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Virtual Currencies: Can Regulators Keep Pace?

Innovation represents the dominant tendency when it comes to solving modern needs; to this extent things have evolved at an outstanding pace and are yet to be settled. The new paradigm is also applying to the payment behavior where the old barter exchanges are nowadays replaced by transactions with digital-conventional sources of value named virtual currencies. Even though progress represents the desiderate for wealth, the process per se creates vulnerabilities due to its dynamics. Along with innovation, social elements such as criminality or economic realities like enhanced competition are in the loop for a coherent regulatory answer.

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Contents

1. Introduction

[Rz 1] The world as we know it today represents the sum of humans' evolutionary achievements; if we are looking at this century's peace and at the ongoing trends, it is for sure that the living paradigm of the generations to come will be based on more and more change. Moreover, as innovation will increase at an ever larger scale that what we are experiencing it today, it can be presumed that societies shall need to adapt their lifestyle to a more dynamic rhythm characterized by short and many transition periods between the new and the ultimate.

[Rz 2] Novelty is for sure present in more and more areas from our existence and one example is being represented by the way in which we used to understand trade and the different perspective we share nowadays. For example, in the ancient times people used non-monetary techniques, like barter, as goods were exchanged for other items of an equivalent value.[1] The attribution of trade value to an otherwise conventional object such as a coin or a trade bill grew as individuals and their trading partners developed a «psychological aptitude to place trust in each other», trend that grew as individual understood the system's benefits (e.g. re-usage as an alternative to the idea of coincidences of wants).[2]

[Rz 3] Going further, this way of mutual trust has evolved nowadays in more institutionalized and regulated shapes, namely currencies. Today there are 168 officially recognized currencies[3], which are being backed and regulated by national banks and domestic governments. Furthermore, as the financial markets have been subject to progress in the past years, there are also supranational institutions that have attributes in this resort.

[Rz 4] *In concreto*, national banks configure and implement the monetary policy, issue coins and banknotes that are used as legal tender or «oversee the smooth operation of the payment systems with a view to ensuring financial stability»[4], while domestic governments develop financial policies with the purpose of assuring economic stability and monetary strength. In the same time, there

1 Jack Weatherford, «The History of Money», (*Three Rivers Press*, New York 1997) p. 32.

2 David Kinley, «Money: A Study of the Theory of the Medium of Exchange», (*Macmillan*, London 1904) p. 48.

3 *Currencies* seen on XE Currency Converter's webpage on 8th August 2014.

4 *The National Bank's objective and role*, seen on Romanian National Bank's webpage on 3rd September 2014.

are external agents that might contribute to this financial logic; exemplifying, it is the case of the European Central Bank (ECB) which manages the euro and gives authorization to central banks within the Eurozone to remit euro banknotes;[5] the coins and banknotes, no matter which currency they belong to, can afterwards take the form of e-money which basically represents the electronic storage of cash on a payment card.

[Rz 5] On the other hand, the recent years came with an alternative to the legal tender regime as we used to know it. By giving primacy to an innovative pattern, private companies have constructed an electronic monetary system which comes to compete with the traditional one; so far, there are more than one hundred undertakings (Bitcoin, Litecoin, Namecoin etc.)[6] that provide this service; however, the system started growing in popularity ever since 2009 and tends to identify itself with the worldwide biggest market player which is Bitcoin.[7]

[Rz 6] The most important difference between real currencies and virtual «currencies» is that the last are not publicly administrated as the classical financial policies are replaced by a mathematical formula that is used to guarantee the system's functionality. However, even though virtual currencies are being generated in digital format they are not the same with e-money as they are created without being backed by conventional, fiat money.

[Rz 7] *Lato sensu*, digital currencies can take several models: centralized, where all transactions take place through an intermediary and decentralized, «where the network distributes transactions between nodes of a network», the case of Bitcoin and Litecoin.[8] However, as mentioned in the first section, of interest for this study is only de second category of digital coins.

[Rz 8] Decentralized virtual currencies became more and more popular because of the advantages they bring. It is for sure that consumers will always seek cheap, fast and easy money transfers, all qualities developed by the digital currencies' networks. Being able to avoid both, the «unfriendly» banking transfer fees and the limited schedule, all of this backed by the possibility of easy value carriage (e.g. memory stick, hard drive) increases for the new products.[9]

[Rz 9] In the same time, the fact that users are anonymous represents a safety net for the ones involved in transactions; this is the situation in matters involving account freeze as the secrecy prevents individuals from having their account values seized by third parties.[10] The same thing can be said about identity theft, crime which has lately been the preoccupation of the European Commission due to its growing character. In this second case, the absence of identification makes a possible theft lack object as no personal data is being shared while transacting.[11]

[Rz 10] Besides the typology of consumers which use such payment networks for sole money transfer purposes, there is another category of individuals which understand the financial potential of the system and which invest in the digital currency *per se*. As the system becomes more and more

5 *European Central Bank* seen on European Union's webpage on 2nd September 2014.

6 *List of all cryptocoins* seen on Bitcoin Talk's webpage on 2nd September 2014.

7 Simon Barber, Xavier Boyen, Elaine Shi, Ersin Uzun, «Bitter to Better – How to Make Bitcoin a Better Currency», *Lecture Notes in Computer Science*, Vol. 7397, (2012) p. 399.

8 Danton Bryans, «Bitcoin and Money Laundering: Mining for an Effective Solution», *Indiana Law Journal*, Vol. 89, No. 441, (2014) p. 443.

9 *Bitcoin: Decentralized, Peer-to-peer, Cryptocurrency* (2011) seen on Stanford University's webpage on 3rd September 2014.

10 Ibid.

11 *Study for an Impact Assessment on a Proposal for a New Legal Framework on Identity Theft* (2012), seen on European Commission's webpage on 3rd September 2014.

popular and the cash flow increases, the exchange rate raises proportional with their financial benefit. For example, in 2013, the value of Bitcoin increased 8,000% fact which made investments from 2009 humongous profitable.[12]

[Rz 11] If this is the most desired *status quo,* on the other hand, besides the great achievements for their daily existence, novelty might also expose the users to several vulnerabilities given, first of all, the relatively low level of consumer emancipation (i.e. literacy) in comparison to the innovation rate and, second of all, the possibility of misusage for criminal purposes. It shall however be seen in the later sections how the reverse of the medal takes place.

2. Structural and methodological stance

[Rz 12] The paper analyzes from a policy and legal perspective the way in which modern societies tend to replace conventional financial forms with new ones and the social and economic implication the whole process develops. It is designed as a case study on a very actual topic, namely modern, decentralized virtual currencies; in the same time, it is not referring to the centralized ones (i.e. issued on receipt of founds), which are already subject to regulatory frameworks in many jurisdictions and seen most often as money transmitters.[13] When exemplifying, I shall use the case of Bitcoin, which has been the world market leader and the most notorious alternative to fiat currencies.

[Rz 13] The structure shall fallow the logic of causality. It will first of all introduce the idea of decentralized virtual currencies (i.e. cryptocurrencies[14]) and continue with the actual regulatory *status quo.* Afterwards, the paper shall develop on the consequences deriving from the current, mostly European, state of affairs and will analyze possible remedies for the problems. Finally, the author will have his own concluding remarks. Considering semantics, it must be emphasized that decentralized virtual currencies are to be found in the paper as: virtual coins, digital coins, modern virtual currencies, digital currencies, cryptocurrencies or just simply, virtual currencies, all of them describing the same idea.

[Rz 14] When it comes to the research, for the first part of the paper it is based on empirical evidence (doctrine, media sources), mostly qualitative, as it considers the substance of the information and also analytical due to the fact of interpreting legislation, case-law with the aim of proposing a feasible solution. Furthermore, as the author analyzes an ongoing process, most of the used sources are very recent (i.e. from 2014-2015). For the second part of the paper the author bases the analysis on his own experiences in handling virtual currencies-related legal and policy aspects. The usage of dual type of evidence reflects the author's early career path as his work on virtual currencies started in the academic world (i.e. research institute) and continued in a more practical environment (i.e. regulatory body). At the end of the day the current article represents a compilation of all his academic work, knowledge and views in the matter of digital money.

[Rz 15] Finally, it must be said that the realistic-technological model of legal dogmatics is the main

12 *Price of Bitcoin Surges Past $1,000, up 8,000% in One Year* seen on Techvibes's (2013) webpage on 3rd September 2014.

13 FinCEN, Guidance – Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies (2013) seen on FinCEN's webpage, p. 4 on 1st September 2014.

14 Intermediary used in trade that relies on cryptography in order to secure the transactions and to control the issuance of new units.

method used. This implies that the writer chooses a state of affairs as the most desirable and offers arguments sustaining that a certain legal policy is suitable to achieve this outcome.[15]

3. From classic to dynamic

[Rz 16] As it has been previously mentioned, virtual currencies represent a medium of exchange accepted by the members of a particular online network. In more technical words, it represents a «software-based online payment system that has its own currency» that, nowadays, compared with the incipient (centralized) forms of digital money, has no central depository and no single administration. The network software is designed for the creation of a specific number of coins which users get on the basis of «solving some system number crunching tasks – procedure called mining».[16]

[Rz 17] Having this as a premise, transactions and the issuance of digital coins are carried out in a collective way by the network *per se*; afterwards, the coins can be sold or exchanged for fiat money or used to purchase goods and services from providers that accept them as payment instruments.[17]

[Rz 18] Basically, the whole financial policies and regulatory measures imposed by a sovereignty or supranational entity are being replaced by a mathematical formula which is meant to assure the network's functionality (e.g. avoidance of inflation). Citing from the doctrine, «rather than relying on confidence in a central authority, it depends instead on a distributed system of trust»[18] in which the state does not have any contribution or influence.

4. Controversial nature

[Rz 19] The novel technological approach implemented in the creation and use of the new types of digital money generated several views when assessing on its legal nature.

[Rz 20] Having regards to the European Union, which is the primarily area of interest for this study, it can be said that one of the most important positions came from 2013 and belonged to the German Finance Ministry which assumed that «virtual currency is not e-money or foreign currency.» Later on the same year Irish Revenue Commissioners considered that «bitcoins have elements both of a commodity and a currency» while in early 2014 Swedish Tax Authority representatives had the view that Sweden is «likely to view virtual currencies as an asset, like art or antiques, and not currency.»[19] On the other hand, Finland had a different approach than its neighbors and, through its Central Bank, stated that «Bitcoin is not a currency or a payment instrument, but is more comparable to a commodity.[20]

[Rz 21] In some countries where financial or political institutions were silent, it was for the judicial authority to impose its point of view. This is the case in the Netherlands where, a district court in

15 Álvaro Núñez Vaquero, «Five Models of Legal Science», *Revus*, No. 19 (2013), p. 70.

16 *How does it work* seen on Bitcoin's webpage on 10th August 2014.

17 Ibid.

18 *Bitcoin under pressure* (2013) seen on The Economist's webpage on 3rd September 2014.

19 Perkins Coie LLP (2014), «Virtual Currencies: International Actions and Regulations», seen on Perkins Coie's webpage on 14th August 2014.

20 Ibid.

a civil case ruled that digital coins «like gold, are a medium of exchange that is an acceptable form of payment in the country but that cannot be defined as legal tender, common money, or electronic money.»[21] This definition is close to the one given by Finland or Ireland, as it fits the description of commodities, point of view that seems to be embraced by more European and worldwide states.

[Rz 22] It is the case of the United States of America as well where, after a controversial Texas judgment in which bitcoins were seen as «currency or form of money» due to the fact that they «could be exchanged for conventional currencies and used to purchase goods and services»[22], in May 2014, the US Internal Revenue Service clarified the situation and decided that virtual money «will be seen as property and treated similar to any other valuable commodity.»[23]

[Rz 23] Summing up, it can be seen that consensus has been reached when differentiating virtual currencies from real money; also, the lack of coherence when it comes to the actual nature seems to disappear as, in the Organization for Economic Co-operation and Development's view, more states perceive this new financial instrument as commodity.[24]

[Rz 24] Anyhow, from a broader perspective, things are far from being settled in this matter and this also happens because there is still a lack of harmonization at the European Union level. As it will be seen in the next section, few legal loopholes are enough to permit virtual currencies escape the regulatory framework.

5. (No) Regulatory framework

[Rz 25] Within the European Union the main piece of legislation dealing with the digital equivalent of cash is the «E-money Directive»[25], which has been enacted in 2009, time when the nowadays big virtual currency networks were just initiating their activity. Even though, as mentioned before, virtual currencies undertakings are not considered to be electronic money institutions, the European Commission, when sending its proposal, codified in the recital that «the definition of e-money should cover […] not only all the electronic money products available today […] but also those products which could be developed in the future.» Having this as a starting point it can be seen that it was aiming for a broad, *lato sensu* definition which would also include other possible financial instruments that were to be developed in the future years. This safety net would have been a good compromise meant to avoid future regulatory gaps fostered by the difference in pace between the very fast innovation cycles and the quite lengthy and bureaucratic legislative bargains.

[Rz 26] However, even though the Commission embraced a visionary way of making legal policy, in the European Union jurisdiction the recital is perceived as soft-law, non-legally binding, which most of the time has interpretative value upon the actual hard law provisions, which are the main

21 *Regulation of Bitcoin in Selected Jurisdictions* (2014) seen on The Library of Congress's webpage on 8th September 2014.

22 «*Bitcoin is a currency»: Federal judge says the virtual cash is real money* (2013) seen on: NBC's webpage on 16th August 2014.

23 *IRS Rules Bitcoin Is Property, Not Currency* (2014) seen on Techcrunch's webpage on 8th September 2014.

24 Adrian Blundell-Wignall, «The Bitcoin Question Currency Versus Trust-Less Transfer Technology», *OECD Working Papers on Finance, Insurance and Private Pensions*, No. 37 (2014) p. 12.

25 Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions, OJ L 267/7.

articles.[26]

[Rz 27] In our case, the Commission's primarily will was diluted even beyond the possibility of having it as an interpretative tool due to the fact that, after the procedure in front of the Parliament and EU Council, article two came with a very clear and exhaustive definition, fact which leaves no place for ambiguity or interpretations. Citing, «electronic money means electronically, including magnetically, stored monetary value [...] which is issued on receipt of funds for the purpose of making payment transactions [...] and which is accepted by a person other than the electronic money issuer.» As it can be seen, there are three cumulative – *sine qua non* – conditions that need to be fulfilled in order for a payment instrument to fall within the scope of the Directive.

[Rz 28] Because of this regulating strategy, bitcoins and other modern virtual currencies evade the legal provision as, for example, they are generated automatically within the network and not issued on receipt of funds. To this extent, the second condition is not fulfilled and, in consequence, the whole act becomes inapplicable.[27]

[Rz 29] This way of reasoning and conclusion are being embraced both, in the United States and European Union. For example, in 2012, the European Central Bank, in one of its reports has stated that virtual «currency is a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community»[28] while the United States Financial Crimes Enforcement Network (FinCEN), has released an official point of view in which it confirms that bitcoins and other decentralized digital currencies are not regulated.[29]

[Rz 30] Within the European Union, the fact that modern virtual currencies evade the e-money Directive's scope has a lot more implications than this pure fact of not having to be in line with «the prudential regime for electronic money institutions» (e.g. establishing, functioning).[30] As there is a set of interlinked secondary legislation acts (i.e. Directives, Regulations) that use the definitions from the 2009 Directive, this makes modern virtual currencies avoid the application of a broader regulatory framework.

[Rz 31] A first example is represented by the Payment Service Directive,[31] law stating which category of organizations can administer payment services. Due to the fact that in article 1 (b) it refers to the previously mentioned e-money definition, bitcoins and other cryptocurrencies are not covered by this piece of legislation either. As a result, the business conduct standards imposed by the European legislator do not apply; for example, rules on how to allow and execute transactions, parties' rights and obligations, transparency of data, liability in case of illegal use, refunds or the revocation of payment orders[32] are non-binding for this area of activity.

[Rz 32] In the same time, consumers can not prevail upon their standard European Union rights

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26 Michael Koeding, «Active Transposition of EU Legislation», *EIPASCOPE*, No. 3 (2007) p. 29.

27 Niels Vandezande, «Between Bitcoins and mobile payments: will the European Commission's new proposal provide more legal certainty?», *International Journal of Law and Information Technology*, Vol. 1, No. 16, (2014) p. 6.

28 European Central Bank (2012), *Virtual Currency Schemes* (European Central Bank, Frankfurt am Main) p. 13.

29 Niels Vandezande, op. cit., p. 7.

30 *E-money* seen on European Commission's webpage on 5th September 2014.

31 Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal, OJ L 319/2

32 Directive 2007/64/EC art. 28-78.

as the main piece of legislation addressing such matters, namely the «Consumer Protection» Directive[33] provides that any type of financial service is excluded from its scope.[34] This happens due to the fact that provisions related to their rights are found in the *lex specialis* (e.g. Payment Service Directive) that governs this particular type of legal relationship but which, as mentioned before, is not applicable in the case of modern virtual currencies.

[Rz 33] Moving from consumer's private interest to the public one, the rather narrow definition of financial institutions which is codified in the «Anti Money Laundering» Directive[35] and the fact that Regulation on information on the payer accompanying transfer of funds[36] makes reference to transfers made only «through payment service providers»[37] allows modern, decentralized virtual currencies to escape the application of several financial surveillance measures meant to protect against money laundering and terrorist financing.

[Rz 34] As it can be seen, the way modern digital currencies networks function permits them to take benefit of the several loopholes that the actual legislation has and function in a shadier, clandestine environment where authorities are not present.

[Rz 35] Because of this, a whole set of vulnerabilities and problems occur; for consumers, they can severely lose their investments, amounts can be stolen from their «virtual wallets», the EU refund rights are not protected and, deriving from the digital money's nature, there is also uncertain tax liability. In the same time, there are big concerns for the general public as well due to the fact that such instruments can be used for criminal activity.[38]

6. Dealing with the problems

6.1. Value loss

[Rz 36] One of the first problems that might occur regards the high volatility of the digital coins. As they are generated by private financial systems that have as main idea the distributed system of trust between the network participants, this is problematic due to the fact that the network is based on simple logic of supply and demand.[39]

[Rz 37] Having this as a premise, such schemes can be facile targets for all kind of manipulation strategies. For example, promoting the threat of possible deflation, bad press campaigns can influence users to withdraw their money out of the system, fact which would lower the demand and, as a consequence decrease the virtual currency's unit price to an unexpected low level.[40] Linking this kind of strategy to severe previous fluctuations (e.g. in 2013 the exchange rate of a

33 Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, OJ L 304/64

34 Ibid, art. 3.

35 Directive 2005/60/EC of the European Parliament and of the Council of 26 October 2005 on the prevention of the use of the financial system for the purpose of money laundering and terrorist financing, OJ L 309/15.

36 Regulation (EC) No 1781/2006 of the European Parliament and of the Council of 15 November 2006 on information on the payer accompanying transfers of funds OJ L 345/1

37 Ibid, art. 2.

38 European Central Bank, (2012), p. 47.

39 Reuben Grinberg,« Bitcoin: An Innovative Alternative Digital Currency», *Hastings Science & Technology Law Journal*, No. 158 (2012), p. 177.

40 Benjamin Wallace, «The Rise and Fall of Bitcoin», *Wired Magazine*, (November 2011) p. 7.

Bitcoin to United States dollars fell about 60 % in a single day and this year, the value dropped by as much as 80 % in 24 hours[41]) can for sure damage the network's strength and reputation.

[Rz 38] Continuing the analysis, during this year the Bitcoin exchange rates in relation to the major currencies varied ten times more than the average fact that made several European Union National banks warn that «because they are not issued or guaranteed by a central authority there is a possibility of value loss due to their high volatility».[42]

[Rz 39] Drawing a conclusion, virtual currency networks might be the victims of their own faulty functioning and bad reputation. On the other hand, besides the poor economic logic backing up the creation and transfer of digital units, the system can also be endangered by different users whom have enough capital to try and manipulate the market by artificially (e.g. using deceptive transactions) increasing or decreasing the unit value; the networks might be good places for Ponzi schemes or other newer fraudulent strategies due to the fact that the attraction for fast gain among users is very high[43] especially for the ones whom speculate the exchange rates.

6.2. Refund issues

[Rz 40] As mentioned before, when it comes to consumer protection, virtual currencies evade the scope of both: *lex generalis* (i.e. the Directive on Consumer Rights) and *lex specialis* (i.e. the Payment Service Directive).

[Rz 41] With regard to this fact, the refund rights provided by the second directive are not enforceable in suits involving modern virtual currencies. In consequence, such network companies are not offering the type of assistance the individuals are expecting from a bank or other financial institution. As payers and payees are anonymous and no account details needs to be provided (e.g. names, address, phone number, country), zero interference with their transactions takes place. In consequence, digital money undertakings (e.g. Bitocins, Litecoins) deny any liability for consumer losses if funds are lost by negligent transfer or stolen.[44]

[Rz 42] Summing up, the refund rights are not being protected due to the fact that, first of all, the technicalities on which the network functions are as such that it is hard for the administrators to check the scope and legitimacy of a payment. On the other hand, the fact that the legislative burden does not apply to the modern virtual currency systems, makes such companies neglect consumer protection standards.

6.3. Theft

[Rz 43] Not having a proper refund policy in the matter of unpermitted transfer of funds from users' accounts is a big incentive for thieves. This way, once the money is transferred from the initial place to another anonymous account, there is no way back except a voluntary return. However,

41 Coindesk, *Bitcoin price index chart 2013-2014*, (2014) seen on Coindesk's webpage on 18th August 2014.

42 *Regulation of Bitcoin in Selected Jurisdictions* (2014) seen on 1st September 2014.

43 Sandra S. Benson, «Recognizing the Red Flags of a Ponzi Scheme», *The CPA Journal* , Vol. 79, No. 6, (2009) p. 18

44 Frank Tudor, «Making Money with Bitcoins, Litecoins and Other», (*Smashwords Inc.*, Los Gatos CA 2014), p. 12.

users of digital money, who lose their deposits while administrated of third-party exchanges, have the option to demand refund and damages from the exchanges.[45]

[Rz 44] It has been claimed that «security is difficult and expensive, and virtual currency startups generally do not have the revenue and profits sufficient to attract the capital that would allow top-notch security to be implemented».[46] Having this as a premise, ever since 2010, there have been stolen bitcoins worth of approximately €380 million, amount which represents about 7% of the total number of this particular type of coins that were generated so far.[47] However, the number refers only to coins released by one market player, which is just one company; in the same time, there might be other fraudulent transactions not uncovered to this extent which can raise the total amount.

[Rz 45] Within the information technology community it is generally recognized that crypto systems are strong enough that the only way to penetrate them is by trying every possible key (i.e. algorithms of symbols that can amount to millions of combinations).[48] However, looking at the particular causes that allow such big frauds to happen, it can be said that undiligent users are always a target. For example, the fact that most of the accounts are not secured by alternative authentication (i.e. hardware token or one-time-password generator as SMS) or do not even have a basic password (i.e. the majority of the virtual wallets being just an internet address that once discovered and accessed gives permission to make transactions) represents a serious vulnerability.[49]

[Rz 46] In the same time, not only regular user can be negligent when handling such information; poor data protection by currency exchange database administrators represents one of the biggest concerns in this resort. Having a database of hundreds or even thousands of accounts that can be accessed by breaking a security system which most of the times is not proportionate to the financial value it should protect is by far the most desirable target for outlaws.[50]

[Rz 47] In the same time, one last problem with which the whole digital currency community has to deal is represented by specially designed malware programs (e.g. received in the mail inbox or when accessing a webpage) that have the aptitude to steel information or foster double spending operations, all in the detriment of the network members.[51]

6.4. Taxes

[Rz 48] When it comes to trading and financial instruments, legal certainty, in general, and foreseeability, in particular, are very important principles due to the fact that costs need to be anticipated

45 Ajibola Ogunbadewa, «The Virtues and Risks Inherent in the ‹Bitcoin› Virtual Currency», (2014) p. 19 seen on SSRN's webpage on 8th September 2014.

46 *How is all this bitcoin theft happening* (2013) seen on Bitcoin Stock exchange's webpage on 10th September 2014.

47 *$500 Million Worth Of Bitcoin Has Been Stolen Since 2010* (2014) seen on Businessinsider's webpage on 19th August 2014.

48 Bert-Jaap Koops, «The Crypto Controversy – A Key Conflict in the Information Society», (Kluwer Law International, Hague 2001) p. 42.

49 Christopher Mann and Daniel Loebenberger, Realizing Two-Factor Authentication For The Bitcoin Protocol (2014) pp. 1-2 seen on Cryptology ePrint Archive's webpage on 10th September 2014.

50 Tyler Moore, Nicolas Christin, «Beware the Middleman: Empirical Analysis of Bitcoin-Exchange Risk», *Financial Cryptography and Data Security Lecture Notes in Computer Science* Vol. 7859 (2013) pp. 25-26.

51 *Cashing in on Cybercrime: New Malware Target Bitcoin* (2012) seen on Trendmicro's webpage on 10th September 2014.

in an easy and transparent way.

[Rz 49] However, this is not always the case for modern digital currencies; as they still have a controversial nature (e.g. being categorized as commodities, stocks or assets by different jurisdictions), the taxation regime differ depending on the applicable legislation (e.g. users will either pay payroll, property, income, capital gains or profit taxes).[52]

[Rz 50] Having regard that the tendency is towards treating virtual currencies as commodities for tax purposes, it must be said that they shall have the same legal regime as gold, oil, wheat, coffee and other fungible goods. More exactly, commodities are a category of goods for which there is demand and which qualities are uniform among producers; exemplifying, a tone of grain is mostly the same product as it does not really matter who produces it.[53]

[Rz 51] Taking the case of Finland, country in which modern digital currencies are treated as commodities, buying a €2 ice-cream in 2014 with bitcoins purchased for €1 in 2013 would generate €1 in capital gains for the ice-cream consumer (i.e. pay capital gains tax) and €2 of gross income for the supermarket (i.e. pay profit tax).[54] Furthermore, most of the states require that digital coins «miners» will have to notify their gains as taxable income with a value equal to the worth on the moment the coins were received from the system.[55]

[Rz 52] However, the lack of harmonization in fiscal matters is not the only issue. Like cash transfers, virtual currencies are hardly traced by tax authorities due to the fact that the users are anonymous. Even though the transaction reports are public, this does not help because no identification is attached to the parties involved in the transfers.[56] As it shall be seen in the future section, besides hindering the refund process and fostering theft, tax evasion or market manipulation, anonymity is also a good incentive for hard core criminality (e.g. money laundering, terrorist financing, illegal purchases).[57]

6.5. Public interest

[Rz 53] It has been said by a financial strategic analyst that «the biggest barrier in the fight against crime is the data» and that «there are literally trillions of transactions going through the world's financial systems.»[58] Adding anonymity to the already challenging situations, the outcome reached is one in which authorities are in the impossibility of handling the situation.

[Rz 54] Looking at the numbers, there have been about 12 million transactions over 6 years which involved €5 billion for child pornographers, drug dealers, identity thieves, hackers and other outlaws, all encouraged by the rapid and anonymous exchange of virtual coins; in the same time,

52 *Bitcoin Taxes* seen on Bitcointaxes's webpage on 11th September 2014.

53 *Commodity* on Inverstorsworld's webpage seen on 11th September 2014.

54 *Virtual Currency Taxation* seen on the Finnish Tax Authority's webpage on 20th August 2014.

55 McLeod, Patrick, «Taxing and Regulating Bitcoin: The Government's Game of Catch Up», *Journal of Communications Law and Technology Policy* Vol. 22, No. 2 (2014) p. 390

56 Adrian Blundell-Wignall, op. cit., p. 13.

57 Raj Samani, François Paget, Matthew Hart (2013), McAffe White Paper – «Digital Laundry – An analysis of online currencies and their use in cybercrime», (*McAffe Inc.*, Santa Clara, CA) pp. 14-16.

58 Cindy Williamson, Jason Vazquez, Jason Thomas, Katherine Sagona-Stophel (2013), Thomson Reuters Accelus Report –« Technology in the Fight Against Money Launderingin the New Digital Currency Age» seen on Thomson Reuters's webpage p. 11, on 21st August 2014.

because of this, several individuals are dealing with possible life imprisonment charges.[59]

[Rz 55] Having regard to this fact, in July 2014 the Russian Government considered banning digital coins; moreover «entities that use or exchanges in virtual currencies are subject to suspicion of money laundering or other criminal activities.»[60] However, this official position might change in time due to the fact that the usage of digital money might be a good alternative in order to compensate for the financial sanctions[61] imposed by Visa and MasterCard as a result of the Ukrainian crisis.

[Rz 56] Turning back to the actual crimes which use anonymity, a United States government official assumed that if Al Capone was alive today he would use these networks to hide his money.[62] The fact that payments are clandestine protects against any control (i.e. to detect, ask justifications and freeze assets) from public authorities over the users' accounts and this is a good way for corrupt politicians or other criminals to hide their illicit income.

[Rz 57] In the same time, without the possibility to tie an identifiable user to a particular virtual currency address, tracking the injection, layering, and reentry of laundered money would be really hard public officials. As a consequence, anti-money laundering authorities are dealing with a «target» that is almost impossible to recognize.[63] Furthermore, anonymity doubled by the «currency's» high volatility can help justify huge incomes and disguise the origins of money obtained through illegal activities, know-how which is also used to launder money.

[Rz 58] Moving forward with the analysis, the lack of information on the payer and the payee allows large amounts of money to be moved cross border without hindrance to undetected areas, method which is perfect for terrorist financing.[64] In the same time, this transaction typology provides a secure service for black market commerce (e.g. narcotics) by assuring a safe way of payment between retailers and costumers from different parts of the world.[65] In both cases, the virtual currency can be transformed in fiat money by either using centralized exchanges, selling them to individual users, withdrawing from digital money ATMs or using to purchase goods and services.

[Rz 59] As it can be deduced, besides the many benefits that virtual currencies bring into the consumer's life, there are also several issues regarding to the fact that so far, the modern, decentralized ones have evaded the European Union or worldwide regulatory frameworks. The next section is intended to present the recent reactions and legal developments in this resort, which came as a response to all the above mentioned problems.

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59 Ibid, p. 4.

60 Perkins Coie LLP (2014), op. cit.

61 Juan C. Zarate (2013), «Conflict by Other Means – The Coming Financial Wars», *Parameters,* Vol. 43, No. 4, (2013) pp. 90-92.

62 *Online Currency Exchange Accused of Laundering $6 Billion* (2013) seen on The New York Times webpage on 12th September 2014.

63 Danton Bryans, op. cit. p. 447.

64 KPMG, Virtually Unregulated, *Countering Virtual Currency Money Laundering in the 21st Century* (2013) pp. 3-4, seen on KPMG's webpage on 21st August 2014.

65 Raj Samani, François Paget, Matthew Hart, op. cit., pp. 14-16.

7. The current EU bottom up regulatory perspective

[Rz 60] The beginning of year 2015 finds virtual currencies in the middle of a proportionality assessment related to the advantages and threats they present. To this extent digital money is considered to bring benefits as increasing cross boarder transactions (especially for smaller financial institutions), decreasing account maintenance costs or providing for real time worldwide settlements.[66] On the other hand, as already mentioned in the first part of the paper, when it comes to possible threats, the criminal activity of anonymously purchasing illegal goods or services, (e.g. Silk Road case), cybercrime/theft (e.g. Mt. Gox case), sanctions avoidance (e.g. Iran case) or money laundering (e.g. Liberty Reserve case) and terrorism financing (e.g. crowdfunding cases) have all been on the authorities' agenda all around the world.

[Rz 61] Basing its initiative on competences deriving from the Treaty of the European Union (art. 4 –consumer protection competences, art. 63 – cross border payments attributes and art. 83 – financial crime prerogatives) the Commission could have initiated discussions for the purpose of reaching a regulatory outcome. At a policy level things might be settled in two different ways. A first option is to create a new piece of legislation dedicated to virtual currencies; to this extent, none of the EU legislators seem ready for such an ambitious process. In subsequent, the easier alternative seems to be the insertion of digital money in the recast process of the current secondary legislation.

[Rz 62] However, even though payment services are fundamental in the free movement of capitals context, EU Member States are still cautious when accepting innovation in this particular sector. At a principle level, the intrinsic linkage between state currency and national sovereignty makes it hard for private money to compete and change the traditional path dominated by national banks.

[Rz 63] To be more precise, within the EU the policies towards digital money differ; for example, on one side the German Federal Financial Supervisory Authority has regulated virtual currencies as financial instruments, making them subject to Anti money laundering/Counter terrorism financing (AML/CTF) rules. In the same time, for economical activities other than these for personal usage (e.g. exchange platforms, wallet services) there is the need for authorization.[67] Moreover, some German organizations lobby with the purpose of banning digital money due to the different risks they present for consumers (e.g. theft, volatility, money laundering/terrorism financing).[68] In line with the German way of regulation, the French Prudential Supervisory and Resolution Authority delivered its position concerning transactions involving virtual currencies and stressed that the act of intermediation with respect to the purchase or sale of digital money in exchange for fiat currency is that of a financial intermediary.[69] As it can be seen, the major regulatory trends are either to consider virtual currencies financial instruments or have the exchange platforms categorized as reporting obliged entities. These two regulatory options are based on different strategies and develop different levels of efficiency; including digital money in the financial instruments' category (e.g. e-money directive) amounts to the imposition of all the current rules on the currencies *per se*

66 *Five ways Bitcoin could shake up finance* (2014) seen on Paymentscardsandmobile's webpage on 3rd March 2015.

67 *Bitcoins: Supervisory assessment and risks to users* (2014) seen on BaFin's webpage on 8th March 2015.

68 *Large German lobby organization supports ban on Bitcoins* (2014) seen on Bitcointalk's webpage on 8th March 2015.

69 *Recommendations to prevent virtual currencies from being used for fraudulent purposes and money laundering* (2014) seen on the French Ministry of the Economy webpage on 10th March 2015.

while having only the exchange platforms (i.e. nodes between virtual and fiat money) regulated narrows down the efficiency as the only thing being dealt whit is transparency.

[Rz 64] On the other hand, in contrast with the German and French position, the UK government has embraced a financial technology friendly policy[70] and never imposed a formal obligation for consumer protection or AML/CTF compliance for virtual currency businesses operating in its jurisdiction.[71] Recently, the UK Treasury organized a call for information as part of the general governmental endeavor of promoting innovation and competition in the banking sector.[72] This approach towards fostering fintech must also be understood in the context in which the United States have adopted burdensome legislation with regard to digital money (e.g. imposing exchange platforms the same requirements as to money transmitters) and, as a result, the UK relaxed policy option can be considered a good incentive for the different businesses to relocate.[73]

[Rz 65] The existence of all these diverging views at the supranational level resulted in a lack of leadership and the absence of path dependency that could have made the 28 Member States embrace the same political agenda with regard to these novel payment instruments.

[Rz 66] This outcome (i.e. path dependency) can be effectively explained by giving primacy to the new institutionalism school of thought. Rosamond assumes that institutional configurations and decision making mechanisms have an important influence upon final policy decisions from which it is hard to depart afterwards.[74] In an EU context, the way in which institutions (i.e. Commission, Council – Member States and Parliament) are configured to decide is essential in the matter of which one is going to impose its view first and, as a consequence, create path dependency.[75] By giving integrationist nuances to the path dependency discussion, Hass stresses that the creation of supranational entities has the purpose of integrating more and more sectors inside the EU «spill over» effect.[76]

[Rz 67] However, things are not always as simple as international relations scholars present them. In our case, even though, in line with France and Germany, the rest of the Member States recognize virtual currencies as being a threat for the financial system, very few of them took effective actions in the absence of binding rules from the EU level; to this extent the tendency has been to promote non-legislative measures (e.g. warnings based on the EBA opinion on virtual currencies)[77]. However, Estonia's authorities imposed a licensing scheme for virtual currency traders[78] while the Belgian Financial Markets and Services Authority went the extra mile and prohibited the distribution to retail clients of financial products whose performance depends on virtual currencies.[79]

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70 *Chancellor on developing FinTech* (2014) seen on UK Government's webpage on 10th March 2015.

71 *HMRC: UK bitcoin exchanges don't have to register under money laundering regulations* (2013) seen on Coindesk's webpage on 10th March 2015.

72 *Digital currencies: 5 reasons we're calling for information* (2014) seen on UK Government's webpage 10th March 2015.

73 *Request for Administrative Ruling on the Application of FinCEN's Regulations to a Virtual Currency Trading Platform* (2014) seen on FinCen's webpage on 11th March 2015.

74 Ben Rosamond, European integration and the social science of EU studies: the disciplinary politics of a subfield, Vol. 83, No.2, (2007) p. 248.

75 Ellen M. Immergut, The Theoretical Core of the New Institutionalism, Politics & Society (1998), Vol. 26, No. 1, p. 8.

76 Ernst B. Haas, Limits and Problems of European Integration, (Hague, Nijhoff 1963) pp. 19-20.

77 *Bitcoin's Legality Around The World* (2014) seen on Forbes Magazine's webpage on 10th March 2015.

78 *FIU Regulation* (2014) seen on the Estonian Police webpage on 12th March 2015.

79 *Ban on distribution of certain financial products in Belgium* (2014) seen on White&Case's webpage on 12th

[Rz 68] Also, after the Charlie Hebdo attack more jurisdictions are expected to embrace a regulatory approach in order to combat the anonymity related threats; while transposing the 4th AMLD (Directive on the prevention of the use of the financial system for the purpose of money laundering and terrorist financing) several Member States may consider virtual currencies exchange platforms as obliged entities or have the different schemes analyzed in the national risk assessments. Also, as on the EU agenda[80] there has been a shift from the money laundering concerns towards the terrorism financing threat, the EU legislators urge having virtual currencies introduced in one of their current or future pieces of secondary legislation. Of relevance in this matter is the French government declaration stating that action needs to be taken in respect of terrorist financing and a way to do so is by removing anonymity in most of the dealings with virtual currencies. Also, it stressed that digital money should also be included in the loop for the ML/TF risk assessments (i.e. national and supranational) that will be carried out in the next period.[81] This seems to be an induced path dependency as the policy process is collective (i.e. no specific initiator) and follows a bottom-up, reactive approach which is fostered by the Paris attacks.

[Rz 69] Summing up, it can be seen that the European Member States are unanimous on recognizing threats posed by digital money; however, the level of action differs depending on how much risk appetite national governments have in the matter of novel payment instruments. As a consequence, in the absence of a coherent majority view, it will be left for each jurisdiction to configure its own solution and for private operators to voluntarily raise their compliance standards.

8. The impact on innovation markets

[Rz 70] Innovation markets are based on the «research and development directed to particular new or improved goods or processes, and the close substitutes for that research and development.»[82] Due to their dynamic nature, decentralized open source virtual currencies fall within the scope of this definition as their whole nature can no way be perceived as being static. The best way to describe them is by using the term «innovation in innovation» as many companies invest in R&D (Research & Development) programmes with the scope of further developing the blockchain[83] platform.[84] As a result of this very dynamic environment, political decision makers will always have difficulties in regulating «moving targets».

[Rz 71] Having regard to the actual *status quo*, it is more than plausible that the different EU markets will be partitioned from a regulatory point of view and, as consequence, the whole idea of Digital Market might suffer. Having this as a premise, the whole virtual currencies industry will

March 2015.

80 *EU is stepping up the fight against terrorism* (2015) seen on Europefinancing's webpage on 13th March 2015.

81 *France calls for strong regulation of Bitcoin in EU counter-terrorist financing laws following Charlie Hebdo incident and an end to anonymous financial transactions* (2015) seen on Antimoneylaunderinglaw's webpage on 13th March 2015.

82 Josef Drexl, *Anti-Competitive Stumbling Stones on the Way to a Cleaner World: Protecting Competition in Innovation without a Market*, Max Planck Institute for Intellectual Property and Competition Law (2012) p. 13.

83 A block chain is a transaction database shared by all nodes active in a system based on the virtual currency protocol.

84 *UBS to Research Blockchain Technology in London Lab* (2015) seen on Coindesk's webpage on 21st April 2015.

suffer due to the fact that most of the transactions take place in a cross border context. Moreover, aiming for passported services will be too burdensome or even impossible. Exemplifying, a travel agency operating worldwide will have to adapt its payment system as to accept virtual currencies in some states and not in others. In the same time, the fees for converting virtual currencies into fiat money will differ depending on the specific compliance expenses exchange platforms might experience in particular jurisdictions (e.g. customer due diligence costs).

[Rz 72] This lack of harmonization has already developed issues related to legal certainty, trusts and also, diminished the risk appetite of private actors in incorporating virtual currencies in their services' portfolio. In consequence, a lot of virtual currencies' start-ups small and medium-sized enterprises (SMEs) have a hard time finding banks to host their accounts; it is for sure the threats linked with their anonymous character and the risk of having «dirty money» introduced in the banking system are the ones mainly discouraging financial institutions to engage in business relationships with the fintech entrepreneurs.

[Rz 73] In order to understand the phenomenon better, reference must be made to the $1.9 billion U.S. fine in a money-laundering case that HSBC was charged with in 2012.[85] Also, the increased media interest towards financial crime (e.g. Lux leaks, Swiss leaks)[86] and the huge reputational damage vulnerabilities made the banking sector have a cautious approach and decrease their risk appetite in operating with financial technology.

[Rz 74] Having regard to these facts, there is a legitimate expectation that most of the regulators will start from a presumption of threat when regulating the industry *per se*. This way of approaching the topic is based on the solid portfolio of already mentioned cases where anonymous virtual currencies have been misused. Of relevance are the declarations made by two successive Commissioners responsible for financial instruments (i.e. Michael Barnier[87] and Jonathan Hill[88]) that talk about virtual currencies in terms of «financial crime risks» and «threats». On the other hand, from the same policy perspective, as it will be further developed, this way of reasoning has the potential of hindering innovation and competition in the internal market.

[Rz 75] The new paradigm has all the elements to affect this novel industry; political pressure, humongous sanctions and the lack of legal clarity are all elements from a Pandora's Box[89] that seems to have opened at the detriment of innovation.

[Rz 76] Transposing this matter of fact in market behavior there is a tendency for big players to be risk averse and, at the cost of loosing clients, follow a very rigid and narrow compliance strategy. Generally speaking, de-risking relates to «the phenomenon of financial institutions terminating or restricting business relations with clients or categories of clients to avoid, rather than manage risks».[90] The development of such behavior made several international actors (e.g. FATF, G20,

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85 *HSBC to pay $1.9 billion U.S. fine in money-laundering case* (2012) seen on Reuters's webpage on 14th March 2015.

86 *Jean-Claude Juncker must push through EU directive on money-laundering* (2014) seen on The Guardian's webpage on 14th March 2015.

87 EU executive to look at regulating Bitcoin currency (2014) seen on Reuters's webpage on 15th March 2014.

88 *Turning around the telescope – consumers at the center of financial services policies* (2014) seen on European Union's webpage on 12th March 2015.

89 Belonging to the Greek mythology, it represents a box that once opened unleashed eight demons unto the world.

90 *FATF clarifies risk-based approach: case-by-case, not wholesale de-risking* (2014) seen on FATF's webpage on 9th March 2015.

European Banking Association or the European Commission) take concrete action and present positions and solutions for the avoidance of major market hindrances.

[Rz 77] Giving clear examples, «victims» of this new *status quo* are politically exposed persons, NPOs based in conflict areas, third-party payment processors and virtual currency businesses. In this matter, banks gave their endeavor stereotypical nuances by dropping categories of clients without always respecting a case-by-case risk analysis.[91] Reacting, the Financial Action Task Force (FATF) plenary has emphasized that: «what is not in line with the FATF standards is the wholesale cutting loose of entire classes of customer, without taking into account, seriously and comprehensively, their level of risk or risk mitigation measures for individual customers within a particular sector».[92]

[Rz 78] On of the landmark cases can be tracked back to 2013; it took place between Barclays (i.e. bank) and Dahabshiil (e.g. remittance company) and was based on competition law grounds as the Somali undertaking accused the UK bank of abusing its dominant position by refusing to deal. While bank officials announced their decision to close the accounts of about 250 money-service businesses in light of fears of terrorism financing, in this particular case, the UK High Court ordered an interim injunction having in mind humanitarian concerns as the Somali GDP is in a significant percentage based on money transfers made from the diaspora.[93]

[Rz 79] Same banking policy tends to be applied to novel financial instruments; after several important voices from the regulatory side (e.g. EBA, ECB, FATF) emphasized on the threats linked to digital money (e.g. over 70 in the EBA report),[94] banks decreased their risk appetite, at least up to the moment when regulation will be put into place. For example, Ireland's Bitcoin ATM company had been refused by Bank of Ireland in its application for a bank account while the largest Nordic Bank and forex trader (i.e. SEB), made public the fact of refusing all clients' requests to open accounts for virtual currencies usage.[95] Also, very recently an important Polish bitcoin exchange has had its accounts suspended by the host bank for lacking credentials that would make costumers identifiable.[96]

[Rz 80] As it can be seen, the compliance requirements for more transparency are doubled by other consumer protection imperatives like the one for reducing volatility or theft threats. Linking the possible measure with the fact that most digital money businesses are in a wide majority conducted by SMEs, it is most likely that market entrance will be hindered and, as result, consumers will face less options and higher prices. In the absence of an innovative answer for complying with the expected standards – which are similar to the ones financial institutions have to respect today -the anticipated financial burden seems too high in order to grow real alternatives to the actual financial system.

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91 *FATF warns on banks' approach to de risking* (2014) seen on Financial Times's webpage on 16th March 2015.

92 Ibid fn. 28.

93 *Remittance company awaits court ruling on Barclays account closure* (2013) seen on The Guardian's webpage on 16th May 2014.

94 European Banking Authority, *EBA Opinion on «virtual currencies»* (2014) seen on European Central Bank's webpage on 12th March 2015.

95 *Largest Nordic Bank SEB Refuses To Accept Bitcoin Amid Risks* (2014) seen on DC Magnates's webpage on 11th March 2015.

96 *Bank Suspends Polish Bitcoin Exchange's Accounts* (2015) seen on Coindesk's webpage on 6th March 2015.

9. Concluding remarks

[Rz 81] It is certain that we live in a dynamic world based on technological change and permanent development. Because of this, legislators must keep pace with it and deliver the best regulatory frameworks meant to sustain progress and not hinder innovation. In order to do so, they must first understand the system's way of functioning, its desirability for the society and the way it can be protected from misusage. Once this level of literacy and planning is being reached, the premises for a solid regulation are being established.

[Rz 82] However, this is not always the case; as it has been developed in this case-study, legislators are sometimes one step behind as the understanding process takes time and normative bargains are lengthy. Moreover, the need to change legislation can occur most of the times due to the fact that previous norms lack visionary character and, as in our case, it allows new technologies to evade their application.

[Rz 83] Besides the timing issue, there is another problem which relates to the substance of the norm to be enforced. In this particular resort a proportionality test between the benefits of the invention and the costs of regulating it must always take place in order to reach the perfect compromise. Exemplifying, what makes the whole decentralized virtual currency really cheap nowadays is the fact that the functioning costs are at a minimum level. Once all of the regulatory requirements from the United States example will be enforced (e.g. book keeping, maximum transparency, surveillance, accountability etc.) the administrative and financial burden might be too heavy for the system and prices for services might rise at the detriment of the average consumer, fact which will «chase away» users.

[Rz 84] Taking a closer look at the industry, it is for sure that virtual currencies, as part of the larger fintech panel, are for the moment «stuck» in both, the political and corporate governance decision-making schemes. In some cases, the difference in the stakeholders' views makes a compromise look impossible fact that places innovation in the legal offline.

[Rz 85] This is for sure not a desiderate; as the EU Digital Agenda aims to foster cross-border online sales and introduce better conditions for SMEs to conduct business via internet[97], a clearer and more uniform policy answer with regard to virtual currencies should be established, at least at a principle level. Once things are settled this way, it will be easier for the EU legislators to revisit previous legislation (e.g. AMLD, PSD [Directive on payment services in the internal market], E-Money Directive) or create special one and not engage in a short run, contextual and incomprehensive approach.

[Rz 86] The proportionality debate involving criminal prevention on one side and innovation and competition on the other side can be also seen as an artificial one as all are important market values that can coexist in the digital age; however, in order to accommodate them, viable technological solutions must be available.

[Rz 87] In this case, the best way to keep pace with innovation is by further innovating; for example, when dealing with the anonymous characteristics and theft vulnerabilities of virtual currencies, instruments and know how similar to the ones mentioned in the e-identification[98] legislation could

97 *Digital Agenda for Europe* (2014) seen on European Commission's webpage on 16th March 2015.

98 Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC OJ L 257/73.

be used. Also, as some banks and financial institutions[99] are willing to embrace this new technology it is for them to invest in R&D projects and come with the most cost efficient and effective compliance solutions. In this race the incentive should be on the long run and any temptations of taking advantage of current legal loopholes or system vulnerabilities will come with financial and reputational damages.

[Rz 88] Bearing this in mind, by proposing clear technological solutions (e.g. for both transparency and consumer protection) private stakeholders can be the ones shifting the paradigm from a purely political discussion to one in which technical answers can be given. Virtual currencies are not good or bad *per se*; they belong to the market and it depends on the industry and regulators how their perspective will look like.

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99 *BNP Paribas Analyst Sees Bitcoin as Technological Tool For the Financial World* (2014) seen on Coinsetter's webpage on 16th March 2015.