services directives (COM (2020) 596 final).

<sup>91</sup> Under Art 2, financial instrument means 'a financial instrument as defined in Article 4(1), point (15), of Directive 2014/65/EU'. According to the current formulation of this directive provision, financial instrument means 'those instruments specified in Section C of Annex I, including such instruments issued by means of distributed ledger technology'.

<sup>92</sup> Parliament and Council Regulation (EU) No 909/2014 of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012 [2014] OJ L257/1.

<sup>86</sup> See Manne Airaksinen, Pekka Pulkkinen and Vesa Rasinaho, *Osakeyhtiölaki I-II* (continuously updated e-book based on 3rd edn of the print books, Alma Talent 2018) pt I, ch 3, s 'Osakekirja ja muut osakeoikeuksiin liittyvät todistukset', especially fn 275, where the authors reject the possibility of electronically signing a share certificate because a signature is part of the content of a share certificate and in the LLCA a share certificate means a 'traditional document'. Cf Juhani Kyläkallio, Olli Iirola and Kalle Kyläkallio, *Osakeyhtiö I* (8th edn, Edita 2020), 262–63, where the authors seem to presuppose the need for a physical share certificate, but approve electronic signatures. For comparison, the Swedish Limited Liability Companies Act (2005:551), c 6, s 3, states explicitly that a share certificate, which is apparently understood as a physical document, cannot be electronically signed under c 1, s 13, unlike certain other documents.

<sup>87</sup> See Nägele and Bont (n 39) 634–35, where the authors seem to consider it clear that in Liechtenstein a token can represent a share of a company, and a share register can be kept on a blockchain (the view is from the time before the TVTG).

mean a settlement system that is duly authorized or permitted to operate.<sup>93</sup> The question remains *whether chapter 1, section 9 of the LLCA, which concerns shareholders' discretion, could support extending that discretion even to tokenization, if prescribed in the articles of association, by means other than incorporating the company's shares into a settlement system within the meaning of the DLT Pilot Regulation.* This should be considered, keeping in mind that the requirement of book-entry form in Article 3 of Regulation (EU) 909/2014 does not apply to all shares. Nevertheless, the Finnish LLCA may be most plausibly interpreted to mean, quite generally, that *it is only possible for the articles of association to prescribe that a company's shares are incorporated either into a book-entry system or into a settlement system within the meaning of the DLT Pilot Regulation.*

The general requirements under the LLCA must be met, even when within the framework of a settlement system within the meaning of the DLT Pilot Regulation. The preparatory works for chapter 3, section 14d of the LLCA noted that the DLT Pilot Regulation enables deviation from the book-entry form required by Article 3 of Regulation (EU) 909/2014. The preparatory works suggest that even in the case of deviating from that form, it should be possible to organize keeping a share register and exercising shareholder rights as required by law. This was understood to require identifiability, in a settlement system maintained on the basis of an exemption permit under the DLT Pilot Regulation, of technical solutions whose effects under company law can be equated to those of entries in book-entry accounts. For the sake of clarity, a provision was proposed stating that even technical implementation of a DLT-based settlement system that deviates from the book-entry form should enable keeping a share register and exercising shareholder rights in accordance with the law.<sup>94</sup>

If a settlement system within the meaning of the DLT Pilot Regulation adheres to the book-entry form, then the LLCA provisions on shares incorporated in a book-entry system apply. However, chapter 3, section 14d of the LLCA also caters for situations where a settlement system deviates from the requirement of book-entry form. In those cases, the LLCA provisions on a book-entry account apply to an equivalent technical solution based on which keeping a shareholder register and using shareholder rights in accordance with the LLCA can be ensured. In other words, *keeping a shareholder register and exercising shareholder rights under the LLCA must be arranged even in this alternative technical solution.*

### 3.4. Ownership of a thing 'tokenized' by its owner

Blockchain-based tokenization has also been considered possible in terms of traditional (material) things, and, in fact, nearly all imaginable objects.<sup>95</sup> One must ask separately for each legal system considered, what kind of juridical aims can be validly achieved through tokenization. The discussion in this section is limited to situations where the owner of a movable or immovable thing creates an NFT in the Ethereum system, with the intention of *connecting ownership of the thing and of the token so that a person who owns the token also owns the thing.* For simplicity, we assume that the owner communicates this intention in the NFT metadata as well as 'off-chain', such as announcing it on the owner's website.

It appears rather clear that the intended connection is not possible in most legal systems, at least not in all respects. In practice, tokenizations,

<sup>93</sup> Recital 11 of the DLT Pilot Regulation states that access to the pilot regime should also be open to new entrants, and hence: 'An entity that is not authorised under Regulation (EU) No 909/2014 or Directive 2014/65/EU could apply for authorisation under that Regulation or under that Directive, respectively, and, simultaneously, for a specific permission under this Regulation.'

<sup>94</sup> Government Proposal 278/2022, 27.

<sup>95</sup> See, eg, Sazandrishvili (n 27); Raffaele Fabio Ciriello, 'Tokenized Index Funds: A Blockchain-Based Concept and a Multidisciplinary Research Framework' (2021) 61 International Journal of Information Management 102400.

despite language suggesting an immediate connection between the ownership of a thing and of a token, may often have actually involved utilizing a company form to that end, one way or another.<sup>96</sup>

The difficulty of connecting the ownership of a thing and of an NFT is particularly due to the fact that *the ownership and exchange of things is typically subject to legislation or judge-made law that cannot be ignored.* For example, in some systems, a person is regarded as the owner if recorded as the owner of a thing in a register kept by the authorities. This is typically the case for immovable things, which are often also subject to special provisions on transfer of ownership. Clearly, tokenization of immovable things involves particular difficulties, some of which may be insurmountable.<sup>97</sup>

If transfer of ownership is not subject to requirements of form, the owner of a thing is probably generally able to bring about transfer with the help of a token, so that ownership of the thing becomes acquired by the person who acquires ownership of the token. That is a plausible starting point, at least in Finland, for if transfer of ownership of an NFT includes intention to transfer ownership of a thing connected to the NFT, then this can be considered as a mode of transfer of ownership of the thing. Immovable things are problematic in this sense in Finland as well because *transfer of ownership (conveyance) of real estate is subject to form requirements.* For example, under chapter 2, section 1 of the Code of Real Estate (540/1995), a sale of real estate must be concluded in a special electronic property transaction service, or in writing following certain further form requirements. Under chapter 4 of the Code of Real Estate, the form requirements on sale also apply to trade (exchange), gift, and other types of transfer (conveyance) recognized by the Code. Under chapter 10, section 1, ownership of (title to) real estate is registered, while under chapter 11, section 1, everyone must apply for registration after having acquired ownership of real estate.<sup>98</sup>

Tokenizing real estate or ownership of real estate is challenging from the perspective of Finnish patrimonial law in the absence of new legislation on the matter. To begin with, real estate exist as register units under the Real Estate Register Act (392/1985), while the Real Estate Register is kept by the authorities. Transfer of ownership of real estate is subject to form requirements which cannot be fulfilled by way of transferring an NFT. To be precise, defects of form are repairable. Under chapter 13, section 1 of the Code of Real Estate, no claim regarding a defect of form in the deed of acquisition can be made after a registration of title based on it has been completed or the application for one has been left in abeyance. However, under chapter 12, section 4, the register authority must reject an application to register title if the form requirements have not been followed, and it would be highly unlikely for the authority not to notice these issues.<sup>99</sup>

Even in this legal environment, one may create an NFT with the purpose that the owner of the NFT owns real estate, a particular piece of land, that at the time of creation belongs to the owner of the NFT. The NFT itself is an object that can be owned. The main problem with this

<sup>96</sup> See, eg, Garcia-Teruel and Simón-Moreno (n 25) 3–4. If a legal system approves tokenization of shares, then one way to avoid or at least mitigate difficulties related to tokenization of (material) things is to transfer the ownership of things to a company, and then to tokenize the shares of the company.

<sup>97</sup> See *ibid.*, 7; Vincent Ooi, Soh Kian Peng and Jerrold Soh, 'Blockchain Land Transfers: Technology, Promises, and Perils' (2022) 45 Computer Law & Security Review 105672.

<sup>98</sup> Although applying for registration entails certain advantages to the owner, registration has no constitutive meaning. Accordingly, Finnish law has been classified in literature as a 'declaratory system' in this respect. See Argelich Comelles (n 26) 218. See also Niemi (n 59) 27–29. Niemi calls Finnish title registration 'protective' and explains that it 'merely affects the priority of property rights and strengthens the position of a transferee in certain relations with third persons'.

<sup>99</sup> As a result, the rules on good faith protection under c 13 have no significance.

kind of tokenization is that the transferee of the NFT does not become the owner of the piece of land. Yet, if the transferor refuses to agree on transferring ownership (title) in accordance with the form requirements, then the transferor should probably compensate the other party for reasonable costs under chapter 2, section 8 of the Code of Real Estate, a provision on compensation for non-conclusion of sale.

Even if transfer of ownership is not subject to form requirements, the rules on ownership and exchange of things remain relevant. For example, consider the situation where an owner transfers ownership of a movable thing to another person by way of transferring ownership of an NFT, but the thing is left in the transferor's (former owner's) possession. Next, the possessor sells the thing to a third party, pretending to be its rightful owner. In doing so, the former owner conceals the earlier transfer of ownership that was carried out by transferring ownership of the NFT. In a situation like this, Finnish law starts with the notion that the former owner lacks the competence to legally transfer ownership. However, the subsequent transferee may enjoy protection of good faith if the conditions for it are met. For example, the object must have been in the transferor's possession, and the transferee must have taken possession of the object and have still been in well-founded good faith at that time. Well-founded good faith means that the transferee did not know and ought not to have known of the transferor's lack of competence to transfer.<sup>100</sup>

The fact that the first transfer is carried out by transferring ownership of a token cannot prevent the subsequent transferee's protection of good faith in accordance with general principles. Moreover, transferees cannot generally be required to find out whether the object has been tokenized. In contrast, it is possible to try to exclude good faith protection, say, by entrusting a movable thing in an outsider's possession to be held on behalf of the owner. A stronger connection between the ownership of a thing and of a token would require special rules, which do not exist in Finland at the moment. It also seems quite unlikely that Finland would enact TVTG-type special rules that attempt to connect the ownership of a thing and of a token by a 'physical validator' system.<sup>101</sup>

Yet another question is *whether a person who acquires ownership of a movable thing through acquiring ownership of a token becomes bound to the token so that they can only transfer the thing through transferring the token*. The owner of the token and the thing might wish to sell the thing to another person in the traditional manner and disregard the token. Under Finnish law, at least, it seems relatively clear that *the owner of the thing must have the opportunity to dispose of the object of ownership in a way other than through disposing of the token*. Similar views have been presented elsewhere in the world.<sup>102</sup>

All in all, it seems that creating a strong juridical connection between the ownership of an NFT and of a (material) thing would require special legislation in most legal systems. The main reason for this is that the juridical starting points of ownership of things differ from those of claims (receivables) discussed in Section 3.2. Indeed, tokenization of claims is generally easy to arrange due to debtors' freedom of will. In contrast, the ownership of things involves no party comparable to a debtor who could exercise their freedom of will so as to create a strong

<sup>100</sup> See Kaisto and Tepora (n 44) 412–13, 422–24. On legislation, see, in particular, the Trade Code (3/1734), c 1, s 5, and c 11, s 4. In a situation where the subsequent transferee enjoys protection of good faith, it is probably possible for the first transferee to become owner by redeeming the object from the subsequent transferee.

<sup>101</sup> See the TVTG, in particular, Arts 2, 17, and 33; Bericht und Antrag Nr. 54/2019 (n 40) 67–69.

<sup>102</sup> See, eg, Dutta (n 74) 86–87, where the focus is on tokenization of (physical) art.

juridical connection between ownership of a thing and of a token. In addition, the realm of things has no counterpart to the articles of association of a limited liability company, which may contain provisions on tokenization of shares.<sup>103</sup> While freedom of will in that respect under Finnish law is, as discussed in Section 3.3, severely limited, one could argue for a system where tokenization of shares can be enabled generally in the articles of association.

#### 4. Digital art and NFTs

While the term 'digital art' can have various meanings, it also has some relatively established uses. For example, according to Christiane Paul, digital art 'is now predominantly understood as digital-born, computable art that is created, stored, and distributed via digital technologies and uses the features of these technologies as a medium'.<sup>104</sup> An artwork created using digital technologies, such as a digital image, may also give rise to different kinds of rights for its creator, including copyright. For example, section 1 of the Finnish Copyright Act (404/1961) starts with the notion that '[a] person who has created a literary or artistic work shall have copyright therein, whether it be a fictional or descriptive representation in writing or speech, a musical or dramatic work, a cinematographic work, a photographic work or other work of fine art, a product of architecture, artistic handicraft, industrial art, or expressed in some other manner'.

A work must be conceptually distinguished from a copy of a work. If an artist paints a picture, the painting (eg, on canvas) itself is an object that can be owned, similarly to movable things in general. Digital art does not necessarily involve equivalent objects, separate from the work, which could be owned similarly to movable things. If someone merely has a copy of the data on which a digital artwork is based, it is quite possible that no owner can be identified for the data who could, say, require the data to be returned similarly to how the owner of a movable thing can require repossession of the thing. To be sure, this question, too, should be discussed in the light of individual legal systems, but the view that *data itself cannot be owned in the patrimonial law sense* is rather common.<sup>105</sup>

Digital art can be tokenized in several different ways. The most common way in practice is to use the Ethereum platform and standard ERC-721, with which NFTs are created. To minimize costs, it is usual to include in the blockchain merely a pointer which gives access to a file containing the NFT metadata. Metadata typically consists of the names of the artist and the work, a brief description, and the actual source of

<sup>103</sup> For the sake of clarity, it should be emphasized that we have not looked into tokenization of shares as a broader phenomenon in this article. Eg, a shareholder could create fungible or non-fungible tokens with the intention that the tokens represent some kind of claims regarding the shares, or property rights in them. Tesla and Apple shares, among others, have been targets of tokenization in this sense. Of course, these arrangements involve several issues, including the applicability of the financial instruments regulation. Unsurprisingly, some major market players, such as Binance, have become cautious, after an initially positive attitude. See, eg, Emily Mason, 'Tokenized Apple, Tesla and Coinbase? Why Binance is Bowing Out' (*Forbes*, 16 July 2021) <[www.forbes.com/sites/emilymason/2021/07/16/tokenized-apple-tesla-and-coinbase-why-binance-is-bowing-out/](http://www.forbes.com/sites/emilymason/2021/07/16/tokenized-apple-tesla-and-coinbase-why-binance-is-bowing-out/)> Accessed 15 August 2023.

<sup>104</sup> Christiane Paul, 'Digital Art Now: Histories of (Im)materialities' (2020) 5 *International Journal for Digital Art History* 2.03, 2.04.

<sup>105</sup> See, eg, Low and Teo (n 32) 247; UK Jurisdiction Taskforce (n 32) 16–17; Stevens (n 32) 7.

the work, which is in practice a URL address that locates the work.<sup>106</sup>

Tokenization enables separating digital copies from each other and making them unique, which attracts the interest of collectors. NFTs are also convenient for sales. Digital art markets were practically revolutionized by tokenization,<sup>107</sup> albeit that much of the initial enthusiasm seems to have faded. Tokenization also enables creating NFTs of pre-existing physical artworks.<sup>108</sup>

Many people have been ready to pay large sums so as to obtain the ‘original copy’ or at least one of the numbered copies of a digital artwork. One may wonder whether this makes sense from the buyer’s perspective. For example, Andres Guadamuz has been quite critical of the phenomenon in his 2021 article. The article is also interesting from the point of view of ownership. When conceptualizing trade in art NFTs, Guadamuz argues: ‘When someone is purchasing an NFT, they are purchasing the metadata file and, as an NFT, this is transferrable as well.’ He does not entirely accept comparing an NFT to a signed copy of a work. This would be inaccurate because ‘the NFT is not a copy itself: instead, it is more like a signed receipt of a work, where the ownership is not of the work itself, but ownership of the receipt’.<sup>109</sup>

It is essential to ask what qualifies as an object of ownership in the legal system in question. A starting point in a particular legal system may be that NFTs can be owned. A purchase of an NFT could then be characterized as purchase of the NFT itself, although the buyer may receive something else besides ownership of the token. As far as digital art and art NFTs in their basic form are concerned, *only NFTs are capable of being owned if digital copies are not regarded as possible objects of ownership*. This appears to be the most plausible position under Finnish law, regardless of whether a digital copy is regarded as a copy of a work from the perspective of the Copyright Act. Furthermore, to speak of ownership of a receipt would require that receipt is an object that can be owned. For clarity, when speaking of NFTs here, we follow the technical definition adopted in the Introduction.

In connection with transfer of a token, it may be intended that the transferee receives some other rights besides ownership of the token, such as *copyright* to the work represented by the digital copy. However, under Finnish law the starting point is that a transferee of an art NFT does not obtain copyright. This is because section 27(2) of the Copyright Act, under which transfer of a copy does not include transfer of copyright, should be applicable in connection with tokens. The result is the same even if ownership of a physical work is transferred together with ownership of a token.

Digital art and tokenization of art involve several questions that are relevant in terms of copyright, but can only be mentioned here in passing. If a work is subject to copyright and the owner of a copy of a work has no economic rights that belong to copyright,<sup>110</sup> then

<sup>106</sup> Bellagarda and Abu-Mahfouz (n 3) 1–2, 6; Garbers-von Boehm, Haag and Gruber (n 14) 15–16. Information outside the blockchain can be kept, eg, by the InterPlanetary File System (IPFS).

<sup>107</sup> See, eg, Ali and Bagui (n 13) 55; Garbers-von Boehm, Haag and Gruber (n 14) 17–19.

<sup>108</sup> Garbers-von Boehm, Haag and Gruber (n 14) 19–20. For a legal analysis of terms of service from selected token minting platforms, see Moringiello and Odinet (n 76) 628–40.

<sup>109</sup> Guadamuz (n 2) 1371.

<sup>110</sup> It should be noted that a vast amount of art exists to which no-one has copyright. Eg, under Finnish law copyright subsists only for a certain period after the author’s death, and it is possible to waive copyright, albeit that the author can waive their moral rights only to a limited extent. See the Copyright Act, ss 3 and 43.

tokenization may infringe copyright.<sup>111</sup> A challenging question, especially in connection with digital art, is whether the author has the right to resale remuneration, as provided under chapter 2b of the Finnish Copyright Act. The provisions are based on Directive 2001/84/EC,<sup>112</sup> whose Recital 2 states that ‘[t]he subject-matter of the resale right is the physical work, namely the medium in which the protected work is incorporated’. Under Article 2(2) of the Directive, the concept of original work includes ‘[c]opies of works of art covered by this Directive, which have been made in limited numbers by the artist himself or under his authority’. While digital art as such can give rise to the right to resale remuneration, this may presuppose physical storage that is usually not present in the creation and sale of NFTs.<sup>113</sup>

Based on the analysis above, we can conclude that digital art can be meaningfully tokenized even though digital copies are not regarded as possible objects of ownership. Generally speaking, it is important to keep in mind that tokenization does not necessarily result in tokens representing a right. Indeed, tokenization is often defined much more broadly, such as meaning ‘converting legal rights or valuable information into a simple digital piece of data “token”’.<sup>114</sup> Even if a transferee of an art NFT receives strictly speaking only one right, namely ownership of the token itself, the transferee typically also receives something that can be described as ‘valuable information’.

<sup>111</sup> Eg, the reproduction of a work, to which the author has an exclusive right as a starting point, can be understood rather broadly. Under the Finnish Copyright Act, s 2(2), it comprises ‘making copies of the work in whole or in part, directly or indirectly, temporarily or permanently and by any means or in any form whatsoever’ and ‘the transfer of the work on to another device, by which it can be reproduced or communicated’.

<sup>112</sup> Parliament and Council Directive 2001/84/EC of 27 September 2001 on the resale right for the benefit of the author of an original work of art [2001] OJ L272/32.

<sup>113</sup> See Garbers-von Boehm, Haag and Gruber (n 14) 39–40, where it is also suggested that the resale right is ultimately unnecessary in the case of NFTs because an artist can obtain part of the resale proceeds by programming a smart contract accordingly. What may weaken this argument is that ‘technically forced’ resale remuneration can probably be circumvented. From the legal perspective, we may ask whether the author is even entitled to force resale remuneration if the law does not provide a corresponding right. An artist could also resort to ‘softer’ ways in NFT design so as to receive compensation from resale. At the moment, the Ethereum system offers several alternative standards. See, eg, ERC-2981: NFT Royalty Standard and ERC-4910: Royalty Bearing NFTs, both explained in <<https://eips.ethereum.org>> Accessed 15 August 2023.

<sup>114</sup> Junghoon Woo, Ridah Fatima, Charles J Kibert, Richard E Newman, Yifeng Tian and Ravi S Srinivasan, ‘Applying Blockchain Technology for Building Energy Performance Measurement, Reporting, and Verification (MRV) and the Carbon Credit Market: A Review of the Literature (2021) 205 Building and Environment 108199, 7. The carbon credit market studied in the Woo et al article could deserve further research from the perspective of different forms of tokenization. Uses of blockchain in the context of the carbon credit market have received much attention in recent years, with some of the ideas discussed resulting in real-life applications. See, eg, Laura Franke, Marco Schletz and Søren Salomo, ‘Designing a Blockchain Model for the Paris Agreement’s Carbon Market Mechanism’ (2020) 12 Sustainability 1068; Woo et al (n 114) 7; Gary E Marchant, Zachary Cooper and Philip J Gough-Stone IV, ‘Bringing Technological Transparency to Tenebrous Markets: The Case for Using Blockchain to Validate Carbon Credit Trading Markets’ (2022) 62 Natural Resources Journal 159; World Bank, *State and Trends of Carbon Pricing 2023* (World Bank 2023) especially 45–46, <<https://openknowledge.worldbank.org/handle/10986/39796>> Accessed 15 August 2023 (doi: 10.1596/978-1-4648-2006-9).

## 5. Conclusion

Patrimonial law varies between countries, and quite significant differences can be observed even in basic concepts. Unsurprisingly, legal systems differ more or less in their approaches to different kinds of crypto-assets, including Ethereum-based NFTs.<sup>115</sup> Some countries have already enacted special legislation relevant to patrimonial law. This development is not entirely without problems since the global nature of blockchain applications causes a particular need for international legislative cooperation.<sup>116</sup>

Blockchain-based tokens are not necessarily as difficult from the perspective of patrimonial law as one may assume at first glance. Acceptable solutions may often be available even without special legislation, by adapting the interpretation of existing legislation and other sources of law to the issues at hand. In fact, greater difficulties may arise in connection with legal developments other than those pertaining to patrimonial law. Examples include, above all, the EU General Data Protection Regulation,<sup>117</sup> which poses various challenges to the development and use of blockchain applications.<sup>118</sup> In addition, this exemplifies tensions within EU law, considering that the co-legislators have sought to promote blockchain-based innovations. The MiCA Regulation illustrates this, but also pursues other aims, such as investor protection.

Generally speaking, no fundamental juridical obstacles exist to the notion that NFTs can be owned. This may even seem self-evident considering that owning NFTs or crypto-assets more generally has been accepted in many countries. Finland, the country of main focus in this article, can be included in that group. It may also be said that crypto-assets are property in many countries, at least in that they are generally protected *erga omnes*. Indeed, it would be difficult to justify not affording to the owner of an NFT similar protection to that which owners generally enjoy, say, in a situation where a hacker takes factual control of the NFT. Many outcomes where crypto-assets are protected as property are quite obvious after all, especially from the point of view of legitimate expectations and other justified interests.

<sup>115</sup> As noted in the Introduction, the discussion in this article is mostly limited to the Ethereum system. However, the observations in it apply more widely, and especially to Ethereum Virtual Machine (EVM) compatible blockchains, such as Avalanche, Cardano, and Polygon. On the EVM, see, eg, 'Ethereum Virtual Machine (EVM)' <<https://ethereum.org/en/developers/docs/evm/>> Accessed 21 August 2023.

<sup>116</sup> See Lehmann (n 23) 171. Lehmann calls for uniform law before it is too late: 'Already, we are witnessing new laws emerging to regulate private law aspects of DLT, of which only some have been studied here in detail. These laws are moulded in national ways of thinking, transposing certain principles and methods from other fields of law to the new phenomenon. If this development continues, it will lead to a new source of global fragmentation.' On similar concerns and opportunities with focus on the EU, see Heikki Marjosola, 'Security Tokens and the Future of EU Securities Law: Rethinking the Harmonisation Project' in Emiliios Avgouleas and Heikki Marjosola (eds), *Digital Finance in Europe: Law, Regulation, and Governance* (De Gruyter 2022). For an international effort to pave the way for uniform law in the area, see 'Digital Assets and Private Law' <[www.unidroit.org/work-in-progress/digital-assets-and-private-law/](http://www.unidroit.org/work-in-progress/digital-assets-and-private-law/)> Accessed 15 August 2023.

<sup>117</sup> Parliament and Council Regulation (EU) 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) [2016] OJ L119/1.

<sup>118</sup> See, eg, Michèle Finck, *Blockchain and the General Data Protection Regulation: Can Distributed Ledgers Be Squared with European Data Protection Law* (European Parliament 2019) <[www.europarl.europa.eu/RegData/etudes/STUD/2019/634445/EPRS\\_STU\(2019\)634445\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2019/634445/EPRS_STU(2019)634445_EN.pdf)> Accessed 15 August 2023 (doi: 10.2861/535).

Parties may attempt to connect different kinds of rights irrevocably in the ownership or control of NFTs. Creditor rights (claims, receivables) seem relatively easy in this respect, for most legal systems allow promisors to obligate themselves as they wish. An NFT can be equated to a traditional physical document. While this equation extends to share certificates as well, suggesting the feasibility of NFT share certificates, at least current Finnish legislation makes it difficult to implement tokenization of a company's shares other than in the framework of a settlement system within the meaning of the DLT Pilot Regulation. Even greater difficulties arise in attempts to connect the ownership of a (material) thing and of a token so that the person who owns the token also owns the thing. This is because the ownership and exchange of things is typically subject to rules which cannot be disapplied in the absence of special rules to that end, regardless of attempted tokenization. These rules may address form requirements that must be followed when transferring ownership, or good faith protection when a person in possession of a movable object is unlawfully transferring ownership to another person acting in good faith. In Finland, obstacles such as these could only be removed with new legislation.

The economic or other social significance of blockchain-based tokens does not necessarily require that rights separate from tokens can be connected to tokens. Some observers may regard native cryptocurrencies, such as bitcoin and ether, as proof of that. In the case of NFTs, the identifiability and 'uniqueness' of tokens enables creation of additional value. For example, the owner of an art NFT need not have anything besides a right to the token itself from the perspective of patrimonial law, but a collector may nevertheless consider that NFT valuable as such, say, due to its being part of a limited series and numbered. This shows that tokenization does not necessarily lead to tokens representing a right, a notion that one should keep in mind when studying different kinds of tokenization applications.

Owning a token must be systematically separated from the right represented by the token. As a result, an NFT as an object of ownership may continue to exist even if a right that it represents ceases to exist. Examples include situations where a tokenized good is consumed. Goods or NFT-associated rights ceasing to exist for other reasons give rise to interesting questions, but those are beyond the scope of this article. Our recommendation for future research on legal aspects of tokenization is to start with the question whether NFTs as digital objects with no added meaning are capable of being owned in the legal system in question.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

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