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## Introduction

Despite the growing commercial use of bitcoin and the many recognised applications of the underlying technology, bitcoins have yet to receive recognition as a form of personal property in English law. This essay provides an analysis of bitcoins from the perspective of English property law, and the means by which property rights in bitcoins may be created and transferred. The analysis will be conducted in three parts. The first part will provide a description of bitcoins as a form of intangible property, and the nature of the system underlying their creation, holding and transfer. The second part will set out the principles of English property law relevant to the analysis of assets of this nature. The third part will (1) demonstrate why bitcoin is a novel form of asset that does not fit within the current property law framework, (2) provide an argument for why bitcoin is and should be considered a form of personal property and (3) offer a tentative suggestion for the way in which established property law principles may be adapted and applied to provide for creation and transfer of property rights in bitcoin. It is suggested that because of their unique nature and use that property rights in bitcoin are best accounted for through the flexible application of property law principles applicable to the ownership and conveyance of interests in chattels.

### Part 1: The Nature of Bitcoin

#### *1.1 Significance – Bitcoin and Beyond.*

Before beginning, it is useful to first take note of the significance of a project of this nature. Bitcoin has received a good deal of media attention and has been the subject of policy reports,<sup>1</sup> regulation and legal action.<sup>2</sup> Despite this it remains largely misunderstood, and notwithstanding their large monetary value bitcoins have yet to be recognised as a form of property capable of ownership in English law. This analysis is not concerned with the economics, policy or regulation of bitcoin although the conclusions may be relevant. Rather, this project focuses specifically on the nature of bitcoin as a “thing” in which rights and interests may arise.

What makes bitcoin so unique is the way in which it came to exist and the system behind its creation and transfer. The technology underlying the Bitcoin network, creates a secure computerised settlement system that does not depend on a third party intermediary. This is a phenomenal accomplishment that has not been properly understood, and the genius of which is yet to be fully appreciated. It is therefore

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<sup>1</sup> Bank of England, ‘The Economies of Digital Currencies’ *Quarterly Bulletin*, Q3:2014; European Central Bank. ‘Virtual currency schemes – a further analysis’ (February 2015)

<sup>2</sup> See *SEC v. Shavers*, No. 4:13-CV-416. In which bitcoins were held to be a security for the purposes of Section 10(b) of the Exchange Act 15 U.S.C. § 78j(b).

worth emphasising before I begin that whether bitcoin survives as a virtual currency is in many ways irrelevant. The blockchain technology which makes the existence of bitcoins possible underlies a number of other virtual currencies.<sup>3</sup> It has also been subject to a good deal of investigation by large financial institutions,<sup>4</sup> and has begun to gain academic interest as means of connecting issuers and investors thereby reducing the need for intermediation.<sup>5</sup> This analysis will use bitcoin as a case study but the conclusions can be applied to any dematerialised assets that use blockchain technology as decentralised settlement system.

The timing of the analysis is particularly apt given the recent insolvency of a large bitcoin exchange in Tokyo.<sup>6</sup> It is upon insolvency that property rights most matter, and a recent judgment by a Japanese court has declared bitcoin not to be property capable of ownership in Japanese law.<sup>7</sup> This has effectively deprived users of the opportunity to assert property rights in the coins deposited with the exchange. The Lehman Brothers insolvency highlighted the importance of property rights in dematerialised securities,<sup>8</sup> and the Mt Gox insolvency has provided a similar situation in the world of Bitcoin. Property rights are essential in that they are enforceable against the world and entitle the holder to certain remedies (not always proprietary) and legal protections essential to maintaining the value of the assets in market economies.<sup>9</sup> Providing a basis for the recognition of property rights in assets of this nature is essential to harnessing the enormous potential this technology offers. It is therefore in light of the protection that property law is able to provide, that the creation and transfer of property rights in bitcoin will be examined.

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<sup>3</sup>P. Franco, *Understanding Bitcoin: Cryptography, Engineering and Economics* (London: The Wiley Finance Series, 2014) pg 171 – 178.

<sup>4</sup> O Williams-Grut, 'Santander is experimenting with bitcoin and close to investing in a blockchain startup.' Business Insider UK. London. 17 June 2015. < <http://uk.businessinsider.com/santander-has-20-25-use-cases-for-bitcoins-blockchain-technology-everyday-banking-2015-6#ixzz3ivlbg43o> > accessed 15 August 2015

<sup>5</sup> See E. Micheler, 'Custody chains and asset values: why crypto-securities are worth contemplating' (2015) *Cambridge Law Journal*.

<sup>6</sup> B McLannahan, Mt Gox 'lost coins' long before collapse. Financial Times. New York. 19 April 2015 < <http://www.ft.com/cms/s/0/0694b99c-e647-11e4-ab4e-00144feab7de.html#axzz3iv7uaNDi> > accessed 15 August 2015; MtGox. Mtgox press release announcing the stop of withdrawals. < [https://www.mtgox.com/press\\_release\\_20140210.html](https://www.mtgox.com/press_release_20140210.html), > accessed 14 August 2015

<sup>7</sup> N. Kyodo, Bitcoins lost in Mt. Gox debacle 'not subject to ownership' claims: Tokyo court. The Japan Times. Tokyo. 6 August 2015. < <http://www.japantimes.co.jp/news/2015/08/06/national/crime-legal/bitcoins-lost-in-mt-gox-debacle-not-subject-to-ownership-claims-tokyo-court-rules/#.Vc-3H10WBIF> > accessed 15 August 2015

<sup>8</sup> Re Lehman Brothers International (Europe) (No 2) [2010] EWCA Civ 917

<sup>9</sup> M. Bridge, *Personal Property Law* (Oxford: OUP, 2002) Pg 14

## 1.2 The Bitcoin Protocol

### 1.2.1 Overview

Bitcoin can be very broadly defined as decentralised digital currency.<sup>10</sup> This means that there is no person or institution behind it, no one controlling the system and no central database or head office entrusted with ensuring the smooth operation of the network. It's completely decentralised nature is one of the most defining features of Bitcoin and part of what makes it so interesting from a property law perspective. The software required to buy, sell and mine bitcoin is open source, which means it is freely available to anyone who wishes to make use of – there is no registration or fee.<sup>11</sup> It allows to users to transact with one another in purely peer-to-peer manner, with no central processing or verification process.<sup>12</sup>

Bitcoin is not a currency in the traditional sense. The currency of bitcoins (spelled with a lowercase b) is what is exchanged between users of the Bitcoin protocol. Bitcoin (with a capital B) is refers to the network as a whole and the operation of a decentralised open source software program able to securely store information and generate its own currency - bitcoin.<sup>13</sup> The creation of the currency is the means by which the network incentivises users to devote computing power needed to ensure the network and protocol are maintained. The decentralised nature of bitcoins is achieved by means of the fact that users are will to accept bitcoins as “payment” in exchange for doing the type of work required for the network to function.

The essence of Bitcoin and the genius behind the system comes from the fact that by using fairly simple software, cryptography and clever programing, the system is able to create and maintain digital scarcity and therefore value. The creators of Bitcoin have found a way to ensure that a particular sting of data (the coin), cannot be copied or replicated in a way that would allow the same coin to be spent twice. The digital space, unlike the physical world allows for the perfect copying of information and for all communication over the internet to be subject to monitoring and interception.<sup>14</sup> This makes it incredibly difficult to generate and maintain a currency that is not vulnerable to counterfeiting.<sup>15</sup>

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<sup>10</sup> P. Franco (note 4 above) pg 4

<sup>11</sup> The Blockchain can be downloaded feely from < <https://bitcoin.org/en/download> > accessed 15 August 2015.

<sup>12</sup> P. Franco (note 4 above) pg 8; A. Antonopoulos, *Mastering Bitcoin: Unlocking Digital Cryptocurrencies* (New York: O'Reilly Media, 2014) pg 7

<sup>13</sup> P. Franco (note 4 above) pg 9 -10

<sup>14</sup>F. Reid & M. Harrigan. 'An Analysis of Anonymity in the Bitcoin System' (2011) *CoRR*

<sup>15</sup> D. Chaum; A. Fiat, and M. Naor, 'Untraceable electronic cash' (1990) *In Proceedings on Advances in Cryptology - CRYPTO*

The ability to protect the integrity of the currency is achieved by one of the key features of the bitcoin network, and arguably the most important innovation this system introduces. This is the decentralised public ledger called the Blockchain.<sup>16</sup> The Blockchain is a record of every transaction ever made on the Bitcoin network to which every user has full access.<sup>17</sup> It is with reference to this public record of every transaction that information can be extracted which determines the funds users have available, and ensures coins are not spent more than once.<sup>18</sup> The ledger is secured against attempts to alter the information it contains by harnessing the computational power of users (nodes) connected to the network. It is this ability to harness computational power that ensures the maintenance of digital scarcity in completely self-sustaining way that avoids the use of a trusted intermediary.<sup>19</sup>

### 1.2.2 Transactions

#### (a) Transaction inputs/outputs

As a currency, bitcoin can be defined as a chain of digital signatures.<sup>20</sup> The process of transferring bitcoins between users starts with the generation of transactions which are broadcast to the network for processing and inclusion in the Blockchain. Each transaction has two parts - a Transaction Input (TxIn) and a Transaction Output (TxOut).<sup>21</sup>

The *Transaction Input* is made up of two pieces of information:

- (1) Reference to a previous transaction in which the “coin”<sup>22</sup> was received.
- (2) A private digital signature associated with the previous transaction. This is required to spend the coin obtained by the previous transaction.

The *Transaction Output* also contains two pieces of information:

- (1) The amount of bitcoins to be sent to a particular address.
- (2) The address to which they are to be sent.

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<sup>16</sup> P. Franco (note 4 above) pg 95

<sup>17</sup> Note 11 above

<sup>18</sup> G. Karame, E. Androulaki, & S. Capkun, ‘Double-Spending Fast Payments in Bitcoin’ (2012) *In Proceedings of ACM CCS*.

<sup>19</sup> P. Franco (note 4 above) pg 102 - 105

<sup>20</sup> S. Nakamoto. Bitcoin: A Peer-to-Peer Electronic Cash System, 2008.

<sup>21</sup> P. Franco (note 4 above) pg 77

<sup>22</sup> I use the term coin in the loosest possible sense as bitcoins are actually divisible by 100,000,000 in to spendable units called Satoshis.

These two components, comprising of four pieces of information, make up a bitcoin transaction.

#### (b) Public and private keys

Essential to the creation of a bitcoin transactions is the use of “public and private keys”. For our purposes it is sufficient to describe a public key as the address to which a bitcoin is sent.<sup>23</sup> One can think of a public key as a bank account number given to a debtor in order to receive funds. Bitcoins sent to this address are under the control of the account holder.

Intimately related to the public key is the private key. The private key is what enables a user to spend the funds credited to a particular address. It is this key<sup>24</sup> that makes up the “signature” part of the transaction input.<sup>25</sup> It is only by signing a transaction with the private key, that the next recipient will have access to the funds being transferred. In other words the private key is what allows users to “spend” the funds received in a previous transaction.<sup>26</sup> A helpful analogy is to think of the public key as a safe into which a coin is deposited, and the private key as the combination necessary to unlock the safe and spend the funds contained.<sup>27</sup>

This is of course an incredibly simplified account of what goes into generating a transaction but remains both relevant and accurate for these purposes. The next section will deal with the way in which transaction are recorded and stored on a decentralized database in a way that prevents the double-spending of coins.

### 1.3 The Blockchain

#### 1.3.1 Overview

The Blockchain is a distributed database containing all bitcoin transactions since 2009.<sup>28</sup> The rationale and importance of the Blockchain to the system as a whole is simple: Once there exists a secure list of all bitcoin transactions ever made, that information can be used to determine which addresses currently hold coins, and whether those coins have been previously spent. Preserving information in this way is

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<sup>23</sup> The technical explanation would require an account of the cryptography use to generate these key. This cryptography is needed to ensure that the security of this information but is not relevant for the present purposes.

<sup>24</sup> The process is more complex than this as the key is combined with a hash function able to secure the transaction against attempts to gain access to the private key through reverse engineering the algorithm that created the public key. For a full description of the hash function used see < <https://bitcoin.org/en/developer-documentation>.> accessed 13 August 2015

<sup>25</sup> P. Franco (note 4 above) pg 78;

<sup>26</sup> Ibid; See also <https://bitcoin.org/en/developer-documentation>

<sup>27</sup> P. Franco (note 4 above) pg 79; A. Antonopoulos (note 12 above) pg 29

<sup>28</sup> S. Nakamoto (note 20 above) pg 8

therefore the means by which digital scarcity is maintained and ensures that the data to which value is attached is not being copied or used in more than one transaction.

The information in the blockchain is used by other software programs in order to populate various databases that allow for the efficient tracking and storage of information relevant to the holding and exchange of bitcoins.<sup>29</sup> The difficulty is how to ensure that the information recorded on the Blockchain is not tampered with or altered by dishonest users. If users were able to change the information in the Blockchain they would be able to credit addresses they control and 'double-spend' coins at will. In order to prevent this, the Bitcoin protocol combines three key concepts. Each of these will be introduced and explained under a separate heading followed by an account of how they combine to produce the Blockchain.

### 1.3.2 Hash Functions

A hash function is an algorithm that takes data of an arbitrary length and converts it into a string of data of a fixed length.<sup>30</sup> This is used as a means of compressing information in a way that ensures the uniqueness of the original input is maintained while converting that input into a more computationally efficient piece of data.<sup>31</sup> An important point about hash functions (particularly in the context of bitcoin), is the fact that they are 'preimage resistant'.<sup>32</sup> This means that given the hash value, it is not possible to determine the input that created it.

### 1.3.3 Digital Time Stamps

The purpose of a digital time stamp is the same as a physical one. Namely to serve as proof that a certain piece of information existed at a particular time. Time stamps can be generated by a server upon request and serve to show when the data being stamped existed.<sup>33</sup> This concept can be applied to bitcoin transactions as a means of showing when a particular transaction was generated. This can then form part of the input in a hash function and which serves to ensure that there is a public record of when certain transactions existed. In order to further the security of information provided by a time stamp, software can be written that links particular stamps<sup>34</sup> to the previously issued stamps.

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<sup>29</sup> P. Franco (note 4 above) pg 109 -111

<sup>30</sup> A. Antonopoulos (note 12 above) pg 37

<sup>31</sup> D. Stinson, *Cryptography : theory and practice* (3rd ed) (London: Chapman & Hall, 2006) pg 23 – 36. See also <https://bitcoin.org/en/resources> > accessed 13 August 2015.

<sup>32</sup> Ibid pg 77

<sup>33</sup> P. Franco (note 4 above) pg 110

<sup>34</sup> Ibid



#### 1.3.4 Proof-of-work

Proof of work is a well-known concept in software engineering that is designed to ensure that any requests made on a particular network or server are made by users willing to expend a certain level of time and computational power generating the request.<sup>35</sup> The difficulty of the problem to be solved will determine how many successful requests will be generated. It serves to ensure that the requests being generated are worth the effort that is expended. This idea can be applied directly to the Blockchain in that proof-of-work can be used to ensure that any attempts to change information contained in the Blockchain requires a level of computational effort greater than the potential gain.

#### 1.3.5 The Blockchain

The Blockchain is an ever growing chain of blocks containing groups of transactions.<sup>36</sup> The information contained in each block is secured through a combination of cryptographic hashes, time stamps and proof-of-work in order to produce a public record of transactions. In order for a block to be attached to the Blockchain, a computationally difficult problem must be solved. It is therefore only once a large amount of computational effort has been expended that a block can be attached to the chain. The computational effort expended through attaching blocks to the chain is known as “mining” which is an essential part of the system.<sup>37</sup>

Mining for bitcoin is the process whereby transactions are verified, placed into blocks and attached to the Blockchain. This process is done by nodes who devote the computational power of their computers<sup>38</sup> to running a particular type of software able to complete this process. These miners are rewarded for their effort by receiving bitcoins as a reward for every block they successfully attached to the chain. When transactions are broadcast to the network, miners gather these transactions, place them in a block and attempt to solve the partial hash inversion problem. Once the partial hash inversion problem is solved, the solution (nonce) associated with that block is created and the block is attached to the blockchain.

Each block therefore has three components. (1) A group of valid transactions, (2) a hash value linked to the nonce of the previous block and (3) a nonce. It is only once the hash inversion problem is solved that the block then becomes part of the blockchain and the miner responsible for solving the block will receive the reward. The speed with which the blockchain grows makes it increasingly difficult to tamper with

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<sup>35</sup> P. Franco (note 4 above) pg 101; A. Antonopoulos (note 12 above) pg 37

<sup>36</sup> P. Franco (note 4 above) pg 98

<sup>37</sup> Ibid

<sup>38</sup> See < [https://en.bitcoin.it/wiki/Comparison\\_of\\_mining\\_pools](https://en.bitcoin.it/wiki/Comparison_of_mining_pools) > accessed 13 August

transactions and outpace the honest mining nodes in the processing of blocks. The process is illustrated in Figure 1 below.

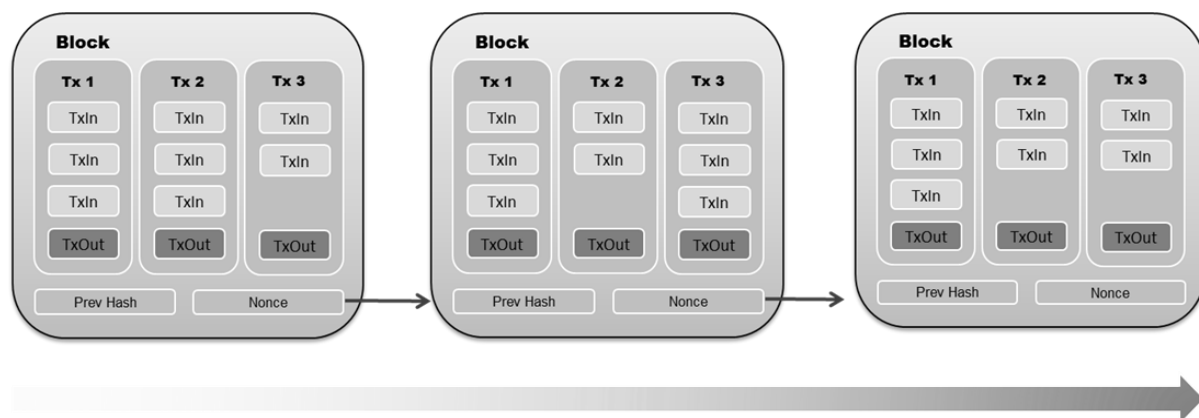


Figure 1 (Author): The figure captures the fact that each block contains transactions, made up of Transaction Inputs and Transaction Outputs. The blocks are linked to each other by means of the partial hash inversion problem of the previous block in an ever growing chain.

## Part 2: English Property law

Having laid out the nature of bitcoins as a digital asset, and the system underlying the creation and settlement of bitcoin transactions, part two will provide an overview of the English property law relevant to understanding the proprietary nature of bitcoin as an intangible asset.

### 2.1 Nature of Personal Property

Whatever the characterisation of bitcoins, they are not a form of real property.<sup>39</sup> It is therefore with reference to the principles of personal property law that the discussion will be developed. Personal property can be described as the category of property rights left after the exclusion of real property.<sup>40</sup> It is therefore residual in nature, describing interests in everything that is not real property.

The interests arising in personal property can be broken down into two mutually exclusive categories based on the nature of assets to which they relate. Interests in tangible assets being defined as a '*chose in possession*' and interests in intangible assets being defined as a '*chose in action*.' This distinction is made with reference to the manner in which the rights are enforced.<sup>41</sup> *Choses in possession* are enforced by means of taking possession of a physical thing, while *choses in action* are enforced by means of an action.

<sup>39</sup> See R. Goode, *Goode Commercial law* (4th ed) (London: Penguin 2010) pg 32

<sup>40</sup> M. Bridge (note 10 above) pg 1

<sup>41</sup> *Ibid.* pg 3 - 6

### 2.1.1 Chose in Possession

A chose in possession is therefore limited to interests in physical chattels subject to possession. These are physical objects that occupy space and can be moved from place to place. The size of the object is not relevant nor its purpose or location.<sup>42</sup> Whether or not a chose in possession can arise will be determined solely with reference to whether the asset is amenable to physical control. This has important implications for the nature of the rights that attach to the asset as well as the means by which interests in the asset are transferred from person to person.

### 2.1.2 Chose in Action.

A *chose in action* is more complex and given the nature of bitcoins, more relevant for these purposes. A *chose in action* embraces a very wide range of interests enforceable by way of action. Smith<sup>43</sup> provides an overview of how this category of personal property expanded to cover the enforcement of rights in respect of wide range of intangible assets. Broadly speaking a chose in action can be defined as follows:

“a chose in action describes all personal rights of property which can only be claimed or enforced by way of action, and not taking physical possession.”<sup>44</sup>

The essence of a chose in action is therefore that it is a right or interests in an intangible “thing”. The definition encompasses two separate elements. The first being the (intangible) asset itself, and the second being the rights or interest that arise in respect of that asset.<sup>45</sup> This distinction will be relevant throughout the discourse below.

Smith<sup>46</sup> provides a useful classification of choses in action under seven different headings. The full list is provided below and will serve as a point of reference throughout this analysis. It is by examining the nature of the assets listed below that the discussion of bitcoin’s place within English property law will be developed. A chose in action can therefore be described as rights or interest arising in respect of one of the following:

- 1) Debts
- 2) Rights under a contract

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<sup>42</sup> See N Gaskell, ‘Interests in a Wreck’ in N. Palmer & E McKenrick, *Interests in Goods* (London: Lloyd's Commercial Law Library, 1998)

<sup>43</sup> M. Smith, *The Law of Assignment: The Creation and Transfer of Choses in Action* (Oxford: OUP, 2007) pg 23 - 26

<sup>44</sup> Ibid.

<sup>45</sup> See S. Worthington, *Personal Property Law: text and materials* (London: Hart Publishing, 2000) pg 3 -6

<sup>46</sup> M. Smith (note 43 above) pg 37

- 3) Leases over land
- 4) Rights or cause of action.
- 5) Shares
- 6) Intellectual property
- 7) Equitable rights.

What is important to note is the way in which the assets themselves come about. The way in which debts, shares, rights under a contract, or causes of action come to exist is very different from the way in which intellectual property and equitable rights come to exist. It is at this point that the distinction between real and personal actions becomes relevant. The first category of assets are clearly the subject of both real and personal actions. As between the issuer and the shareholder, shares are personal obligations,<sup>47</sup> but as between the shareholder and third parties, the shares are subject to a real action. The same is true for debts, rights under a contract and causes of action.

The position is different however for intellectual property and equitable rights. The origin of the “thing” is not a claim against someone but rather an abstract form of property recognised law. Rights in respect of these assets do not arise out of a personal action. The granting of a patent over an invention does not create any obligations between the inventor and the patent office. Rather the granting of a patent creates a form of property in which rights and interest can be arise.

## *2.2 Nature and Transfer of Property Rights*

In English law, property rights are not concerned with the thing itself but rather with rights in respect of the things.<sup>48</sup> They are an abstract notions which provide for the rules governing the relationship between an individual and a thing, and the world at large. While the law is concerned with the rights and not the asset, the nature of the asset has an important influence on the way in which the rights are created and transferred.

The two primary ways in which property rights can be exercised in English law can be discussed under the headings of ownership and possession. These two principles are what confer property rights enforceable against the world at large.<sup>49</sup>

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<sup>47</sup> J. Benjamin, *Interests in Securities* (Oxford: OUP, 2000) pg 305

<sup>48</sup> J. Benjamin (note 47 above) pg 36; R. Goode (note 41 above) pg 31

<sup>49</sup> M. Bridge (note 10 above) pg 16

### 2.2.1 Ownership and Possession

Possession is a vital concept in English law and has two separate components. The first being physical control, the second being the intention to possess.<sup>50</sup> In order to have possession, a person needs to be in a position to exercise a certain degree of physical control over the object in question and have the intention to possess it. Having possession over a tangible gives the possessor certain rights in respect of that thing even if the possession is acquired in an unauthorised manner.<sup>51</sup> The concept of ownership is closely linked, and in many ways an extension of possession.<sup>52</sup>

According to Bridge,<sup>53</sup> ownership in English law is not about identifying absolute entitlement but priorities of entitlement. It involves a search for the better possessory right, not the only one. The owner can therefore be defined as the person with the best possessory interest. Ownership encompasses a bundle of rights which include, enjoyment, fruits from the profits, the right to alienate and the right to bequeath and destroy.<sup>54</sup> The notion of ownership is closely associated with title, and an important distinction needs to be drawn between interests and title.<sup>55</sup> Interests refer to rights in respect of a thing enforceable against the title holder. Title refers to the best possessory interest subject to any interest that may have arisen. The title holder can therefore be described as enjoying residual rights in the property.

Ownership in English law is also dualist in the sense that interests in things can be legal or equitable. Equitable interests usually arise through a process of intermediation and are a means used to confer rights upon the trustee while affording the beneficiary a stronger claim to the assets held on trust. Space does not permit a full explanation of the law of equity, and a discussion about the creation of equitable interests in bitcoin is a separate topic.

### 2.2.2 Transfer of Property Rights

An essential part of the way in which property rights are excised is through the transfer and alienation of personal property. Transfer is not a legal term but rather describes a particular economic result. There are various methods of achieving this in English law, the applicability of which depends largely on the nature of the property in question.

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<sup>50</sup> M. Bridge (note 10 above) pg 17

<sup>51</sup> R. Goode (note 41 above) pg 46

<sup>52</sup> M. Bridge (note 10 above) pg 28

<sup>53</sup> Ibid

<sup>54</sup> Ibid pg 30

<sup>55</sup> R. Goode (note 41 above) pg 36

#### (a) Assignment

Assignment refers to a method by which claims or rights are transferred from person to person. The Law of Property Act 1925<sup>56</sup> provides for the assignment of legal and equitable interests in various assets subject to certain formalities. The assignor can only assign the benefit and not the burden of a particular right or interest.<sup>57</sup>

#### (b) Novation

Novation is another a means by which contractual claims can be transferred. The process involves the extinguishment of an existing agreement between two parties and the conclusion of a new contract (on the same terms) between one of the initial parties and a third party. All parties involved agree that the new contract will replace the old contract creating an entirely new set of rights and obligations between contracting parties.<sup>58</sup> Novation therefore is not technically a form of transfer, as entirely new contact is created.

#### (c) Negotiation

Transfer by negotiation applies to a special class of commercial instruments and allows a claim or right to be embodied in a physical document.<sup>59</sup> This was done in order to allow these commercial instruments to circulate freely and serve as a means of payment “as good as cash”.<sup>60</sup> The purchaser of a negotiable instrument in good faith will take it free from any equities and therefore can acquire better title than the transferor.<sup>61</sup>

#### (d) Delivery

Delivery is a means by which ownership of chattels is conveyed and is usually associated with contracts for the sale of goods.<sup>62</sup> While it usually applies in the context of sale this is not the only area in which property rights can be transferred by means of delivery.<sup>63</sup> Delivery is essentially the transfer of possession.

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<sup>56</sup> See section 136 and section 53(1) (c).

<sup>57</sup> Benjamin (note 47 above) pg 66

<sup>58</sup> Ibid pg 64

<sup>59</sup> R. Goode (note 41 above) pg 518

<sup>60</sup> Ibid

<sup>61</sup> In the UK the The Bills of Exchange Act 1882 provides for the negotiability of Bills of Exchange, Promissory Notes and Cheques.

<sup>62</sup> Section 61 (1) of the Sale of Goods Act 1979 defines delivery as the “voluntary transfer of possession from person to person.”

<sup>63</sup> Bridge (note 10 above) pg 43

It is the means by which the seller relinquishes possession in favor of the buyer. It is closely related to the notion of control and a vital part of delivery relates to establishing an identifiable change of control.<sup>64</sup> The law also recognizes the possibility of constructive delivery which is effected by giving the recipient the means of exercising control over the chattel. An example of this may be handing the transferee keys to a room in which the goods are stored.<sup>65</sup> Another way in which delivery can be effected is by means of delivery of documents. This form of delivery will usually take place by negotiating a document of title in a manner that would ensure uninhibited access to the goods.<sup>66</sup>

### 2.3 Dematerialisation Securities and Property Law

The securities market has seen a growing trend towards computerisation. Securities are increasingly held and transferred by means of an electronic ledger maintained by the various intermediaries on behalf of investors. This has prompted a good deal of debate about the legal nature of dematerialised securities and the property law implications of computerised holding and transfer systems. These discussions can be particularly informative from a property law perspective.

It is now possible for securities to exist purely as electronic records and to be transferred by means of an electronic settlement system. It is only intermediaries and not investors themselves that are able to participate in the electronic settlement system.<sup>67</sup> The electronic settlement system in the UK used for most dematerialised equity securities is known as CREST.<sup>68</sup> CREST was given effect to by statute and operates in terms of the USR 2001 regulations.<sup>69</sup> Statutory intervention was necessary to allow for CREST registers to serve as means of transferring ownership in securities.<sup>70</sup> CREST operates by maintaining a database and accounts of all dematerialised securities capable of settlement through the CREST system. Members of then hold the securities on behalf of issuers. These members are therefore the first in the chain of ownership and pass the securities on to other intermediaries as a holding chain develops.

The holding and transfer of securities in this way has raised questions about the type of rights and interests that can be created in intangible assets held on behalf of investors on an unallocated basis.<sup>71</sup> This is

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<sup>64</sup> See *Cooper v Bill* (1865) 3 H & C 722.

<sup>65</sup> See *Wrightson v McArthur & Hutchinsons* (1921) 2 KB 807

<sup>66</sup> *Bridge* (note 10 above) pg 45

<sup>67</sup> E. Micheler, *Property in Securities*, (New York: Cambridge University Press, 2007) pg 67

<sup>68</sup> *Ibid*

<sup>69</sup> *Ibid* pg 74

<sup>70</sup> *Ibid* pg 80 - 85

<sup>71</sup> M. Yates and G. Montagu, *The Law of Global Custody*, (4th ed) (London: Totel, 2013) pg 23 - 37; L. Gullifer and J. Payne (eds), *Intermediated Securities*, (London: Hart Publishing, 2010)

particularly important given the potential insolvency of intermediaries.<sup>72</sup> The necessary intervention of intermediaries has been accommodated in English law by the development of the law of trust in order to provide for property rights in securities held by intermediaries. The case of *Hunter v Moss*<sup>73</sup> was the first to recognise the unique nature of securities as a form of property capable of being held on trust. Despite the well-established requirement that the subject matter of the trust must be certain, this case held that shares need not be specifically identified in order for a trust to be established. This can be contrast to cases involving tangibles<sup>74</sup> in which the lack of identification of specific assets held on an unallocated basis was fatal to the assertion of property rights.

The application of trust law as a means of providing for property rights in securities has been stretched even further with the growing tend to dematerialisation and electronic settlement. The insolvency of Lehman's Brothers is a clear example of the conceptual difficulties in this respect. The ensuing litigation has shown a willingness of English courts to adapt and apply the principles of trust law in the context of electronic custody and settlement.<sup>75</sup> In addition to the common law developments in this regard, the Financial Collateral Directive and its implementation in the UK is clear recognition of the fact that proprietary security interests can be created in dematerialized securities.<sup>76</sup>

The property law analysis of dematerialised securities is further supported a wealth of academic literature. Notably by Dr Joanna Benjamin. According to Benjamin,<sup>77</sup> as against the issuer the securities in question remains obligation not subject to property rights, but through the process of intermediation, investors are given property rights in securities as against the intermediary.<sup>78</sup> Consistent with this analysis, Benjamin analyses the transfer of dematerialised securities as form novation.<sup>79</sup> Her analysis is based on the fact that the same claims are not transferred but rather existing contractual relationships are extinguished and new

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<sup>72</sup> See *Re Lehman Brothers Europe* (note 8 above)

<sup>73</sup> [1993] 1 WLR 934;

<sup>74</sup> See *Re Goldcorp Ltd* [1995] 1 AC 74; *Re London Wine Co* [1986] PCC 121; For further discussion see D. Hayton, 'Uncertainty of Subject-Matter of Trusts' (1994) 110 LQR 335

<sup>75</sup> M. Bridge, 'Security financial collateral transfers and prime broker insolvency' (2010) *Law and Financial Markets Review* 189; M. Yates, 'Custody, prime brokerage and right of use: a problematic coalition?' (2010) *Butterworths Journal of International Banking and Financial Law* 7

<sup>76</sup> J Benjamin (note 47 above) pg 79 – 82. See also L. Ho, 'The financial collateral directive's practice in England' (2011) *Butterworths Journal of International Banking and Financial Law* 151; Beale, Bridge, Gullifer, Lomnicka. *The Law of Security and Title-Based Financing* (Oxford: OUP 2012); E. Johansson, 'Property Rights in Investment Securities and the Doctrine of Specificity' (2009) Springer

<sup>77</sup> J Benjamin (note 47 above) pg 39

<sup>78</sup> *Ibid*

<sup>79</sup> *Ibid* pg 65



ones created.<sup>80</sup> The analysis is by no means uncontroversial and there are a number of alternative approaches suggested.<sup>81</sup> I will not offer an attempt to comment of the merits of the different positions but rather to draw on the way in which the debate has developed, and the manner in which established principles of property law have been applied to creation and transfer of rights in dematerialised assets.

The discussion surrounding property rights in dematerialised securities and the current approach in both legislation and case law indicates that dematerialisation is no obstacle to the assertion of property rights. Transfers of ownership and title by means of electronic ledger is recognized as a valid means by which property rights in securities (and the securities themselves) can be passed from person to person. The law of trust has been flexibly deployed in order to accommodate the intermediated holding of securities despite a lack of specificity and tangibility, and in fact may be the legal basis for the assertion of property rights.

These developments are particularly important as like securities, bitcoin is transferable from person to person. It is possible to convey interests in securities by transferring (whatever the means) the security itself. In the case of computerised securities this can be done by electronic settlement. Securities are the only intangible asset mentioned above (section 2.1.2) that are capable of transfer independent of any rights in relation to them. The possessory interests that may arise through unauthorised transfers of securities is the subject of a good deal of debate.<sup>82</sup> However, there is a clear recognition that property rights in securities are able to confer rights upon the holder.<sup>83</sup>

#### *2.4 Credit Transfers and Property Law*

It is well established since *Foley v Hill*<sup>84</sup> that the relationship between a bank and its clients is one of debtor creditor. The property law implications of this are that the transfer of credit between bank accounts takes place in term of the discharge of an agreed mandate.<sup>85</sup> This framework contract provides the underlying legal basis for a bank's obligation to its clients and it is with reference to this contract that the bank acts

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<sup>80</sup> See *R v Preddy* [1996] AC 815 (HL)

<sup>81</sup> E. Micheler, 'The Legal Nature of Securities: Inspirations from Comparative Law' in L. Gullifer and J. Payne (eds), *Intermediated Securities* (London: Hart Publishing, 2010); P Paech, "Market needs as paradigm – breaking up the thinking on EU securities law", LSE WP 11/2012

<sup>82</sup> J. Benjamin, *Financial Law* (Oxford: OUP 2007) pg 366 – 370; J. Benjamin, *Computerisation And Negotiability* (1995) *Journal of International Banking and Financial Law* 6 JIBFL 253

<sup>83</sup> E. Micheler, 'Farewell quasi-negotiability? Legal title and transfer of shares in a paperless world' (2002) *Journal of Business Law*

<sup>84</sup> (1848) 2 HLC 28, 9 ER 1002 (HL)

<sup>85</sup> P. Ellinger, *Modern Banking Law* (5th ed) (Oxford: OUP, 2011) pg 510

as agent for its client in performing credit transfers.<sup>86</sup> The Payment Services Directive and its implementation in the UK provides a regulatory framework in which payment services providers must operate.<sup>87</sup>

The law underlying credit transfers derives from the fact that physical money changes from being property to being an unsecured debt upon being deposited in a bank. This allows banks to provide payment services that are entirely separate from the deposit or transfer of physical cash. Payment systems essentially provide another means of discharging payment obligations through an agreement that a credit to particular account is a valid discharge of payment of obligations.<sup>88</sup> While both legitimate means of discharging payment obligations, payment by means of delivery of cash and payment by means of credit transfer need to be treated as conceptually distinct.

### **Part 3: Property Law and Bitcoin**

Having laid out both the nature of Bitcoin and relevant property law, part three will attempt to apply the property law principles set out above to the holding and transfer of bitcoins. The first section will set out some of the key features of bitcoin, and the effect these have on the creation and transfer of property rights. Based on this, the second section will provide a tentative proposal as to how bitcoin can be accommodated as a unique form of personal property in English law.

#### *3.1 Unique Nature of Bitcoin*

##### 3.1.1 Defining Features

(1) *Bitcoin is not a claim.*<sup>89</sup> As chain of digital signatures, bitcoins are not a claim against any issuer or third party. They are far more analogous to chattels in this respect. Despite the contradictory nature of this term, bitcoins are actually best described as “intangible chattels.” The fact that is an oxymoron is indicative of why it is so difficult to place them within English property law. Bitcoins therefore require a property law analysis able to account for the fact that they are entirely dematerialized but do not originate out of a personal action.

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<sup>86</sup> B. Geva, *Bank Collections and Payment Transactions* (Oxford: OUP, 2001) pg 10

<sup>87</sup> D. Turing & N. Crown, ‘21st Century Payments in Europe: The Payment Services Directive’ (2007) *J. Payment Sys. L.* 639

<sup>88</sup> R. Goode (note 41 above) pg 488 -492; Proctor (ed), *Mann on the Legal Aspect of Money* (6th ed) (Oxford: OUP, 2005) pg 28 -34

<sup>89</sup> Section 1.2.1 above

- (2) *Bitcoin is a number of differ things.*<sup>90</sup> It is a protocol which covers all the aspects of the network required for the safe and efficient transfer of coins. It is a settlement system which provides the mechanism and software by which coins are transferred between users. It is also the coins themselves, which exist as strings of data given value by members of a particular community. The coins and the system by which they are transferred are inseparable in a way they are not in the case of any other intangibles. Whatever the property law analysis of bitcoins, it is submitted that they need to understood as part of the overall protocol of which they are a part.
- (3) *Bitcoin is both a currency and a commodity.*<sup>91</sup> This dual usage has led to a good deal of conceptual confusion in the media and case law.<sup>92</sup> Most merchants which accept bitcoin will provide for a dollar price that is payable is the bitcoin equivalent.<sup>93</sup> Any property law analysis needs to account for this dual usage and allow for the fact that a bitcoin may be the subject of a purchase in fiat currency, and equally be the means by which payment obligations dominated in fait currency are discharged.
- (4) *Bitcoins are fungible, individually identifiable and subject to control by specific users.*<sup>94</sup> The users of bitcoins (through the medium of private keys) are the only one ones who have control over the coins. The control that users exercise is far more analogous to the type of control required for possession than to the type of control exercised by investors in respect of intermediated securities. Coins can be specifically identified and are not reflected in the ledger as a credit balance.
- (5) *Users are able to participate directly in the settlement system.*<sup>95</sup> There is no need for intermediation, and users can transact in a variety of ways<sup>96</sup> that will result in a transfer of control over bitcoins. This does not means there is no intermediation and there are services like

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<sup>90</sup> Ibid

<sup>91</sup> Section 1.2.2 above

<sup>92</sup> See note 2 above

<sup>93</sup> C. O'Connor, 'How To Use Bitcoin To Shop At Amazon, Home Depot, CVS And More. Forbes London.' FEB 17, 2014. < <http://www.forbes.com/sites/clareoconnor/2014/02/17/how-to-use-bitcoin-to-shop-at-amazon-home-depot-cvs-and-more/> > accessed 15 August 2015

<sup>94</sup> Section 1.2.3 above

<sup>95</sup> Ibid

<sup>96</sup> For the different ways in which bitcoin transactions can be structured to provide for more than one authorizing signature see P. Franco (note 4 above) pg 39 - 48

exchanges that hold coin on behalf of clients.<sup>97</sup> These services raise questions about the nature of the client's property rights in the coins, and any property law analysis will need to account for this.

### 3.1.2 Bitcoin Transfers

These unique proprietary features not only effect the ownership and custody of coins but also have an impact on the legal position regarding transfer. Bitcoins cannot be transferred by means of assignment for the simple fact that they are not a claim or right but an actual "thing", and are therefore not assignable in the same way that a chattel is not assignable. This point reiterates the key distinction between the assets and rights in the asset.<sup>98</sup>

Transfer by means of novation is also not possible for the simple fact that there is no contract to novate and no person against whom any agreement might be enforceable. As a means of transfer, this method is not suited to assets that are not a claims. In the case of bitcoin there is no underlying framework contract in terms of which a mandate can be exercised, and there is no standing agreement to novate claims between parties as there would be in the case of discharging payment obligation by means of credit transfer.<sup>99</sup>

Transfer by means mean of negotiation is also not an option. Negotiation is reserved for a special class of assets and given effect to by statute. While the characteristics of negotiability can be provided for in a number of ways (estoppel and contract),<sup>100</sup> actual transfer by means of negotiation<sup>101</sup> can only occur in limited instances and in terms of specific instruments.

Transfer by delivery is limited to chattels and usually applied in the context of a sale of goods. This is not suited to an intangible asset like bitcoin that can serve as both currency and goods. Despite the inapplicability of delivery in the traditional sense. The possibility of viewing bitcoin transfers as a form on "digital delivery" will be suggested in section 3.2.1 below.

The use of bitcoin as a means of exchange may invite comparison to payments by means of credit transfers. Unfortunately the law underlying the transfer of bank money does not provide any guidance as to how bitcoin fits into the framework of English property law. Unlike bank transfers, there is no third

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<sup>97</sup> Note 6 above

<sup>98</sup> Section 2.2.2 above

<sup>99</sup> E. Micheler (note 83 above)

<sup>100</sup> Ibid

<sup>101</sup> Section 2.2.2 above

party intermediary and no framework contract underlying the obligations of various parties. Transactions are done in a completely decentralised way and there is no underlying mandate at any stage of the transaction process. The transfer of a bitcoin involves an actual change of control of an identifiable “coin”. It is certainly not the discharge of a payment obligation by means of adjusting the balance of an outstanding debt.<sup>102</sup>

### *3.2 Property Rights in Bitcoin*

Having set out some of the unique proprietary features of bitcoin. This section will provide a tentative suggestion for how bitcoin can be accommodated within the established principles of English property law. This will be done by firstly arguing that bitcoin is and should be considered a form of personal property, and secondly setting out how existing property law principles can be applied to the holding and transfer of bitcoins given the ‘unique characteristics’ identified above.

#### 3.2.1 Bitcoin as Personal Property

There should be no doubt that bitcoin is a form of personal property in English law. This is based on three distinct points which when considered cumulatively indicate a strong legal and practical basis for considering bitcoin a form of property. Firstly, personal property is residual in nature and is intended to capture all forms of property that are not real property.<sup>103</sup> The approach to determining what constitutes personal property in English law is not one in which property needs to be identified by means of a certain criteria or check list.<sup>104</sup> Quite the contrary. It is for the law to make explicit what cannot be regarded as property.<sup>105</sup> The nature of personal property is such that unless something is explicitly excluded, then something treated as property is property.<sup>106</sup> Bitcoins clearly have a value. There are no immediate policy reason why they should not be considered property, and if they weren’t property we are left with the more difficult question of what they are.

The second point supporting this position is the fact that bitcoin is treated as property by a large community of users accustom to viewing bitcoin as a valuable form of property. In the same way as negotiable instruments received the status of negotiability though custom and use,<sup>107</sup> the ongoing and

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<sup>102</sup> Section 2.4 above

<sup>103</sup> Bridge (note 10 above) pg 2

<sup>104</sup> See Bridge (note 10 above) pg 3 on the possibility of a catalogue of chattels.

<sup>105</sup> R. Magnusson, ‘Proprietary Rights in Human Tissue’ in N. Palmer & E. Mckendrick (note 42 above)

<sup>106</sup> S. Worthington (note 45 above) pg 674

<sup>107</sup> Goode (note 41 above) pg 515 -517

increasing use of bitcoin among a recognised community provides a legal basis for it to be considered property. Custom and use has long been recognised as a means of developing the common law.<sup>108</sup> The *lex mercatoria* is a recognised source of common law and has a long an established influence on the law surrounding the creation and transfer of property. Given that commercial practices have always had an important influence on the development of English law there is no reason why this should be any different in the case of bitcoin.

The final point is the fact that bitcoins are in fact far more amenable to a description as property than a number of other recognised forms of property. The fact that property law has got to a point where it now recognises tort claims as “thing”,<sup>109</sup> means it would be very odd if an asset readily exchangeable in a number of different markets and store of large monetary value were suddenly excluded from catalogue of personal property. Not only would denying bitcoin proprietary status be inconsistent with residual nature of personal property law, but it would also be inconsistent with the forms of property already recognised. The law has continually broadened the range of things which can be considered property<sup>110</sup> to the point that there is an ongoing debate about whether information and goodwill can be considered property.<sup>111</sup> It is submitted that if those discussions constitute a debate about the bounds of personal property, then there cannot be a question as to whether bitcoin is property. It is traded everyday with minute by minute changes in price recorded on exchanges and indices around the world.<sup>112</sup> It is bought by investment funds, portfolio managers and is now even the subject of a futures exchange.<sup>113</sup>

While these arguments can be developed further, the discussion will proceed on the assumption that there is sufficient legal justification for considering bitcoin a form of property. The next question is the type of property it is and the implications of this categorisation for the creation and transfer of property rights.

### 3.2.2 Property Rights in Bitcoin

Bitcoin is unique in that it is entirely intangible but at the same time capable of being transferred from person to person in the same way as a chattel would be transferred by delivery. It is not a claim of some

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<sup>108</sup> See J. Braithwaite, 'Standard form contracts as transnational law' (2012) 75(5) *Modern Law Review* 779; H. Collins, *Regulating Contracts* (Oxford University Press 1999) pg 215 -220

<sup>109</sup> M. Smith (note 43 above) pg 37

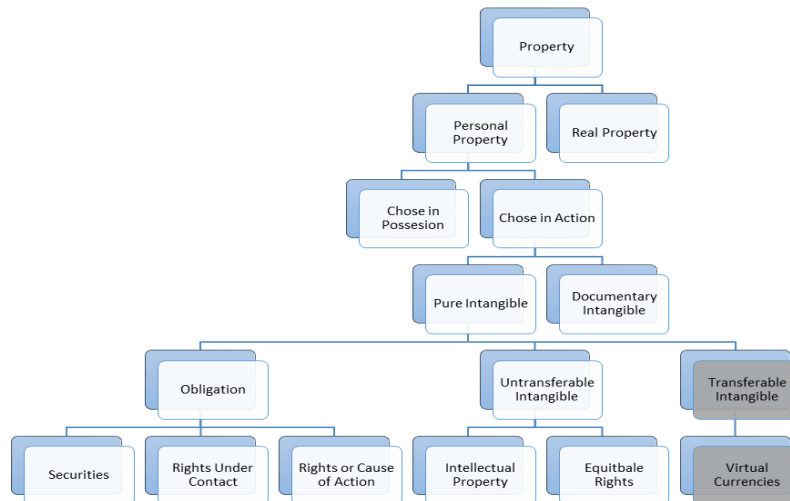
<sup>110</sup> *Ibid* pg 23 - 26

<sup>111</sup> See P. Kohler & N. Palmer, 'Information as Property' in N. Palmer & E Mckendrick (note 42 above)

<sup>112</sup> See < <http://www.coindesk.com/> > accessed 18 August 2015 for current prices and indices

<sup>113</sup> *Ibid*

kind like the first category of *choses in action* outlined above, which places it in a category of intangible assets that do not arise out of claims.<sup>114</sup> However, unlike intellectual property or equities, it is not rights in respect of the “thing” that are transferred – it is the “thing” itself. Bitcoin therefore does not fit entirely comfortably in this category either. The categorization just described is illustrated in figure 2 below.



*Figure 2: (Author):<sup>115</sup> The categorisations in this figure refer only to the nature of the asset and not the transferability of the rights which may arise in respect of it. It is intended to capture the place of virtual currencies as a unique chose in action defined as a “transferable intangible”.*

It is submitted that bitcoin is best understood as a new category of chose in action indicated on the far right of figure 3. This categorisation is based on the fact that the asset in which interests arise, is not a claim and is transferable directly from person to person. This means that unlike intellectual property, rights in respect of the underlying property can arise through transfer of the thing itself.<sup>116</sup>The more difficult question now becomes what are the consequences of this type of characterisation for the protection of property rights?

It is submitted that the best way the above categorisation can be accommodated within established property law principles is by adapting and applying the common law principles relevant to the ownership and transfer of chattels to a digital setting. This may sound initially infeasible and very speculative but what I hope to demonstrate below is the following:

<sup>114</sup> Section 2.2.1 above

<sup>115</sup> This is adapted from similar figure in Smith (note 43 above) and Worthington (note 45 above) in a manner that includes virtual currencies among the recognized type intangible personal property.

<sup>116</sup> Section 1.2.2 above

(1) An analysis of this type is perfectly consistent with the unique features of bitcoin laid out in section 3.1.1 above.

(2) The Bitcoin protocol provides all the information necessary to determine ownership disputes by means of established property law principles applicable to tangibles.

(3) English law has proved flexible in accommodating the changing nature of assets in the securities market, and there is no reason in principle why existing property law principles cannot be applied to the recognition of property rights in bitcoins.

In order to account for the creation and transfer of property rights in the manner suggested, one would need to understand the transfer system as a whole and the means by which bitcoins are exchanged among users. This could be coupled with conduct of the parties to the transaction, the intention of the parties, and any agreement outside the bitcoin protocol providing for the exchange or custody of the coins. The nature of the bitcoin system is actually particularly amenable to this type of analysis. Control over funds is exerted exclusively by the holders of the private key (section 1.2.2 above). It is very clear to which address the funds are intended to be sent<sup>117</sup> and who has control over that address. It is also clear when the transaction was generated, by what device, and when the funds became irreversibly at the disposal of the recipient. Given all these elements as well as a specifically identifiable coin (not credit balance) it is perhaps less of a contradiction than first suggested to speak of an “intangible chattel.”

This approach will allow ownership rights and title disputes to be determined in the traditional way of seeking the best possessory interests.<sup>118</sup> Ownership of bitcoins can be acquired either through transfers or mining.<sup>119</sup> The transfers can either be consensual in the form of a sale/exchange, or a gratuitous transfer in which bitcoins are passed without any consideration. The only difference being that coins exist in a digital as oppose to physical space. Coins obtained by mining would be obtained through an original form acquisition, the title of which is easily verifiable within the protocol. This approach would also mean that users are afforded the protection and remedies of trespass and conversion.<sup>120</sup> Once the protocol is understood it comes clear that there nothing in principle preventing the use of these remedies. In fact the

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<sup>117</sup> Section 1.2.2 above

<sup>118</sup> Bridge (note 10 above) pg 28

<sup>119</sup> Section 1.3.5 above

<sup>120</sup> Bridge (note 10 above) pg 49



information needed to in order to ensure their applicability is more readily available through the bitcoin system that it in most litigation.<sup>121</sup>

This approach is also perfectly consistent with the dual nature of ownership in English law and would allow for the acquisition of both legal and equitable title in respect of the coins. Equitable title would arise when bitcoin are deposited on trust with an intermediary. The coins subject to the trust are easily separable (they can even be kept in a separate agreed upon address)<sup>122</sup> and are entirely identifiable, as is the beneficiary and the intention to create a trust. There are therefore no obstacles to the creation of valid trust structures for the holding of bitcoins. In fact bitcoins are far more amenable to custody relationships of this nature than dematerialised securities.<sup>123</sup>

Bitcoins are not a chose in possession because they cannot take physical form. This will mean they cannot be considered goods for the purposes of the Sale of Goods Act 1979 which would raise a number of complications given the dual use of bitcoin, which it is suggested needs to be preserved.<sup>124</sup>

Following from this, it is suggested that the transfer of the coins can be analyzed as a form of “online delivery”. A valid delivery of chattels can take place by giving the transferee access to the goods. The textbook example of effecting constructive delivery by handing over a key could not be more apt in the context of bitcoin (see section 1.2.2 above). In the case law on delivery,<sup>125</sup> there is not a single element that would be required to determine if a valid delivery has been effected that is not available in the context of bitcoin transactions. The fact that delivery is concerned with surrendering control in a way that places the asset at the disposal of the transferee is exactly how bitcoin transactions take place.

The bitcoin protocol provides more than enough information to allow for the creation and transfer of property rights in the same manner as chattels. This makes it difficult to see why the established body of law applicable to the protection of property rights in chattels cannot be applied to bitcoin. The reason delivery and possession have not been previously been appropriate in respect of intangibles is because either the intangibles themselves are not capable of transfer or, they are personal claims and better analysed as a transfer of obligations.<sup>126</sup> Bitcoin has made it possible to effect actual delivery of intangible property that is not a claim. It is submitted that there is no reason why the principles applicable to the

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<sup>121</sup> Ibid pg 52

<sup>122</sup> Section 1.2.2 above

<sup>123</sup> Section 2.3 above

<sup>124</sup> Section 3.1.1 above

<sup>125</sup> Notes 64 & 65 above

<sup>126</sup> Section 2.3 above

protection of property rights in chattels cannot be flexibility applied to bitcoin as a novel form of personal property.

## **Conclusion**

Bitcoins are a form of intangible property generated by a decentralised settlement system which allows users to transact on a purely peer-to-peer basis. Confusion about their nature abounds and despite obvious proprietary features, they have yet to receive recognition as a form of property in English law. This essay has attempted to provide an analysis of bitcoins from the perspective of English property law. It is suggested that what makes bitcoin unique is, (1) the fact that they do not arise out of a personal right, (2) are entirely intangible and (3) are transferable from person to person without the use of a third party intermediary. Given these unique features it was argued that bitcoins do not fit comfortably within the current property law framework. Despite this, it is suggested that there exists a firm legal basis for considering bitcoin a form of personal property, best be described as a unique chose in action amenable to both possession and delivery. This would allow for the creation and transfer of rights and interest in bitcoin to be accounted for by applying property law principles applicable to the protection of interests in chattels. The Bitcoin system provides all the information necessary to determine title disputes in this manner, whether the coins in question are used as a currency or commodity. Just as established principles of property law are employed in the recognition of property rights in the dematerialised securities, it is suggested that the legal principles necessary for the protection of property rights in bitcoin are already established, and despite being developed in respect of chattels, can find ready application in the digital setting created by the Bitcoin protocol.

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