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# THE TANGLED WEB OF CRYPTOCURRENCIES AND TERRORISM

*ABSTRACT: Cryptocurrencies first appeared in 2009 and swept around the world in less than five years creating both crypto billionaires and new interfaces of illicit activities tasking government officials with the challenge of regulating a technology that was understood by but a few. Some governments choose the path of regulating the new asset class in terms of registration requirements, taxation as well as the extension of counter terrorism and anti money laundering measures on crypto currencies and related services while others choose to simply ban them. Along with the development of the blockchain and the spread of cryptocurrencies its use for illicit activities including the financing of international terrorism gained a new impetus as well. This article assesses the technological features of the blockchain, the security concerns constituted by the new asset class and the technology it is built upon, the international developments in terms of financial and legal regulation on cryptocurrencies and their trade. Finally, the paper elaborates some possible threats and challenges that have never been discussed yet, together with some recommendations towards their management.*

*KEYWORDS: cryptocurrency, blockchain, terrorism, hacking, regulation*

## INTRODUCTION

The first scientific research paper ‘Bitcoin: An Innovative Alternative Digital Currency’ was published in 2011 by Reuben Grinberg in the *Hastings Science & Technology Law Journal*<sup>1</sup>. The article focused on three topics, 1) competitive e-commerce environment, 2) sustainability in terms of the confidence of the users/consumers and the state authorities and 3) the legal issues regarding the right of initiating currencies and the regulations on securities. As the use of crypto assets expanded and their value increased to unforeseen heights, research became indispensable on all aspects of the revolutionary asset. The interest was not limited to technological questions as the legal status was yet to be determined and their economic power was beyond sight.

Security emerged as an essential focus point as well since the uncertainty around the above questions together with the core characteristics of the blockchain gave way to the illicit use of crypto assets, for instance financial crimes, like fraud or theft, organised crime, including money laundering, and most of all: terrorism. How these threats can be tackled is a multifaceted question also because the regulation of the crypto assets remains in state authority while its use is global, also, because the truth is that the development of crypto-

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<sup>1</sup> Grinberg, R. “Bitcoin: An Innovative Alternative Digital Currency”. *Hastings Science and Technology Law Journal* 4/1. 2012. 159–207. <http://bitcoinaffiliatelist.com/wp-content/uploads/bitcoin-by-reubengrinberg.pdf>, Accessed on 24 June 2018.

currencies is far ahead of the policies and the decisionmakers as Nakamoto<sup>2</sup> was ahead of academics who were unable to discover what came to him intuitively<sup>3</sup>.

## THE EVOLUTION OF CRYPTOCURRENCIES

The domain name ‘bitcoin.org’ was registered on August 2008 and Bitcoin, the first and widely considered as the most preeminent<sup>4</sup> cryptocurrency was officially released on January 2009<sup>5</sup> in the form of an open source code. The identity of the developer remains unknown to date<sup>6</sup> and he has not been heard of since April 2011<sup>7</sup>. It was designed as a peer-to-peer electronic cash system<sup>8</sup>. In other words, a decentralised digital currency with no single administrator or a central bank backing the transactions or actual bank accounts<sup>9</sup> in use.

The idea of decentralisation of money has both its theoretical<sup>10</sup> and ideological roots ranging from the Austrian school of economics to anarchism although the practical use of cryptocurrencies is centralised in a number of aspects<sup>11</sup>. Hayek was the first economist to advocate the end of the era of central banks and an entirely free money market<sup>12</sup> in terms of production, distribution, administration and management. The libertarian idea of lifting the governmental control from currency was widely supported by the first, if not most of the owners and users of the cryptocurrencies. Thus, apart from the business-oriented interest there has been a philosophical pattern behind the use of cryptocurrencies since their initial release. Parallel to this, there is also a reverse ideology the reality of which cannot be foreseen yet precisely. What was revolutionary about cryptocurrencies and labelled as ‘fundamentally humanitarian’<sup>13</sup> is essentially anti-establishment as the separation of the currency and the state undermines governments and disrupts institutions<sup>14</sup>. However, should cryptocurrencies

<sup>2</sup> The developer of Bitcoin, claiming to be a Japanese man by the name of Satoshi Nakamoto.

<sup>3</sup> Bonneau, J. et al. “SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies”. *Proceedings 2015 IEEE Symposium on Security and Privacy SP2015, 18-20 May 2015 San Jose, California, USA*. Washington DC: IEEE Computer Society, 2015. 104–121. <https://doi.org/10.1109/SP.2015.14>, Accessed on 23 June 2018.

<sup>4</sup> Bernard, Z. “Everything you need to know about Bitcoin, its mysterious origins, and the many alleged identities of its creator”. *Business Insider*, 2 December 2017. <https://www.businessinsider.com/bitcoin-history-cryptocurrency-satoshi-nakamoto-2017-12>, Accessed on 22 June 2018.

<sup>5</sup> Davis, J. “The Crypto-Currency: Bitcoin and its mysterious inventor”. *The New Yorker*, 10 October 2011. <https://www.newyorker.com/magazine/2011/10/10/the-crypto-currency>, Accessed on 11 July 2018.

<sup>6</sup> Nakamoto, S. “Satoshi Nakamoto’s Page”. P2P Foundation. <https://web.archive.org/web/20120529203623/http://p2pfoundation.ning.com/profile/SatoshiNakamoto>, Accessed on 29 June 2018.

<sup>7</sup> S., L. “Who is Satoshi Nakamoto? The Economist explains”. *The Economist*, 2 November 2015. <https://www.economist.com/the-economist-explains/2015/11/02/who-is-satoshi-nakamoto>, Accessed on 29 June 2018.

<sup>8</sup> Nakamoto, S. “Bitcoin: A Peer-to-Peer Electronic Cash System”. 31 October 2008. <https://bitcoin.org/bitcoin.pdf>, Accessed on June 17 2018.

<sup>9</sup> In the traditional sense of an account administered by a bank.

<sup>10</sup> Virtual Currency Schemes: October 2012. Frankfurt am Main: European Central Bank, 2012. 22. <http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>, Accessed on 17 May 2018.

<sup>11</sup> Böhme, R. et al. “Bitcoin: Economics, Technology, and Governance”. *Journal of Economic Perspectives* 29/2. 2015. 215., 219–222. <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.29.2.213>, Accessed on 21 July 2018.

<sup>12</sup> Hayek, F. A. *Denationalisation of Money: The Argument Refined*. London: The Institute of Economic Affairs, 1990.

<sup>13</sup> Tourianski, J. “The Declaration of Bitcoin’s Independence”. [https://archive.org/details/DECLARATION\\_201508](https://archive.org/details/DECLARATION_201508), Accessed on 1 July 2018.

<sup>14</sup> Golumbia, D. “Bitcoin as Politics: Distributed Right-Wing Extremism”. In Lovink, G., Tkacz, N. and De Vries, P. (eds), *Moneylab reader: an intervention in digital economy*. Amsterdam: Institute of Network Cultures, 2015, 117–131.

be accepted as legal currencies internationally, the core idea would fail as an ideology. The question is whether it is the philosophical thought driving the development and the trade or it was the very existence of the electronic cash that paved the way to the formation of a new form of anonym possession of money that cannot be controlled by central authorities and the parties to the transactions cannot or can hardly be tracked down due to the fundamental characteristics of the blockchain.

The mining of cryptocurrencies<sup>15</sup> is permissionless, theoretically anyone can become a miner. In practice, however, there are but a few major miners since the activity is very expensive due to the heavy demand on electricity, the highly specialised hardware, and the so called consensus mechanism of the blockchain also referred to as ‘proof of work’, which can only be completed through a trial-and-error procedure meaning a large number of costly computations. As a result of the fierce competition, mining farms can only be profitable where there is access to cheap electricity. Most of the crypto mining farms are located<sup>16</sup> in the USA, China and Russia augmented by a very few in countries such as Iceland or Switzerland<sup>17</sup>.

The largest markets of bitcoin are Japan (< 50%), the USA (> 25%) and the EU (< 5%). Bitcoin started a new era even though there were no new assets developed and introduced to the market in 2010–2011 and even 2012 saw but a slow pace of development. Ripple, one of the notable assets, appeared in 2013 along with a number of other still active cryptocurrencies launching an avalanche-like evolution in the following years.

Table 1: *Most prominent cryptocurrencies and their values*<sup>18</sup>

Ranking	Name	Market Cap (Billion USD)	Market Share (%)	Initiation
1.	Bitcoin	141.35	32.91	2009
2.	Ethereum	48.24	11.48	2015
3.	Ripple	18.08	1.37	2013
4.	Bitcoin Cash	14.40	4.20	2017
5.	EOS	7.72	4.50	2017
6.	Stellar Lumens	6.21	1.48	2014
7.	Litecoin	5.01	1.97	2011
8.	Cardano	4.44	0.57	2018
9.	IOTA	2.89	0.29	2016
10.	Tether	2.50	19.20	2015
11.	TRON	2.50	1.31	2017
12.	Monero	2.31	0.22	2014
13.	NEO	2.25	0.58	2014

<sup>15</sup> Berentsen, A. and Schär, F. “A Short Introduction to the World of Cryptocurrencies”. Federal Reserve Bank of St. Louis. Review 100/1. 2018. 5–7. <https://doi.org/10.20955/r.2018.1-16>, Accessed on 22 June 2018.

<sup>16</sup> Daniels, P. “These are the largest Bitcoin mining farms in the world”. Digital Trends. 7 January 2018. <https://www.digitaltrends.com/cool-tech/largest-bitcoin-mining-farm/>, Accessed on 26 June 2018.

<sup>17</sup> Magas, J. “Top Five Biggest Crypto Mining Areas: Which Farms Are Pushing Forward the New Gold Rush?”. 23 June 2018. <https://cointelegraph.com/news/top-five-biggest-crypto-mining-areas-which-farms-are-pushing-forward-the-new-gold-rush>, Accessed on 26 June 2018.

<sup>18</sup> “CoinMarketCap”. <https://coinmarketcap.com/all/views/all/>, Accessed on 18 July 2018.

Ranking	Name	Market Cap (Billion USD)	Market Share (%)	Initiation
14.	Dash	2.02	0.99	2014
15.	Ethereum Classic	1.77	1.32	2015
16.	NEM	1.65	0.58	2014
17.	VeChain	1.37	0.06	2018
18.	Tezos	1.32	0.02	2018
19.	Binance Coin	1.28	0.38	2017
20.	OmiseGo	1.01	0.26	2017

On May 2 2013 the first Crypto ATM was installed in San Diego, CA. In the same year, on August 20 the German Federal Ministry of Finance recognised Bitcoin as a form of private money and approved its use in both private and commercial sales while on December 5 the People's Bank of China<sup>19</sup> banned crypto transactions for financial institutions after Thailand and before Denmark, Russia<sup>20</sup> and Indonesia took similar steps. On January 6 2015 Coinbase became the first regulated Bitcoin exchange in 25 US states with an ambitious plan of international expansion.<sup>21</sup>

Crypto assets experienced high volatility and exponential price appreciation in recent years. 2017 saw an explosion of the market and prices skyrocketed in the fourth quarter.

Early investors have seen immense profits as Bitcoin for instance peaked at nearly USD 20,000 at the end of 2017 compared to the value of less than a dollar after its initiation<sup>22</sup>. Currently there are nearly 2000 crypto assets traded with a total value of some USD 500 billion and in 2018 the first ever branded coin<sup>23</sup> appeared in the market. Even though the segment is not related to terrorism at all, the phenomenon itself does deserve attention from the regulatory authorities and intelligence agencies as well.

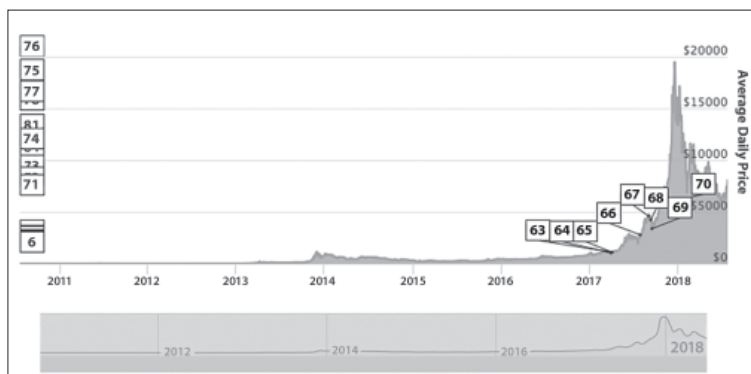


Figure 1: Timeline of Bitcoin Price<sup>24</sup>

Source: 99 Bitcoins

<sup>19</sup> The Chinese Central Bank.

<sup>20</sup> Pototsky, D. and Kuchma, A. "Russia Becomes the Second Country to Ban Bitcoin". *Russia Beyond the Headlines*, 5 February 2014. [https://www.rbth.com/business/2014/02/05/russia\\_becomes\\_the\\_second\\_country\\_to\\_ban\\_bitcoin\\_33871.html](https://www.rbth.com/business/2014/02/05/russia_becomes_the_second_country_to_ban_bitcoin_33871.html), Accessed on 16 May 2018.

<sup>21</sup> "Futurism". <https://futurism.com/images/the-entire-history-of-bitcoin-in-a-single-infographic/>, Accessed on 27 July 2018.

<sup>22</sup> Its current value still exceeds 8,000 USD.

<sup>23</sup> Namely, Fashion TV's Fashion Coin Deluxe (Fashion Coin).

<sup>24</sup> "99 BITCOINS". <https://99bitcoins.com/price-chart-history/>, Accessed on 18 July 2018.

Alltogether, crypto assets represent significant value and their share in the internet-based merchandise is continuously growing. They are used in hundreds of thousands of transactions every day and can buy more than 3 million unique products ranging from toys and cosmetics through real estate to weapons and illegal drugs. Therefore, their role in the global markets and their share in financial transactions cannot be ignored. Instead, it is essential to regulate the transactions and ensure more efficient oversight, since the increase in trading volumes inherently brings the rise of the amounts that can be used to finance illicit activities that pose a threat on the society globally.

## SECURITY CONCERNS

As the US Department of Homeland Security assumed, transnational crime and trafficking facilitate the movement of narcotics, people, funds, arms and other support to hostile actors including terrorist networks. Terrorists, proliferators and other criminal elements seek to take advantage of the increasingly globalized financial system to move money in support of their dangerous conduct.<sup>25</sup>



Figure 2: *Global Merchandise in Cryptocurrencies*  
Source: *coinmap.org*

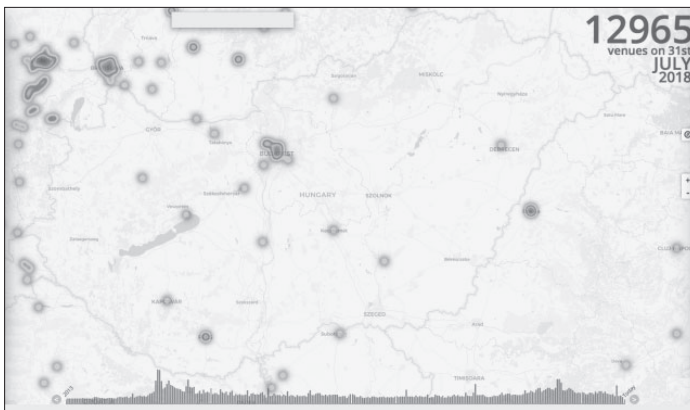


Figure 3: *Merchandise in Cryptocurrencies in Hungary*  
Source: *coinmap.org*

<sup>25</sup> US Department of Homeland Security. "Quadrennial Homeland Security Review Report: A Strategic framework for a Secure Homeland". February 2010. 7–9. [https://www.dhs.gov/xlibrary/assets/qhsr\\_report.pdf](https://www.dhs.gov/xlibrary/assets/qhsr_report.pdf), Accessed on 27 July 2014.

Certain characteristics of the blockchain technology and the single crypto assets make them highly attractive for those willing to engage in illicit activities and avoid traceability. These features include 1) pseudo-anonymity, 2) low transaction costs, 3) fast transactions, 4) global reach in terms of national borders and sovereign currencies, 5) user friendly interfaces, 6) a continuously developing technology, 7) a line of obstacles for the authorities to track down and monitor transactions. Regulatory authorities, law enforcement as well as defence and intelligence officials are all concerned about the fact that the blockchain serves as a ground for transmitting monetary value outside the conventional channels that are properly if not overregulated.

One of the revolutionary characteristics of crypto assets namely pseudo-anonymity represents a major challenge for governments and state authorities responsible for taxation, public safety, criminal investigation and national security. The Bitcoin and Ethereum blockchain technology for instance offer pseudo-anonymity while other crypto assets like Monero have anonymity-enhancing features. Blockchain does not require real names or addresses and the identity of the wallet holders is not public. The keys to use a wallet are known only and exclusively by their owners and once they are lost, the content of the wallet is lost forever. Consequently, it means that the given amount remains in the system but no-one can ever use it again. In the first case, once the real identity of the owner of a given wallet is revealed, all transactions related to the wallet can be traced and linked with the given entity<sup>26</sup>. Since the ledger records every transaction and all transactions that were once recorded remain in the system forever, tracing them is unlimited in time and the sites that offer pseudonymity are also vulnerable to confidentiality breaches. The second case might be extremely appealing for those who try to avoid the attention of the authorities and to be under scrutiny. However, as it was proved by research, even Monero is vulnerable to publicly deanonymized transactions and its untraceability mechanism cannot provide perfect anonymity<sup>27</sup>.

Illicit activities related to crypto assets are theft, the merchandise of illegal goods and money laundering. Potential threats to national security are the use of crypto assets to finance international terrorism including the conversion of cryptocurrencies to sovereign currencies, international organised crime with a special attention to the trade of illegal or dual use products and sanctioned states in relation with the trade of sanctioned products. Ransomware activities may fall into both of these categories depending on the aim of the actor.

While Russia and Venezuela took steps towards creating their very own cryptocurrencies, North Korea took advantage on ransomware activities. Ransomware attacks infect a computer or network encrypting its files in order to demand ransom paid in cryptocurrency to decrypt them. The most damaging ransomware attack in recent times was the so called WannaCry worm in late 2017. EUROPOL confirmed that the attack, which was linked with the North Korean government infected systems in more than 150 countries with an estimated overall damage of USD 8 billion worldwide. There are concerns amongst US cybersecurity firms that North Korea is also experimenting with other malware to gain financial assets.

The most notable criminal activities are constituted by the merchandise of illicit goods through the so-called Dark Web Markets. Silk Road, AlphaBay and Hansa Market are some

<sup>26</sup> Clifford, J. "Privacy on the blockchain". 17 Oct 2017. <https://hackernoon.com/privacy-on-the-blockchain-7549b50160ec>, Accessed on 16 July 2018.

<sup>27</sup> Möser, M., Soska, K., Heilman, E., Lee, K., Heffan, H., Srivastava, S., Hogan, K., Hennessey, J., Miller, A., Narayanan, A. and Christin, N. "An Empirical Analysis of Traceability in the Monero Blockchain". *Proceedings on Privacy Enhancing Technologies* 4/3. 2018. 143–163.



of those dark net marketplaces that the FBI<sup>28</sup>, the DEA<sup>29</sup> and the European law enforcement agencies successfully closed down and captured their owners and operators. These highly anonym marketplaces traded different kinds of illegal products and services in cryptocurrencies, primarily narcotics, since online users were able to browse them anonymously and securely without any potential traffic monitoring.

The dark web is also being used to merchandise hacking services, pirated media content, fake licences and malicious software, malware necessary for theft<sup>30</sup>. The first major theft took place in July 2011. A Bitcoin Forum member claimed that BTC 25,000 was stolen from his wallet which constituted nearly \$ 375,000 at the then exchange rate. More than 3 m Bitcoins have been lost or stolen so far and since Bitcoin (and crypto assets in general) were created of finite supply, some 14 percent of the already existing currency has been lost possibly forever.<sup>31</sup> The biggest thefts included a heist in Japan worth USD 500 million amongst others ranging from USD 30 to 155 million.<sup>32</sup> Altogether, cryptocurrencies of more than USD 1.7 billion of value have been stolen by hackers or gone missing due to security holes since 2012 causing distrust amongst investors from time to time towards the new asset class. Should the pace of theft continue at its present level the amount could reach as high as USD 4 billion by the end of 2018.<sup>33, 34</sup> On the flipside, the blockchain also has cybersecurity applications that can fight cyberattacks such as data tampering or distributed denial of service. Thus, the decentralized approach to fighting theft and fraud is a crucial step towards making crypto assets a reliable financial instrument and form of payments<sup>35</sup> as hackers tend to attack cryptocurrencies all around the world.

According to a press release by Kiagus Ahmad Badaruddin, chairman of the Indonesian Financial Transactions Agency, Islamic militants based in the Middle East and related to the Islamic State have already used Bitcoin and online payment services like PayPal to fund terrorist activities in Indonesia.<sup>36</sup>

<sup>28</sup> Federal Bureau of Investigation, USA

<sup>29</sup> Drug Enforcement Administration, USA

<sup>30</sup> US Attorney's Office, Southern District of New York, FBI New York Press Office, Attorney for the Southern District of New York. "Manhattan U.S. Attorney Announces Seizure of Additional \$28 Million Worth of Bitcoins Belonging to Ross William Ulbricht, Alleged Owner and Operator of 'Silk Road' Website". <https://archives.fbi.gov/archives/newyork/press-releases/2013/manhattan-u.s.-attorney-announces-seizure-of-additional-28-million-worth-of-bitcoins-belonging-to-ross-william-ulbricht-alleged-owner-and-operator-of-silk-road-website>, Accessed on 08 June 2018.

<sup>31</sup> Nova, A. "After \$500 million Japan cryptocurrency theft, here's how to keep yours secure". CNBC. 29 January 2018. <https://www.cnbc.com/2018/01/29/after-500-million-japan-cryptocurrency-theft-heres-how-to-keep-yours-secure.html>, Accessed on 27 June 2018.

<sup>32</sup> Tan, A. and Nakamura, Y. "Timeline: More Than \$1 Billion in Cryptocurrency Thefts Since September 2012". *Insurance Journal*, 22 June 2018. <https://www.insurancejournal.com/news/international/2018/06/22/493047.htm>, Accessed on 27 June 2018.

<sup>33</sup> Murphy, I. "2018 Cryptocurrency thefts top \$1.7bn". *Enterprise Times*, 10 July 2018. <https://www.enterprise-times.co.uk/2018/07/10/2018-cryptocurrency-thefts-top-1-7bn/>, Accessed on 22 July 2018.

<sup>34</sup> "Top Cryptocurrency Theft Hacks: List Of Biggest Security Breaches?". <https://bitcoinexchangeuide.com/top-cryptocurrency-theft-hacks/>, Accessed on 27 August 2018.

<sup>35</sup> Dickson, B. "This company wants to stop hackers from stealing your cryptocurrency". The Next Web. 29 June 2018. <https://thenextweb.com/cryptocurrency/2018/06/29/this-company-wants-to-stop-hackers-from-stealing-your-cryptocurrency/>, Accessed on 27 August 2018.

<sup>36</sup> Yuniar, R. W. "Bitcoin, PayPal Used to Finance Terrorism, Indonesian Agency Says". *Wall Street Journal Online*, 10 January 2017. <https://www.wsj.com/articles/bitcoin-paypal-used-to-finance-terrorism-indonesian-agency-says-1483964198>, Accessed on 19 April 2018.

The international policy framework that was established in cooperation with the UN and sovereign national legislations created serious obstacles for the terrorist organisations in raising, transferring and using funds. Accordingly, the global counter-terrorism financing regime is more oriented towards the identification and the operations of terrorist groups at present than the rising threat of independent, lone wolf attacks. Cryptocurrencies offered a new platform to collect funds, to transfer them overseas as well as to convert them into sovereign currencies. Terrorist organisations can use cryptocurrencies to purchase illegal goods and dual-use products, to acquire weapons, and to pay foot soldiers and other affiliates around the world as well as to gather funds through transfers or theft. Opposite to cybercriminal networks, the use of cryptocurrencies is limited in financing international terrorism as regards to traditional terrorist activities causing casualties and other forms of physical destruction at present.

Crypto assets are normally used in technologically sophisticated activities where a rather developed telecommunications and financial infrastructure is a core requirement. Thus, there are two main groups of terrorist activities posing further and possibly more significant challenges in the future. One is evidently cyberterrorism including ransomware activities. The other is the growing interactions of terrorist cells and lone fighters in the developed countries due to a number of reasons. First, there is easy access to high-end financial and technological infrastructure, which is indispensable to initiate transactions in cryptocurrencies and to accept transfers. Second, the past two decades saw a trend of radicalisation amongst the second and third generation Muslims living in Europe or North America for instance. Amongst them, there can easily be ones who are highly educated in information and communications engineering, and are capable of operating and even creating the necessary systems, software and algorithms. Once the appropriate amounts are channeled to them, it is also possible for the less educated Western radicals to buy the services of skilled experts especially since IT and telecommunications engineering emerged as a key discipline and gained a prominent role in higher education ever since. Therefore, highly skilled IT and CT experts are available in the developed countries in large numbers. It is possible that the target person will never know for whom and to what end he is working for as it is also possible that one would support a cause for ideological reasons.

## REGULATION OF CRYPTO ASSETS

9/11, the grave terrorist attack on the United States in 2001, marked a new era in the regulation on all activities that can be linked to terrorism including but not limited to money laundering and the financing of terrorism. Both the global banking sector and society became a subject to heavy regulations in terms of customer identification and transparency. However, the peer-to-peer transactions of the blockchain are independent from all regulated financial institutions. On December 6 2012 Bitcoin Central became the first crypto currency exchange licensed as a European Bank under the EU regulatory framework while FinCen, the Financial Crimes Enforcement Network of the US Treasury Department first issued guidance on the applicability of existing regulations on (the use of) cryptocurrencies<sup>37</sup> in 2013.

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<sup>37</sup> U.S. Department of the Treasury. "Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies: FIN-2013-G0001". 18 March 2013. <https://www.fincen.gov/resources/statutes-regulations/guidance/application-fincens-regulations-persons-administering>, Accessed on 18 June 2018.



After the initial resistance, also Russia, which is a very large market for crypto assets, legalized Bitcoin and other cryptocurrencies in 2018, as it is the only way to regulate the new assets and their trade. The act aimed to enable the monitoring of cryptocurrencies while tracking them would largely contribute to the investigations of dubious financial operations.<sup>38</sup>

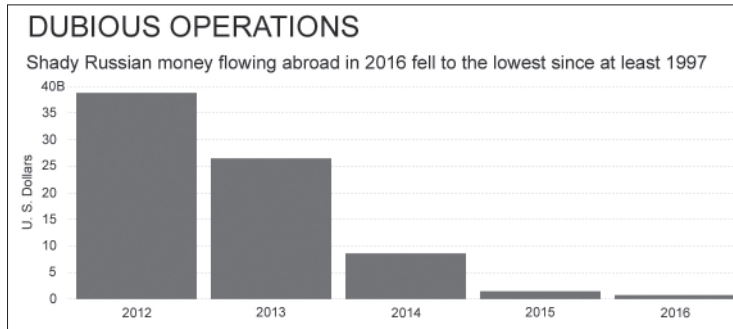


Figure 4: *Dubious Operations. Shady Russian money flowing abroad in 2016 fell to the lowest since at least 1997*

Source: Bank of Russia

Taxation has already been introduced in many countries and in particular the USA, where self-declaration is required. Unsurprisingly, taxes are of high importance for investors, with cryptocurrencies generating about USD 70 billion in global tax revenue for 2017. Still, cryptocurrency taxation remains tumultuous. According to a survey, 31 percent of respondents said that they paid taxes on gains. However, the number of those technically obligated to pay taxes may be higher than those that report taxable gains. 82 percent of US respondents indicated that they could not understand their tax liability, while 62 percent of non-US respondents said the same thing. Such surveys lend credence to the idea that people – regulators included – genuinely have little to no clue about the legal and tax status of the entire, emergent asset class. It could be that the 20 percent difference between the US and non-US respondents signals that the US is lagging behind in acceptance in comparison to other countries.

The debate on the classification of cryptocurrencies covers a wide range of perceptions, of course, depending on the sources, as the view of its supporters is very different from that of the theorists and the authorities aiming to elaborate a regulation framework to it. The definitions vary from the terms ‘money transmission system’<sup>39</sup> or ‘non-voting liabilities of a distributed autonomous company’<sup>40</sup> through ‘security’, ‘commodity’<sup>41</sup> all the way to the

<sup>38</sup> Pismennaya, E., Rudnitsky, J. and Kravchenko, S. “Russia Caves In on Bitcoin to Open Front on Money Laundering”. Bloomberg Online. 10 April 2017. <https://www.bloomberg.com/news/articles/2017-04-10/russia-caves-in-on-bitcoin-to-open-new-front-on-money-laundering>. Accessed on 28 June 2018.

<sup>39</sup> U.S. Department of the Treasury. “Application of FinCEN’s Regulations to Persons Administering, Exchanging, or Using Virtual Currencies...”

<sup>40</sup> Larimer, S. “Bitcoin and the Three Laws of Robotics”. Let’s Talk Bitcoin Network. 14 September 2013. <https://letstalkbitcoin.com/bitcoin-and-the-three-laws-of-robotics>. Accessed on 12 June 2018.

<sup>41</sup> Internal Revenue Service and the Commodity Futures Trading Commission officials view XBTs as a commodity.

term ‘community currency’<sup>42</sup>. Some see the blockchain ledger bearing the characteristics of a bank with crypto assets as liabilities<sup>43</sup> in it while the European Central Bank does not recognise them as a currency<sup>44</sup>. FinCen defines virtual currencies as a medium of exchange that operates like a currency in some environments, but does not have all the attributes of a real currency and has no legal tender status in any jurisdiction.<sup>45</sup> The core of the present debate<sup>46</sup> is whether cryptocurrencies should be considered as securities or commodities. Considering all the aspects, however, they act more like a security than a commodity.

Uncertainty is, of course, natural due to their revolutionary and innovative nature and it does not seem to be decided whether cryptocurrencies should be regulated as part of a preexisting category, which might not be that easy<sup>47</sup>, some sort of a hybrid asset, or as an entirely new asset class. The different actors e.g. users, stock holders, bankers, theoreticians, academics, government officials, politicians and financial experts all see a different aspect related to (the matter of regulations on) crypto assets which in turn is undermining the regulatory endeavours. Nevertheless, while failing to scrutinize crypto assets and their trade is not an option, it is indeed rather difficult for any government.<sup>48</sup> In a promising turn of events, G20 members are looking at an October deadline for setting up an anti-money-laundering standard on cryptocurrency. According to an issued statement, finance ministers and central bank governors of the G20 member countries favor a strategy for “vigilant” monitoring of digital currencies. Member countries declared that ‘While crypto-assets do not at this point pose a global financial stability risk, we remain vigilant...We reiterate our March commitments related to the implementation of the FATF standards and we ask the FATF to clarify in October 2018 how its standards apply to crypto-assets.’<sup>49</sup>

<sup>42</sup> Blanc, J. and Fare, M. “Understanding the Role of Governments and Administrations in the Implementation of Community and Complementary Currencies”. *Annals of Public and Cooperative Economics* 84/1. 2013. 63–81.; Evans, C. W. “Coins for Causes”. Conscious Entrepreneurship Foundation. 13 July 2014. <http://consciousentrepreneurship.org/coins-for-causes/>, Accessed on 3 July 2018.; Owen, O. “Biafran Pound Notes”. *Africa* 79/4. 2009. 570–594.; Seyfang, G. and Pearson, R. “Time for Change: International Experience in Community Currencies”. *Development* 43/4. 2000. 56–60.

<sup>43</sup> Fama, E. “Banking in the Theory of Finance”. *Journal of Monetary Economics* 6/1. 1980. 39-57.

<sup>44</sup> Virtual Currency Schemes...; Lo, S. and Wang, J. C. “Bitcoin as Money?”. *Current Policy Perspectives* 14/4, 2014. 1–28. <https://www.bostonfed.org/publications/current-policy-perspectives/2014/bitcoin-as-money.aspx>, Accessed on 17 May 2018.; Velde, F. R. “Bitcoin: A Primer”. *Chicago Fed Letter* 317. 2013. [http://www.chicagofed.org/webpages/publications/chicago\\_fed\\_letter/2013/december\\_317.cfm](http://www.chicagofed.org/webpages/publications/chicago_fed_letter/2013/december_317.cfm), Accessed on 17 May 2018.

<sup>45</sup> U.S. Department of the Treasury. “Application of FinCEN’s Regulations to Persons Administering, Exchanging, or Using Virtual Currencies...”

<sup>46</sup> Mainly in the USA.

<sup>47</sup> Brito, J. and Castillo, A. *Bitcoin: A Primer for Policymakers*. Arlington, VA: Mercatus Center at George Mason University, 2013. 38.

<sup>48</sup> Brill, A. and Keene, L. “Cryptocurrencies: The Next generation of Terrorist Financing?”. *Defence Against Terrorism Review* 6/1. 2014. 7–30.

<sup>49</sup> G20 Finance Ministers & Central Bank Governors. “Communiqué”. 19–20 March 2018. [https://g20.org/sites/default/files/media/communique\\_-\\_fmcgbg\\_march\\_2018.pdf](https://g20.org/sites/default/files/media/communique_-_fmcgbg_march_2018.pdf), Accessed on 02 April 2018.

Table 2: *Global policies towards crypto assets*<sup>50</sup>

AMERICAS	Legal Status	Policy	
		Exchanges	Regulation
USA	Not legal tender	Depends on the state	Classification is unclear whether it is a security or a commodity in the Securities and Exchange Commission and the Commodity Futures Trading Commission. The Internal Revenue Service does not consider it a currency. H.R. 6069 Bill on the Fight Illicit Networks and Detect Trafficking Act passed unanimously on June 25 2018 to help prevent the illicit use of cryptocurrencies including but not limited to Bitcoin, Monero, Dash, ZCash.
ASIA	Legal Status	Policy	
		Exchanges	Regulation
CHINA	Not legal tender	Not legal	Initial Coin Offerings are banned. Domestic cryptocurrency exchanges got shut down in 2017. Cryptocurrency mining continues with the Chinese authorities aiming to end it.
INDIA	Not legal tender	Legal	Taking steps towards the oversight and regulation of cryptocurrencies as well as the elimination of the use of crypto assets in financing illicit activities. Ready to take firm measures in order to eliminate cryptocurrencies from the payment system.
JAPAN	Legal tender	Legal	Consumers need to register with the Financial Services Authority. Theft and hacking is also a sensitive issue due to the global market share (almost 50%) of the country.
SINGAPORE	Not legal tender	Legal	Singapore is a hub of Initial Coin Offerings (two of the largest ICO offerings ever took place in the country). Investigating of the threats and risks is underway. The Monetary Authority of Singapore identified anonymity as a significant risk.
SOUTH KOREA	Not legal tender	Legal	Use of anonymous bank accounts for cryptocurrency trading is prohibited. Consumers need to register with the Financial Services Commission. XRP trading in Korean won prevails over other crypto assets traded in other currencies. Since the idea of shutting down cryptocurrency exchanges failed due to heavy public opposition the government decided to take firm actions against illicit and unethical activities related to the trading of crypto assets. Cryptocurrency futures are banned since 2017. Regulation on crypto assets is pending as consultations continue.

<sup>50</sup> Rooney, K. "Your guide to cryptocurrency regulations around the world and where they are headed". CNBC. 27 March 2018. <https://www.cnbc.com/2018/03/27/a-complete-guide-to-cyprocurrency-regulations-around-the-world.html>, Accessed on 29 June 2018.

EUROPE	Legal Status	Policy	
		Exchanges	Regulation
EU	Depends on the country	Depends on the country	Concerns about money laundering and the financing of illicit activities. Wallet providers as well as virtual exchanges should fall under the Anti-Money Laundering Directive. Monitoring of cryptocurrency markets continues. Regulations differ amongst member states. Joint French-German proposal is to be expected on the regulation of cryptocurrency markets.
SWITZERLAND	Legal tender	Legal	Consumers need to register with the Swiss Financial Supervisory Authority. Clear guidelines for Initial Coin Offerings laid down by the Financial Supervisory Authority. Bitcoin is seen as investment rather than a currency. Friendliest environment for blockchain and cryptocurrency wallet companies as well as related tech and advisory firms globally. Ten of the greatest Initial Coin Offerings took place in Switzerland.
UK	Not legal tender	Legal	Consumers need to register with the Financial Conduct Authority. Need to meet with anti-money laundering counter-terrorism standards. Viewed as a high-risk speculative product.
GLOBAL	Legal Status	Policy	
		Exchanges	Regulation
G 20	Depends on the country	Non-existent	Crypto asstes pose risks but should not be banned. The Financial Stability Board is to elaborate proposals.

## CONCLUSIONS

When Security Tokens are done correctly, they don't skirt laws and regulations, they remove financial institutions and middlemen. Taxation has already been introduced in many countries and in particular the USA, where self-declaration is required. However, with more sunlight being directed at exchanges now, the logic will probably be in the very near future that taxes will be reported automatically on digital holdings via exchanges much the same way as it is the case for banks now. This might be instrumental in detecting and monitoring illicit activities even if anonymity is much rather sought in transactions than holdings.

While cryptocurrencies challenge governments and state authorities, they offer an opportunity for terrorist groups, organized crime as well as sanctioned states. The challenge regulators face is threefold: 1) to fully comprehend what needs and can be done in order to decrease and possibly eliminate the illicit use of the otherwise legitimate and beneficial instruments and assets, 2) to overcome the technological gap among the developers and hackers and the governmental experts and 3) to adopt new methods and approaches that might be necessary to succeed in order to implement the previous two. International cooperation is instrumental in the field of regulation, monitoring and data collection with a special emphasis on tracking wallet owners. This requires inter-agency and inter-state collaboration when aiming to prevent the misuse of cryptocurrencies for financing international terrorism.

When it comes to financing international terrorism, theft is both a challenge and an opportunity for terrorists. Every wallet holder, also those acquainted with terrorism are prone to theft. However, once terrorists obtain the necessary skills and technical equipment, they are also in the position to initiate ransomware activities and to hack other wallets and steal considerable amounts from other proprietors of crypto assets, which can be used to finance and commit terrorist acts globally. This is also true for any other legitimate and illicit activities related to crypto assets. Thus, the regulations on the trade of the specified technical equipment related to mining as well as monitoring of patterns of transactions might be useful to minimize risks of cross-border transfers of funds. It seems to be logical that with the rapid growth of the information & telecommunication industry and the proliferation of international terrorism, technological preparedness and financial solvency may intercept in the near future giving way to more diverse and sophisticated use of crypto assets by terrorists.

The blockchain technology itself is to be further analysed as well in order to explore ways it can be utilised by the armed forces. There are several areas where the defence industry can apply this technology should it be already existing products and processes or innovation and development. Blockchain can add value, for instance, where there is an opportunity to automate a process, where data collection and/or standardization is involved or mission-critical mobile connectivity can be applied. The most notable areas where blockchain can be utilised depending on the current trends are the development of autonomous vehicles, tracking, targeting and following devices and signal intelligence for instance.

The appearance of the first branded coin will probably set a whole new trend, and many other specified coins will be created. While most of them will be born by various industries (e.g. ‘Farmer Coin’ or ‘Baby Coin’) global or certain local or regional interest groups or basket of consumer goods (e.g. ‘Alpine Coin’ or ‘Northern Fishermen’s Coin’), terrorist organisations might also create their very own coins under cover. Therefore, a close monitoring of this segment of the market is strongly recommended as well.

Many traits and features of cryptocurrencies will continue to be assessed and discussed over time. However, the creation of a new asset class is not easy and never easily embraced by all, but it is certain that cryptocurrencies are here to stay.

## BIBLIOGRAPHY

- “99 Bitcoins”. <https://99bitcoins.com/price-chart-history/>, Accessed on 18 July 2018.
- Berentsen, A. and Schär, F. “A Short Introduction to the World of Cryptocurrencies”. Federal Reserve Bank of St. Louis. *Review* 100/1. 2018. 1–16. <https://doi.org/10.20955/r.2018.1-16>, Accessed on 22 June 2018.
- Bernard, Z. “Everything you need to know about Bitcoin, its mysterious origins, and the many alleged identities of its creator”. *Business Insider*, 2 December 2017. <https://www.businessinsider.com/bitcoin-history-cryptocurrency-satoshi-nakamoto-2017-12>, Accessed on 22 June 2018.
- Blanc, J. and Fare, M. “Understanding the Role of Governments and Administrations in the Implementation of Community and Complementary Currencies”. *Annals of Public and Cooperative Economics* 84/1. 2013. 63–81.
- Bonneau, J., Miller, A., Clark, J. Narayanan, A., Kroll, J. A. and Felten, E. W. “SoK: Research Perspectives and Challenges for Bitcoin and Cryptocurrencies”. In *Proceedings 2015 IEEE Symposium on Security and Privacy SP2015, 18-20 May 2015 San Jose, California, USA*. Washington DC: IEEE Computer Society, 2015. 104–21. <https://doi.org/10.1109/SP.2015.14>, Accessed on 23 June 2018.

- Böhme, R., Christin, N., Edelman, B. and Moore, T. “Bitcoin: Economics, Technology, and Governance”. *Journal of Economic Perspectives* 29/2. 2015. 213–38. <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.29.2.213>, Accessed on 21 July 2018.
- Brill, A. and Keene, L. “Cryptocurrencies: The Next generation of Terrorist Financing?”. *Defence Against Terrorism Review* 6/1. 2014. 7–30.
- Brito, J. and Castillo, A. *Bitcoin: A Primer for Policymakers*. Arlington, VA: Mercatus Center at George Mason University, 2013.
- Clifford, J. “Privacy on the blockchain”. 17 Oct 2017. <https://hackernoon.com/privacy-on-the-blockchain-7549b50160ec>, Accessed on 16 July 2018.
- “CoinMarketCap”. <https://coinmarketcap.com/all/views/all/>, Accessed on 18 July 2018.
- Daniels, P. “These are the largest Bitcoin mining farms in the world”. Digital Trends. 7 January 2018. <https://www.digitaltrends.com/cool-tech/largest-bitcoin-mining-farm/>, Accessed on 26 June 2018.
- Davis, J. “The Crypto-Currency: Bitcoin and its mysterious inventor”. *The New Yorker*, 10 October 2011. <https://www.newyorker.com/magazine/2011/10/10/the-crypto-currency>, Accessed on 11 July 2018.
- Dickson, B. “This company wants to stop hackers from stealing your cryptocurrency”. The Next Web. 29 June 2018. <https://thenextweb.com/cryptocurrency/2018/06/29/this-company-wants-to-stop-hackers-from-stealing-your-cryptocurrency/>, Accessed on 27 August 2018.
- Evans, C. W. “Coins for Causes”. Conscious Entrepreneurship Foundation. 13 July 2014. <http://consciousentrepreneurship.org/coins-for-causes/>, Accessed on 3 July 2018.
- Fama, E. “Banking in the Theory of Finance”. *Journal of Monetary Economics* 6/1. 1980. 39-57.
- “Fashion TV”. <https://coinlauncher.io/ftv-coin-deluxe-ico>, Accessed on 15 August 2018.
- “Futurism”. <https://futurism.com/images/the-entire-history-of-bitcoin-in-a-single-infographic/>, Accessed on 27 July 2018.
- G20 Finance Ministers & Central Bank Governors. “Communiqué”. 19–20 March 2018. [https://g20.org/sites/default/files/media/communique\\_-\\_fmcgbg\\_march\\_2018.pdf](https://g20.org/sites/default/files/media/communique_-_fmcgbg_march_2018.pdf), Accessed on 02 April 2018.
- Golumbia, D. “Bitcoin as Politics: Distributed Right-Wing Extremism”. In Lovink, G., Tkacz, N. and De Vries, P. (eds), *Moneylab reader: an intervention in digital economy*. Amsterdam: Institute of Network Cultures, 2015, 117–31.
- Grinberg, R. “Bitcoin: An Innovative Alternative Digital Currency”. *Hastings Science and Technology Law Journal* 4/1. 2012. 159–207. <http://bitcoinaffiliatelist.com/wp-content/uploads/bitcoin-by-reubengrinberg.pdf>, Accessed on 24 June 2018.
- Hayek, F. A. *Denationalisation of Money: The Argument Refined*. London: The Institute of Economic Affairs, 1990.
- “H. R. 6069: Fight Illicit Networks and Detect Trafficking Act”. The Senate of The United States. 26 June 2018. <https://www.congress.gov/bill/115th-congress/house-bill/6069/text>, Accessed on 03 July 2018.
- Larimer, S. “Bitcoin and the Three Laws of Robotics”. Let’s Talk Bitcoin Network. 14 September 2013. <https://letstalkbitcoin.com/bitcoin-and-the-three-laws-of-robotics>, Accessed on 12 June 2018.
- Lo, S. and Wang, J. C. “Bitcoin as Money?”. *Current Policy Perspectives* 14/4, 2014. 1–28. <https://www.bostonfed.org/publications/current-policy-perspectives/2014/bitcoin-as-money.aspx>, Accessed on 17 May 2018.
- Magas, J. “Top Five Biggest Crypto Mining Areas: Which Farms Are Pushing Forward the New Gold Rush?”. 23 June 2018. <https://cointelegraph.com/news/top-five-biggest-crypto-mining-areas-which-farms-are-pushing-forward-the-new-gold-rush>, Accessed on 26 June 2018.
- Möser, M., Soska, K., Heilman, E., Lee, K., Heffan, H., Srivastava, S., Hogan, K., Hennessey, J., Miller, A., Narayanan, A. and Christin, N. “An Empirical Analysis of Traceability in the Monero Blockchain”. *Proceedings on Privacy Enhancing Technologies* 4/3. 2018. 143–63.



- Murphy, I. “2018 Cryptocurrency thefts top \$1.7bn”. *Enterprise Times*, 10 July 2018. <https://www.enterprisetimes.co.uk/2018/07/10/2018-cryptocurrency-thefts-top-1-7bn/>, Accessed on 22 July 2018.
- Nakamoto, S. “Bitcoin: A Peer-to-Peer Electronic Cash System”. 31 October 2008. <https://bitcoin.org/bitcoin.pdf>, Accessed on June 17 2018.
- Nakamoto, S. “Satoshi Nakamoto’s Page”. P2P Foundation. <https://web.archive.org/web/20120529203623/http://p2pfoundation.ning.com/profile/SatoshiNakamoto>, Accessed on 29 June 2018.
- Nova, A. “After \$500 million Japan cryptocurrency theft, here’s how to keep yours secure”. CNBC. 29 January 2018. <https://www.cnbc.com/2018/01/29/after-500-million-japan-cryptocurrency-theft-heres-how-to-keep-yours-secure.html>, Accessed on 27 June 2018.
- Owen, O. “Biafran Pound Notes”. *Africa* 79/4. 2009. 570-594.
- Pismennaya, E., Rudnitsky, J. and Kravchenko, S. “Russia Caves In on Bitcoin to Open Front on Money Laundering”. Bloomberg Online. 10 April 2017. <https://www.bloomberg.com/news/articles/2017-04-10/russia-caves-in-on-bitcoin-to-open-new-front-on-money-laundering>, Accessed on 28 June 2018.
- Pototsky, D. and Kuchma, A. “Russia Becomes the Second Country to Ban Bitcoin”. *Russia Beyond the Headlines*, 5 February 2014. [https://www.rbth.com/business/2014/02/05/russia\\_becomes\\_the\\_second\\_country\\_to\\_ban\\_bitcoin\\_33871.html](https://www.rbth.com/business/2014/02/05/russia_becomes_the_second_country_to_ban_bitcoin_33871.html), Accessed on 22 May 2018.
- Rooney, K. “Your guide to cryptocurrency regulations around the world and where they are headed”. CNBC. 27 March 2018. <https://www.cnbc.com/2018/03/27/a-complete-guide-to-cyprocurrency-regulations-around-the-world.html>, Accessed on 29 June 2018.
- S., L. “Who is Satoshi Nakamoto? The Economist explains”. *The Economist*, 2 November 2015. <https://www.economist.com/the-economist-explains/2015/11/02/who-is-satoshi-nakamoto>, Accessed on 29 June 2018.
- Seyfang, G. and Pearson, R. “Time for Change: International Experience in Community Currencies”. *Development* 43/4. 2000. 56–60.
- Tan, A. and Nakamura, Y. “Timeline: More Than \$1 Billion in Cryptocurrency Thefts Since September 2012”. *Insurance Journal*, 22 June 2018. <https://www.insurancejournal.com/news/international/2018/06/22/493047.htm>, Accessed on 27 June 2018.
- “Top Cryptocurrency Theft Hacks: List of Biggest Security Breaches?”. <https://bitcoinexchangeuide.com/top-cryptocurrency-theft-hacks/>, Accessed on 27 August 2018.
- Tourianski, J. “The Declaration of Bitcoin’s Independence”. [https://archive.org/details/DECLARATION\\_201508](https://archive.org/details/DECLARATION_201508), Accessed on 1 July 2018.
- US Attorney’s Office, Southern District of New York, FBI New York Press Office, Attorney for the Southern District of New York. “Manhattan U.S. Attorney Announces Seizure of Additional \$28 Million Worth of Bitcoins Belonging to Ross William Ulbricht, Alleged Owner and Operator of ‘Silk Road’ Website”. <https://archives.fbi.gov/archives/newyork/press-releases/2013/manhattan-u.s.-attorney-announces-seizure-of-additional-28-million-worth-of-bitcoins-belonging-to-ross-william-ulbricht-alleged-owner-and-operator-of-silk-road-website>, Accessed on 08 June 2018.
- US Department of Homeland Security. “Quadrennial Homeland Security Review Report: A Strategic framework for a Secure Homeland”. February 2010. [https://www.dhs.gov/xlibrary/assets/qhsr\\_report.pdf](https://www.dhs.gov/xlibrary/assets/qhsr_report.pdf), Accessed on 27 July 2014.
- U.S. Department of the Treasury. “Application of FinCEN’s Regulations to Persons Administering, Exchanging, or Using Virtual Currencies: FIN-2013-G0001”. 18 March 2013. <https://www.fincen.gov/resources/statutes-regulations/guidance/application-fincens-regulations-persons-administering>, Accessed on 18 June 2018.
- Velde, F. R. “Bitcoin: A Primer”. *Chicago Fed Letter* 317. 2013. [http://www.chicagofed.org/webpages/publications/chicago\\_fed\\_letter/2013/december\\_317.cfm](http://www.chicagofed.org/webpages/publications/chicago_fed_letter/2013/december_317.cfm), Accessed on 17 May 2018.

- Virtual Currency Schemes: October 2012*. Frankfurt am Main: European Central Bank, 2012. <http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>, Accessed on 17 May 2018.
- Yuniar, R. W. "Bitcoin, PayPal Used to Finance Terrorism, Indonesian Agency Says". *Wall Street Journal Online*, 10 January 2017. <https://www.wsj.com/articles/bitcoin-paypal-used-to-finance-terrorism-indonesian-agency-says-1483964198>, Accessed on 19 April 2018.