Regulating Peer-to-peer Network Currency: Lessons from Napster and Payment Systems

Safari Kasiyanto*

Abstract

It was only yesterday when the central banks across the world shared a similar concerns about the rise of e-money as a 'new' form of money. Theoretically, e-money as a network good has the potential to achieve a position necessary to replace traditional money. If this happens, the central bank's task in conducting monetary policy will become more and more difficult. This phenomenon gives rise to a dilemma among the central banks as to whether or not to regulate e-money at its early stage. The recent emergence of Bitcoin, a peer-to-peer network currency that is totally different from e-money or many other payment instruments has elevated the debate on whether to regulate new forms of money. How should the authorities react to this innovation then? This paper outlines the legal issues surrounding the rise of peer-to-peer network currency and the measures available in dealing with the rise of such crypto currency. Two lessons are provided by this paper, one from the case of peer-to-peer network file sharing system, Napster, and the other from existing payment systems instruments.

1. Introduction

1.1 Background

The use of technology and innovation in retail payment systems has been evolutionary.[1] On the one hand, this development benefits consumers and the entire economy by providing many means of completing transactions faster and cheaper than those

* Safari Kasiyanto is a Ph.D. researcher at Tilburg Law and Economic Center (TILEC) and a junior research fellow at European Banking Center (EBC), Tilburg University, Warandelaan 2 5037 AB Tilburg, The Netherlands; Also working as a legal advisor at Bank Indonesia, the central bank of Republic of Indonesia. Author wishes to thank Prof. Pierre Larouche for long discussions and valuable feedbacks, Prof. Panagiotis Delimatsis, Prof. Hans Lindahl, and all participants of Queen Mary Legal Postgraduate Conference on June 5th, 2014, of Magister JFT's discussion event on March 31st, 2014, and of TILEC work-in-progress seminar on January 22nd, 2014.

[1] For an overview on the recent and future developments in retail payment systems see for instance EUROPEAN CENTRAL BANK AND OESTERREICHISCHE NATIONAL BANK, THE FUTURE OF RETAIL PAYMENTS: OPPORTUNITIES AND CHALLENGES (European Central Bank. 2011). Bank for International Settlement also provides many reports on payment systems and regularly up dated payment systems statistics. See for instance COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS, INNOVATIONS IN RETAIL PAYMENTS (2012).

provided by traditional instruments.[2] On the other hand, it gives rise to a concern from regulators as keeping up with such development is nearly impossible.[3] For instance, it was only yesterday that the central banks and economists paid attention on the debate over the impact of electronic money (e-money) –a 'new' form of money in which its value is electronically stored either directly or indirectly into a certain medium[4] – to the economy, in particular to the central bank in conducting its tasks relating to monetary policy and maintaining financial stability.[5] Theoretically, e-money as a network good has the potential to achieve a position necessary that could replace traditional money.[6] The bigger the network participants in an e-money system, the better the impact to the economy.[7] This theory has been confirmed by studies which show that over the years, demand for traditional money has declined in most developed economies because of the continuous developments of advance technology in payment systems.[8] This phenomenon has caused a dilemma as to whether the authorities shall enact any regulations at the early stage development of e-money. Some chose to do so,[9] whereas others waited to see if e-money flourished first.[10]

The debate over the importance of regulating e-money has not yet been fully addressed. In the meantime, we now have Bitcoin, a totally new form of money that is different from e-money or many other payment instruments in existence. Compared to "traditional e-money" mentioned above,[11] Bitcoin has everything it takes to be considered as a newest form of money, distinct from other payment instruments currently in existing.

---

[2] See for instance *The Impact of Electronic Payments on Economic Growth*, MOODY'S ANALYTICS, (2013). Using data from 2008-2012 Moody's highlighted that electronic payments had contributed to 0.3% of increase in GDP in developed economies and 0.8% of increase in GDP in emerging economies.

[3] In some civil law countries such as Indonesia there is a famous proverb among law scholars stating (in Dutch) "*Het recht hinkt achter de feiten aan*", its unofficial translation is "*the laws are always left behind the facts*".

[4] Marco Arnone and Luca Bandiera, *Monetary Policy, Monetary Areas, and Financial Development with Electronic Money*, WP/04/122 IMF WORKING PAPER (2004). See also Connel Fullenkamp & Saleh M. Nsouli, *Six Puzzles in Electronic Money and Banking*, WP/04/19 see *id*. at.

[5] Although a recent study conducted by the Central bank of Hungary stated that cash would not be replaced by e-money in immediate time, there was a widespread concern that in the future e-money will replace cash. Since 2002 OECD has stand for this position, see ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, THE FUTURE OF MONEY (OECD Publication Service. 2002).

[6] Cash: banknotes and coins.

[7] It calls as network effect or network externalities. To be economically beneficial, a system must have a certain degree of participants.

[8] See for instance Retail Payment Systems to Support Financial Access: Infrastructure and Policy. (2008).

[9] EU for instance regulates e-money from its early period.

[10] Case of *M-Pesha*, a successful mobile money in Kenya. There is a study that one of the main reasons for mobile money in Kenya to success is because of the lenient regulations by Kenyan central bank. See Mobile Money Study. (2011).

[11] *Inter alia*, card-based e-money such us *Octopus Card* (Hong Kong) or *OV-chipkaart* (the Netherlands) and server-based e-money and mobile money such us *M-Pesha* (Kenya).

Bitcoin is *decentralized*, whereas all current payment instruments in existence in existing are basically centralized. Bitcoin needs no underlying government authority back-up nor financial institutions as intermediaries,[12] In comparison, the current while all the rest of payment instruments connects to financial institutions and need the central bank's authority to operate and s for central bank's back-up in case of emergency.[13] Lastly, Bitcoin uses peer-to-peer network to verify and approve transactions, whereas the other systems go to a central server.[14] How should the authorities react to this totally new innovation in payment systems?

Why do Regulators Concern over the rise of Peer-to-peer Network Currency?

In order to give a better background as to why the rise of peer-to-peer network currency is problematic, this section will briefly discuss the regulator's concerns over the rise of such peer-to-peer network currency. The case of Bitcoin will be used as an example since it is a type of peer-to-peer network currencies that is widely known and used compared to other types. Different authorities have different concerns over the rise of virtual currency such as Bitcoin. The concerns can be divided into three groups and, surprisingly, none of them is actually new.

The first concern is raised by the central banks or authorities responsible for the monetary policy and financial systems. As outlined by European Central Bank[15] the central banks have concerns about the development of virtual currency because if such development is left unmonitored it could pose several risks to the economy.[16] The main risks involved are price stability risk, financial system stability risk and payment systems stability risk.[17] These risks are actually quite similar to those of unregulated e-money.[18] This is because peer-to-

[12] At least in theory since currently the needs for connecting some part of the Bitcoin systems to financial institutions have arisen. For instance, the needs for using bank accounts in case of exchanging Bitcoin with real money.

[13] The function of lender of the last resort of central bank to intervene the market when liquidity is short and to support illiquid financial institutions during that liquidity shortfall.

[14] Roeschlin M. Scherer T. Capkun S. Karame G. O. Th International Conference on Financial Cryptography Androulaki E & F. C. Data Security, *Evaluating User Privacy in Bitcoin*, 7859 LNCS LECT. NOTES COMPUT. SCI. LECTURE NOTES IN COMPUTER SCIENCE (INCLUDING SUBSERIES LECTURE NOTES IN ARTIFICIAL INTELLIGENCE AND LECTURE NOTES IN BIOINFORMATICS) (2013).

[15] EUROPEAN CENTRAL BANK, VIRTUAL CURRENY SCHEME (European Central Bank. 2012).

[16] SEE also the letter from the Governor of the Federal Reserve System, Bernanke to the US Senate dated on September 6, 2013. In this letter, Federal Reserve shared the same concern to that of ECB regarding the rise of virtual currency. For details, see Board of the Governors of the Federal Reserve System, (Chairman of Committee on Homeland Security and Governmental Affairs The Honorable Thomas R. Carper, United States Senate ed., 2013).

[17] ECB, VIRTUAL CURRENY SCHEME, p. 33-41

[18] For early explanation on the risks of e-money see for instance OECD, The Future of Money. 2002.

peer network currency such as Bitcoin shares the common function to e-money and even to traditional money, which is as a medium of exchange for good services.[19]

The second concern is raised by the authorities that have power in regulating trading and securities exchanges such as SEC,[20] and financial authorities other than the central bank.[21] They raise a concern over the rise of peer-to-peer network currency for the sake of consumer protection. For instance, it is merely a fact that Bitcoin is not easy to use by lay people since it requires a certain degree of knowledge on information technology (IT) and the Internet transaction.[22] Although basic, the degree of knowledge on IT and the Internet transaction are needed to initiate a transaction using Bitcoin. Such knowledge includes how to open a wallet to store the digital currency, how to exchange the real money with such digital currency and then redeem back to the real money, and how to conduct transactions such as buying goods or services online. Without acquiring this knowledge, users can be easily confused or risky of being fooled by cybercriminals.

The third concern is raised by authorities such as FBI,[23] criminal or justice office,[24] homeland security[25] and similar national institutions. They are concerned that the rise of crypto-currency may increase the chances for a rise in illicit activities such as drug dealings,

[19] The similarities (and differences) of the characteristics of peer-to-peer network currency to that of e-money will be discussed on the section 3.3. On this section, peer-to-peer network currency will also be compared to other payment instruments in existence such as paper-based instruments (checks) and card-based (credit and debit cards).

[20] A letter from SEC dated on August 30, 2013 to the US Senate. In this letter, SEC provided three information regarding the rise of virtual currency, namely relevant policies or procedures, coordination with other government bodies, and future plan or strategies. For detail, see Securities and Exchange Commission, (Chairman of Committee on Homeland Security and Governmental Affairs The Honorable Thomas R. Carper, United States Senate ed., 2013). For the first issue on policies or procedures, SEC also mentioned that it had made an "investor guidance" regarding Ponzi scheme used to fraud people using Bitcoin investment. See SECURITIES AND EXCHANGE COMMISSION, PONZI SCHEMES USING VIRTUAL CURRENCIES (Securities and Exchange Commission. 2013).

[21] See the letter from the US Department of Treasury dated on September 18, 2013 to the US Senate, Department Of Treasury, (Chairman of Committee on Homeland Security and Governmental Affairs The Honorable Thomas R. Carper, United States Senate ed., 2013). Similar to the letter from SEC, the US Department of Treasury also reported to the US regarding any policies, coordination, and plans in tackling the rise of virtual currency. In addition, on March 18, 2013 the US Department of Treasury had also issued a detail guidance on the application of Financial Crimes Enforcement Network (FinCEN) Regulations to the persons administering, exchanging, or using virtual currencies. For details see Application of Fincen's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies. (2013).

[22] See for instance RICHARD AMORES & PIERLUIGI PAGANINI, DIGITAL VIRTUAL CURRENCY AND BITCOINS : THE DARK WEBS FINANCIAL MARKET - EXCHANGE & SECRETS (Paganini/Amores Publishing. 2013).

[23] For detail report by FBI see (U) Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Deterring Illicit Activity. (2012).

[24] U.S. Department Of Justice, (Chairman of Committee on Homeland Security and Governmental Affairs The Honorable Thomas R. Carper, United States Senate ed., 2013).

[25] U.S. Department of Homeland Security Office of Legislative Affairs, (Chairman of Committee on Homeland Security and Governmental Affairs The Honorable Thomas R. Carper, United States Senate ed., 2013).

money laundering and tax evasion.[26] These groups argue that the advantages of virtual currency in which it is anonymous, borderless, and rapid, support the use of such currency for illegal activities.[27]

The complete concerns of regulators concerning the rise of peer-to-peer network currency such as Bitcoin are shown on the **Table 1**.

Table 1. Regulator's Concerns over the Rise of Peer-to-Peer Network Currency

Types of Concerns	**Authorities Involved**
Price stability Financial system stability Payment systems stability	Central banks Monetary and financial authorities
Consumer protections	Financial authorities other than central banks Authorities in charge on trading & exchange and consumer protection.
Illicit activities or criminal uses	Intelligence, homeland security, AML, and justice authorities

Source: Author

The Previous Works on the Legal Issues Surrounding the Peer-to-peer Network Currency

This article is mainly concerned with what measures are available in dealing with the rise of crypto currency such as Bitcoin. To answer this question, it will firstly discuss whether such peer-to-peer network currency constitutes money and as to whether it falls under the coverage of current payment systems instruments. Since this article focuses on the legal issues, we will briefly review the existing literature related to peer-to-peer network currency.

There are a few works on the legal issues surrounding the rise of Bitcoin, but none comes up with clear idea on what approaches available to regulate this novel virtual currency. ECB (2012) comprehensively reviewed virtual currency scheme and discussed Bitcoin as a case study.[28] It highlighted the lack of existing regulations of such currency both from public and private laws perspectives.[29] Public laws consisted of state legislations such as laws and regulations while private laws in this case talked about right and obligations between parties, materialized in the provisions of contract/agreement. Both remained unclear. Doguet (2013)

[26] Issue on tax evasion was at first highlighted by the US Government Accountability Office (GAO). See Virtual Economies and Currencies: Additional IRS Guidance Could Reduce Tax Compliance Risks. (2013).
[27] FBI report provides detailed analysis that the unique features of Bitcoin as virtual currency (anonymous, borderless, rapid and online) challenge the law enforcement authority to detect and cease illicit activities. See Directorate of Intelligence, (U) Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Deterring Illicit Activity. 2012.
[28] ECB, *Vitual Currency Schemes. (2012).*
[29] *Id. at.*, pp. 42-43.

outlined three regulatory regimes for Bitcoin as a peer-to-peer network currency system,[30] namely self-regulation, regulation for market participants, and prohibition.[31] In the end, Doguet came up with general conclusions that any regulatory actions should be carefully measured.[32] In addition, Doguet also suggested that prohibition to Bitcoin would never answer the problems, although this approach could be a logical choice considering the decentralized nature of such currency. However, Doguet did not include the fact that recently Thailand had prohibited the use of Bitcoin for local transactions within its jurisdiction.[33] Plassaras (2013) argued to bring peer-to-peer network currency such as Bitcoin under the IMF since its wide-use may pose (liquidity) risks to relevant country.[34] Although Plassaras's argument represented the best on how far the concerns of the authorities would be if peer-to-peer network currency is used worldwide, the idea to bring such system under the IMF is just gone too far and therefore falls beyond the scope of this paper.

1.2 Problem Analysis and Methodology

The analysis of peer to peer currency involves three primary research questions. The first two questions are basic questions serving as a foundation to answer the central question on what approaches can be taken to regulate peer-to-peer network currency such as Bitcoin.

Is peer-to-peer network currency such as Bitcoin money?

This question is derived from the fact that Bitcoin community always used an excuse that Bitcoin is not money, so the authority cannot use "law relating to legal currency" in order to questioning Bitcoin. To have a better understanding on whether Bitcoin is money, this research employ legal philosophy, basic economic theory and modern law on legal tender.[35]

Is Bitcoin a payment systems instrument?

This question is mainly generated from the result of the ECB's assessment that peer-to-peer network currency such as Bitcoin is not e-money under the E-money Directive.[36] However, ECB still believes that it remains within the central bank's power to monitor and

[30] Joshua J Doguet, *The Nature of the Form: Legal and Regulatory Issues Surrounding the Bitcoin Digital Currency System*, 73 LOUISIANA LAW REV. LOUISIANA LAW REVIEW (2013).
[31] *Ibid*, pp. 1143-1152.
[32] *Ibid*, pp. 1153.
[33] *Trading suspended due to Bank of Thailand advisement*, BITCOIN, https://bitcoin.co.th/trading-suspended-due-to-bank-of-thailand-advisement (last accessed 29 May 2015)
[34] Nicholas A. Plassaras, *Regulating Digital Currencies: Bringing Bitcoin within the Reach of the Imf*, 14 CHI. J. INT'L L. 377 2013 (2013).
[35] See Section 3.
[36] ECB, Virtual Currency Scheme. 2012.

evaluate the development of such currency and, if necessary, to take any appropriate measures.[37] This paper elaborates the issue as to whether peer-to-peer network currency is a payment instrument. Using law and payment systems approach, this paper firstly assess the characteristics of payment system instruments (paper-based, card-based, and electronic-based payment instruments) and then compares such characteristics to those of Bitcoin.[38]

What approaches available to regulate such peer-to-peer currency?

This is the central question of this paper, derived from the recent phenomena in several major countries regarding the rise of Bitcoin.[39] To answer this question, this paper provides two lesson-learned available in regulating innovation: lessons from regulating peer-to-peer network file sharing[40] and lessons from payment systems.[41]

For lessons from P2P file sharing, this paper assess the case of Napster that was shut down in 2001 following the decision of the 9th Circuit Court of Appeal,[42] and tries to apply this case to peer-to-peer network currency. As for lessons from payment systems, this paper firstly outlines the laws applicable to payment instruments. This outline serves as a horizon to determine what laws apply to peer-to-peer network currency. After determining such laws, the paper analyzes policy approaches available in dealing with such peer-to-peer network currency.[43]

1.3 Structure

The structure of this article is organized as the following. Summary on Bitcoin as the firstly well-known peer-to-peer network currency is provided on Section 2. This summary is needed to understand the concrete example and the operational of peer-to-peer network currency. Section 3 explains two materials: the concept of money from basic economic theory as well as from modern laws on legal tender and the comparison of peer-to-peer network

[37] In this case, the relevant regulation is the Payment Systems Directive (PSD). Thus, although virtual currency does not meet requirements to become e-money, it falls within the scope of payment systems activities in which the central bank has power to oversee. For a good evaluation on the PSD, see for instance The Payment Services Directive, Pitfalls between the Acquis Communautaire and National Implementation (2009).

[38] Elaboration on these issues is provided on section 4.

[39] The main countries and regions discussed on this paper are mainly US and EU, and some developing countries with strong cases in dealing with Bitcoin such as China and Thailand. However, the discussions provided here are as examples only, for the sake of a greater clarity, not to provide detailed elaborations on countries' cases.

[40] Provided on Section 4.1 of this paper, based on the case of A & M Records, Inc. V. Napster, Inc. 239 F.3d 1004 (9th Cir. 2001). For an excellent summary of such a case, see for instance Case Summary a&M Records, Inc. V. Napster, Inc.: Implications for the Digital Music Library (Sept. 18, 2001).

[41] Provided on Section 4.2.

[42] See A & M Records, Inc. V. Napster, Inc. 239 F.3d 1004 (9th Cir. 2001).

[43] For the policy approaches available, this paper combines the analysis of the Napster case with the theoretical framework such as that of Schumpeter's famous theory that "*economic logic prevails over the innovation*".

currency to the existing payment instruments. It will serve as a bridge to the elaboration on regulatory approaches on Section 4, in which it will provide lesson learned from the case of peer-to-peer network file sharing system: Napster, and from laws applicable to payment systems. This paper will close with conclusions on Section 5.

2. Overview of Peer-to-peer Network Currency: the Case of Bitcoin

Although there are already a number of papers describing Bitcoin as one type of peer-to-peer network currencies,[44] it is important to, once again, summarize the important characteristics of peer-to-peer network currency as a foundation for the discussion on the regulatory approaches. Bitcoin will be used as a case study since previously mentioned, it is the most widely used among other types of peer-to-peer network currencies.

2.1 What Makes Bitcoin Different

What makes Bitcoin different from other payment instruments comes from its nature and design. It is (1) digital or virtual currency, as well as (2) private currency, which means there is (3) no need for central counterparty, government back-up or, at least in theory, intermediaries.[45]

Bitcoin is digital currency as it is basically a computer file like text file or music file encrypted with sophisticated logarithm and is transferable using private and public key for the security. It is also virtual currency as the 'coin' is enabled in such a way as to be used online only and there is no physical currency in existence (there was *bitbills* cards –sort of debit card with Bitcoin value stored inside, but they are no longer produced now.[46] Furthermore, this could not be claimed as the physical appearance of Bitcoin).[47]

As one of peer-to-peer network currencies Bitcoin is also private currency as there is no government back-up for its 'issuance'. It does not need any central banks nor financial institutions for the operations. It initially attempts to replace the trust to financial institutions with the trust to logarithm.[48] No need for central counterparty means that, instead of owned or controlled by one individual party, the transactions are published to peer-to-peer network for verifications. It is therefore decentralized. Every time a transaction is initiated, the

[44] Jacob Aron, *Bitcoin Software Finds New Life*, 213 NSCI NEW SCIENTIST (2012).; Zohar A. Babaioff M, Dobzinski S. & Oren S., On Bitcoin and Red Balloons (2012).; D. Bradbury, *The Problem with Bitcoin*, 2013 COMPUTER FRAUD & SECURITY (2013).; JAMES COX, BITCOIN AND DIGITAL CURRENCIES (Laissez Faire Books. 2013).
[45] R. Grinberg, *Bitcoin Open Source Money?*, 14 MILKEN INSTITUTE REVIEW (2012).
[46] BITBILLS, http://bitbills.com (which is no longer producing debit cards for Bitcoin).
[47] ECB, Virtual Currency Scheme. 2012.
[48] J. Moyer, *Getting the Dope on Bitcoin*, 407 ECONOMIST ECONOMIST (UNITED KINGDOM) (2013).

costumer's computer sends the data to the receiver as well as to the network. All transactions are published in the network, so there is some kind of a ledger book in existence (namely block-chain). To address privacy issues, no real identification (private identifications such as names and addresses) attached to the published transactions, all identifications are digital in block-chains.[49]

2.2 Bitcoin Controversy

As the most popular and widely used of peer-to-peer network currency. Bitcoin has been controversial since its inception. Since its discovery in 2008 it has faced difficult moments and it has been criticized with local authorities. It has been suspected for illicit activities such as those on Silk Road website[50] for drug dealers, money laundering and tax evasion.[51]

In the US, FBI had conducted an assessment on Bitcoin with the most focus on its use for illegal undertakings. GAO also pointed out on the potential tax evasion from revenue resulted from activities using Bitcoin, and it therefore suggested the government to regulate Bitcoin in particular on the tax issues. IRS picked up this suggestion by publishing comments on potential tax for virtual currency on its website. Department of Homeland Securities also raised concerns on the use of this innovative yet anonymous means of payments for criminal activities. On the state level, Bitcoin was facing even more difficult circumstances. Texas Court was ruling in favor of SEC that some kind of investment using Bitcoin was categorized as Ponzi scheme and therefore violated law on securities investment. SEC also published a short of guideline on this kind of investment and warned people to be more precaution. In early July 2013, New York State Department of Financial Institution sent letters to major players of Bitcoin, asking for information and cooperation. This leaded to assumptions that in the absence of federal law the state would likely adopt regulations for virtual currency. State of California was even more aggressive in taking stances. It sent a letter to Bitcoin Foundation stating that its activities were potentially against the laws and therefore ordered to cease and desist. Formerly major exchanges such as Mt. Gox, based in Tokyo and now vanished, also faced difficulties. Its accounts were frozen and suspended by the Federal

[49] Stefan Katzenbeisser & Kay Hamacher Micha Ober, *Structure and Anonymity of the Bitcoin Transaction Graph,* FUTURE INTERNET, http://www.mdpi.com/1999-5903/5/2/237/pdf (last accessed 29 May 2015).
[50] Bradbury, COMPUTER FRAUD & SECURITY, (2013).
[51] Robert Stokes, *Virtual Money Laundering: The Case of Bitcoin and the Linden Dollar*, 21 INFORMATION & COMMUNICATIONS TECHNOLOGY LAW (2012).

Reserve Bank, which ordered it to comply with laws especially anti-money laundering and terrorism financing.

In the EU, ECB conducted a preliminary yet quite comprehensive elaboration on virtual currency.[52] ECB came up with conclusions that due to the existing value and volume today it posed no threat to financial stability or economy but to the users only. It also outlined that the lack of regulatory framework for such a virtual currency could lead to the exposures of certain risks such as credit, liquidity, legal and operational risks.[53] It worth mentioning that ECB still believes that under existing framework, peer-to-peer network currency such as Bitcoin remains under central bank's power to examine or asses. Within the member states level, similar to that happened to Mt. Gox under the US Federal Reserve's monitoring, major exchange in France was also suspended due to the need for compliance with anti-money laundering laws.

The most extreme approach was taken by the government of Thailand. It prohibited the use and sale of Bitcoin for local activities in Thailand.[54] On July 19th, 2013 Bitcoin.co.th, Thailand Bitcoin exchange, announced on its website that its trading activities had been suspended after having the meeting with the central bank of Thailand and *Foreign Exchange Administration and Policy Department*. The local authorities in the country had advised Bitcoin.co.th that the action had been taken due to the lacks of laws and regulation for Bitcoin activities. Thus, such activities were deemed illegal in Thailand. As for the currency exchange activities, it is currently under review by the Bank of Thailand. Similarly, one of major Bitcoin exchange was also facing the same problems. Tradehill on its website[55] announced that, despite the facts that Tradehill already registered with the US Department of Treasury -Financial Crimes Enforcement Network in August 2013, its trading activities had also been suspended due to some issues on banking and regulatory. Until now, it remains unclear what was exactly happening, but Tradehill states on its website that it currently engages with banks and authorities to solve the problems.

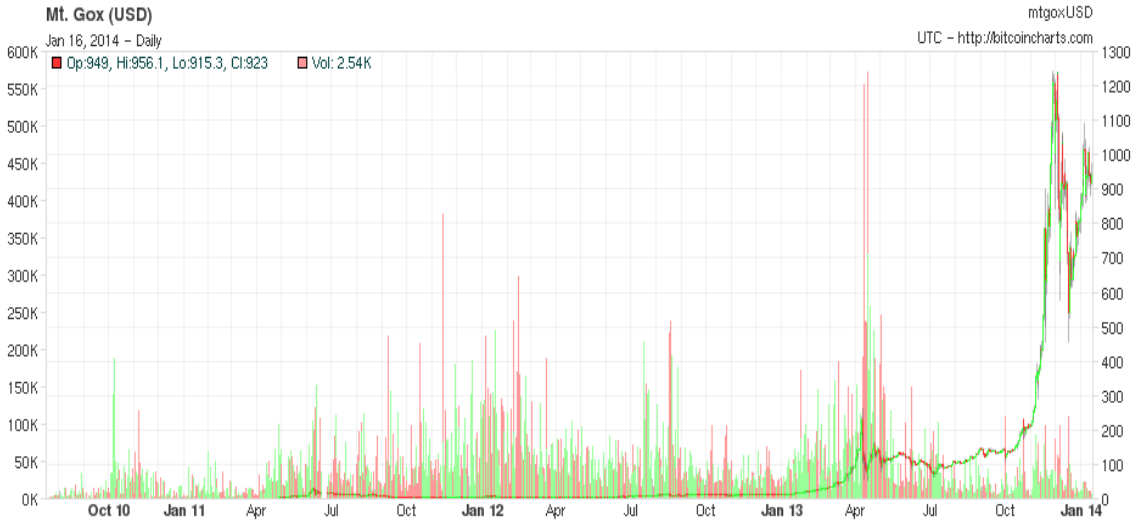
2.3 Bitcoin Market

Beside its controversy against local authorities, Bitcoin remains flourish in its own market. Nowadays there are about 12,002,450 Bitcoins in circulation, worth of USD 9.89

[52] ECB, Virtual Currency Scheme. 2012.
[53] *Ibid*, pp 47.
[54] The illegal activities include buying and selling Bitcoin, buying and selling goods or services in exchange for Bitcoin, and sending and receiving Bitcoin involving anyone located in Thailand.
[55] See https://tradehill.com.

billion (using exchange rate of 24 November 2013, 1BTC=USD824)[56]. There will be only 21 million Bitcoin in circulation ever when the mining will have been fully ceased around 2040. The value of Bitcoin has been significantly volatile time after time. In December 2012 for instance one Bitcoin was only worth for less than USD15 but it spiked to USD238 in the middle of April 20013, downed to USD84 in the end of April 2014, and started to hike up lately.[57]

Figure 1. The value and volume of Bitcoin transacted via Mt.Gox from 2010 to lately[58]



2.4 Bitcoin Weaknesses

As applied to general peer-to-peer network currency, Bitcoin has three major issues that might be considered weaknesses,[59] namely technical, legal and regulatory, and competition problems. Those issues are actually rooted in the "clever" design of Bitcoin as a decentralized currency using peer-to-peer network. This article only deals with the legal and regulatory issues, and therefore technical and competition issues fall far beyond the scope of this paper. However, since some technical issues might lead to legal issues, these will be highlighted.

Technical issues merely relate to the facts that, like many other technological innovations, Bitcoin systems need to be improved time after time in line with the development of technology and the sophistication of crimes. The claim that Bitcoin system

[56] Market Price, BLOCKCHAIN, https://blockchain.info/charts/market-price (Using data from blockchain.info) (last accessed 29 May 2015).
[57] *Ibid.*
[58] Unfortunately, when this paper is being finalized, Mt.Gox is no longer exist (being shut down).
[59] Doguet, LOUISIANA LAW REV. LOUISIANA LAW REVIEW, (2013). In his paper, however, Doguet only mentioned two weaknesses: technical and legal problems.

has flawless mechanisms and therefore cannot be compromised might theoretically be proven. However, this is not what always happens in practice/daily life. Lost or stolen Bitcoin occurred time after time regardless of the fact that the main cause of such accidents might be because of the negligence or lack of awareness of the users. It is also a fact that to use Bitcoin people need to have sufficient knowledge and familiarity with transactions on the Internet. Thus, peer-to-peer network currency such as Bitcoin is not be able to use by lay people without adequate information. Furthermore, the claim that peer-to-peer network currency system such as that of Bitcoin has no technical flaws has also been proven wrongly by the compatibility issue between the operating systems of Bitcoin and those of Android. It was widely discussed within the Bitcoin groups of users that Bitcoin operating system had unintentionally created a weak spot in Android systems, making it easy for cybercriminals to enter. If Bitcoin is to flourish in the long term, these practical problems cannot be ignored.

As for the legal and regulatory issues, Bitcoin raise some legal questions such as: is it legal currency to use? What laws applicable to Bitcoin? Why do the authorities give concerns? It will be too ambitious saying that this paper will answer all those questions. With all limitations, this paper only tries to shed the light on three issues outlined on the research questions.

3. Is Peer-to-peer Network Currency either money or payment systems instrument?

3.1 Money from Economic Theory and Modern Law on Legal Tender

What constitutes money? Basic economics theory believes that to constitute money, a number of characteristics must be satisfied. These characteristics are the functions of money, namely unit of account, means of payment, and monetary unit. If a certain form has qualified the above mentioned characteristics, the following question then arises: does that form of money also constitute money? It is rather confusing to answer this question since money is a means of payments but not every means of payments is necessarily money. Society then needs something beyond economics theory to define what money is. Then it comes law. While basic legal theory was mostly absent in defining money, recent laws on legal tender set a clearer boundaries what constitutes money as legal tender and what just merely a means of payments. Although vary on the enforcement level, current major laws on legal tender generally require the acknowledgment from the state for legal tender.[60]

[60] *Id*. at.

3.2 Peer-to-peer Network Currency Compared to Existing Payment Systems Instruments

3.2.1 Overview of Payment Systems

The Bank for International Settlement (BIS) and European Central Bank define payments systems as "a set of instruments, procedures, and rules for the transfer of funds among system participants".[61] Legal and regulatory framework for payment systems are currently based on two major laws: public laws –also known as hard laws- those that have been stated in legislation, law and/or regulation; and private laws which are set of provisions agreed bilaterally between or multilaterally among the parties (system operator and system participants) involved in the system.[62]

In general, payments systems can be divided into two categories.[63] The first category includes systems which are so-called high or large value payment system. These systems only processes high values payments and therefore has been defined as Systemically Important Payments Systems (SIPS) as the failure of this system will create disturbance to the financial market stability. Second, the so-called retail payment systems. Its failure will or might not necessarily create a disturbance to financial stability, but nuisance to the parties involved will likely occur. Some regulator's approaches focus on consumer protections for this system, alongside with economic efficiency. It is worth noting that the development of retail payment systems is very dependent to the adoption of technology and innovation. To give concrete description, 20 years ago retail payment systems mainly consisted of the processing of paper-based instruments such as checks through the clearing houses. Today, it has been evolving from merely paper based to card based payments such as debit and credit cards, to electronic based such as e-money, and to the Internet based such as peer-to-peer network money.[64]

---

[61] For a good elaboration on payment systems, including what their future will look like, see STEPHEN MILLARD ANDREW G HALDANE, AND VICTORIA SAPORTA, THE FUTURE OF PAYMENT SYSTEMS (Routledge. 2008);Innovation in Retail Payments Worldwide: A Snapshot Outcomes of the Global Survey on Innovations in Retail Payment Instruments and Methods (2012).

[62] The World Bank provided a detail guideline regarding how an economy can develop a comprehensive national payment systems strategy, including elaboration on the legal aspects. See Developing a Comprehensive National Payment Systems Strategy. (2012). See also Banu Sit, *Electronic Retail Payment Systems in Conflict of Laws: Basic Electronic Payment Systems and Determination of the Applicable Law in North America and Europe*, 2 ANKARA LAW REVIEW (2005).

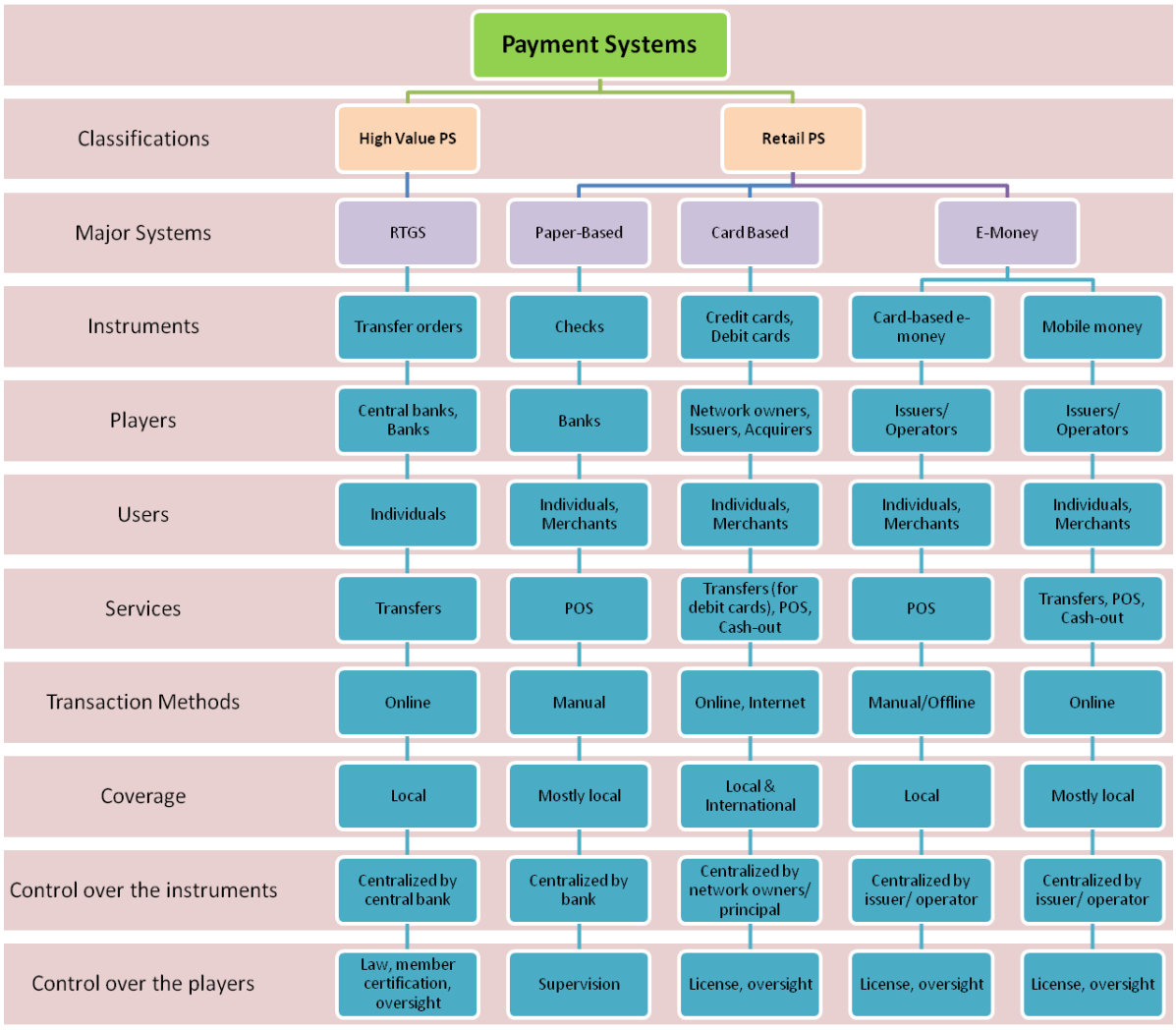
[63] See for instance ISAACK KILATO MAXWELL J FRY, SANDRA ROGER, KRZYSZTOF SENDEROWICZ, DAVID SHEPPARD, FRANSISCO SOLIS, AND JOHN TRUNDLE, PAYMENT SYSTEMS IN GLOBAL PERSPECTIVE (Routledge. 1999);BRUCE J SUMMERS, PAYMENT SYSTEMS: DESIGN, GOVERNANCE AND OVERSIGHT (Central Banking Publications. 2012).

[64] BIS, Innovations in Retail Payments. 2012.

3.2.2 Characteristics of Existing Payment Instruments

Before outlining the novel features of per-to-peer network currency such as Bitcoin it is firstly necessary to outline the characteristics of existing payment systems instruments. To make it easier and comparable, such characteristics are provided on **Table 2** below.

Table 2. Characteristic of existing payment instruments



Source: Author

Instruments

Although cashless payment systems today have been electronically processed, they still require "physical instruments" for its initiation. RTGS systems use transfer orders; paper-based payments are represented by all types of checks, from traditional to travel checks; card based payments of course need cards to initiate any transactions; and lastly, e-

money need either stored value cards such as *OV-chipkaart* in the Netherlands or Octopus cards in Hong Kong or mobile phones such as for *M-Pesha* in Kenya.[65]

Players

For 'old fashioned' payment systems, it is sort of 'obligatory' to have financial institutions as the issuer of the payment instruments.[66] In the end, this systems would be backed by the central bank as the regulator as well as overseer in case of emergency. For example when such financial institutions have liquidity problems, the central bank will intervene by providing liquidity assistances.[67] Paper-based, card payments and e-money at its earlier development, for instance, need a bank or at least a financial institution to issue and operate. Since the development of mobile money, regulators have realized that it is neither wise nor enough to give the monopoly to financial institutions for the issuance and operation of payment systems.[68] There are also huge potential for other institutions such as telecommunication providers to be involved in payment markets. Such institutions have advantages in which financial institutions do not, such as owning massive consumers spread across the globe.[69] In order to keep up with the current development and satisfy the needs for efficiency, regulators currently include non-financial institutions such as telecommunication providers as a player in payments system market. It was not easy in the beginning. The European Union, for instance, had in the past prohibited institutions other than financial institutions to issue e-money.[70] It had come to amend such regulation repealing the old with the new ones, allowing non-financial institutions to issue e-money under the oversight of the central bank.[71]

---

[65] From this list of examples of existing payment instruments, it is clear that peer-to-peer currency such as Bitcoin is distinctive. It needs no physical instrument to conduct a transaction.

[66] It would not necessarily be old fashioned actually. In fact, all existing retail payment systems are centralized with a central counterparty. Such systems encompass two layers: the 'first' layer consists of the operator of the system, its agents and users, while the second or upper-layer consists of the operator and its overseer. Within the first layer, the system is centralized by the operator, while within the upper layer the system is centralized under the overseer.

[67] The role of the central bank as the lender of the last resort. For a brief literature review on the role of the central bank as the lender of the last resort, see Curzio Giannini Xavier Freixas, Glenn Hoggarth & Farouk Soussa, *Lender of Last Resort: A Review of the Literature*, November 1999 FINANCIAL STABILITY REVIEW (1999). For more discussion from a historical point of view, see Michael D. Bordo, *The Lender of Last Resort: Alternative Views and Historical Experience*, January/February 1990 ECONOMIC REVIEW (1990).

[68] The early debate was whether or not to include non-financial institution such as telecommunication providers to the payment systems market. Both regulators and market players were at first reluctant, but in the end, considering the huge benefits such institutions possess (massive customers, wide network), regulators have accepted them as a payment systems player, and markets start to cooperate with them.

[69] IFC, Mobile Money Study. 2011.

[70] Reflected on the first e-money directive that was enacted in 2000.

[71] The latest e-money directive that was enacted in 2009.

Users

Retail payments system perfectly represents the so-called two-sided market.[72] It involves two users: merchants on one side and individuals (end-consumers) on the other side. Many studies demonstrated that changes on one side would also make alterations to the other side.[73] That is why scholars in particular economists suggest to the policy makers for taking measures delicately in ruling this particular market.[74]

Services

Each of existing payment instruments has its own limitation for use. RTGS can be used for transfers only, whereas checks and card-based e-money can be used for point-of-sale transactions only.[75] People cannot, for instance, in practice paying goods or services at shopping mall using RTGS. The complete features of payments are actually owned by card payments and mobile money. Both can be used to perform either transfers (although recently only applicable to debit cards), point-of-sale transactions, or cash out (withdrawal). The limitations of these two payment instruments lay on the extension of their network, depending on the available spots receiving such payments.

Methods

Methods to use payment instruments can be divided into three categories: manual, online, and via the Internet. In line with the services outlined in the previous sub-section, each payment instrument has its own limitations. Checks and card-based e-money can only

[72] For elaboration on two-sided market see or instance Stephen P King, *Two-Sided Markets*, 46 AUSTRALIAN ECONOMIC REVIEW (2013).; Jean-Charless Rochet and Jean Tirole, *Tying in Two-Sided Markets and the Honor All Cards Rule*, 26 INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION (2008).; Jean-Charles Rochet and Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND THE RAND JOURNAL OF ECONOMICS (2006).; and Z. Wang, *Market Structure and Payment Card Pricing: What Drives the Interchange?*, 28 INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION (2010).

[73] Sujit Chakravorti Santiago Carbo-Valverde, And Francisco Rodriguez-Fernandez, *Regulating Two-Sided Markets : An Empirical Investigation*, EUROPEAN CENTRAL BANK (2009), http://www.ecb.int/pub/pdf/scpwps/ecbwp1137.pdf (last accessed 29 May 2015); Julian Wright, *The Determinants of Optimal Interchange Fees in Payment Systems*, 52 THE JOURNAL OF INDUSTRIAL ECONOMICS (2004).; and David S. Evans Daniel D. Garcia Swartz Howard Chang, *The Effect of Regulatory Intervention in Two-Sided Markets: An Assessment of Interchange-Fee Capping in Australia*, 4 REVIEW OF NETWORK ECONOMICS (2005).

[74] See D. S. Evans, *Payments Innovation and Interchange Fees Regulation: How Inverting the Merchantpays Business Model Would Affect the Extent and Direction of Innovation*, 7 COMPET. POLICY INT. COMPETITION POLICY INTERNATIONAL (2011). and DAVID S. EVANS, INTERCHANGE FEES,THE ECONOMICS AND REGULATION OF WHAT MERCHANTS PAY FOR CARDS (Competition Policy International. 2011).

[75] However, some of e-money's features in the developing countries such as Indonesia are now enable to consumers to cash-out the money they have received from (incoming) remittance, under the new Bank Indonesia Regulation on the Funds Transfer No. 14/23 /PBI/2012. See Michael Joyce, Good News for E-Money and Remittance Operators in Indonesia § 2015 (Mobile Money Asia 2013).

be used manually at the point of sale.[76] RTGS mostly requires physical presence through the bank's teller although some online funds transfers are now available using the Internet as the front-end delivery channel but still limited.[77] The most promising methods are actually those of card payments and mobile money. They can be used manually, online, and via the Internet but again, their limitations lay on how extensive their networks are.[78]

Coverage

All existing payment instruments share the same limitation on their coverage: they can only be used for local transactions except, of course, card payments.[79] However, not all debit and credit cards can be used internationally or cross-border, only debit and credit cards joining to the international networks are accepted world-wide.[80] Although the network is quite extensive, it is still surrounded by many severe issues such as fraudulent uses, unjustified charges[81] and high pricing on fees in particular interchange fees.[82]

Control over the instruments

The main common features on how existing payment instruments operated are that they are centralized. High value payment systems are centralized by the central banks, while retail payment systems are centralized by banks.[83] Within retail payment systems, mobile money systems are centralized by telecommunication providers.[84] All transactions initiated with these instruments go to central server for verifications and approvals. Thus, every single player involved in each system has to be connected to the central counterparty.

[76] In this case point-of-sale includes all payment devices enabling for card-based e-money transactions, for instance those placed for at public transportation.
[77] This is true for the case of developing countries where the RTGS infrastructure is still very limited. However, for the case of developed countries such as EU member states, this is not necessarily true. The availability of online transfer using RTGS is greater. However, the use of RTGS is still limited for funds transfer, and almost impossible for some other purposes such as point of sale for instance.
[78] In economics theory, this is called as network externalities. Network industries such as media or payment industry are included within this theory. The bigger the network, the better the system.
[79] Card payments such as credit cards are able to use globally under the so-called four-party scheme, involving the principal (owner) of the system, the card issuers, acquirers, and merchants. For detail discussion on the credit card systems, see for instance SAFARI KASIYANTO, LOSSES FROM CARDING: THE FLAWS OF THE LAWS (Lambert Academic Publishing. 2010).
[80] Examples of international card network are Visa and MasterCard.
[81] See for instance RONALD J MANN, CHARGING AHEAD: THE GROWTH AND REGULATION OF PAYMENT CARD MARKETS (Cambridge University Press. 2007).
[82] Interchange fees on card payments have raised concerns of local authorities in Australia, New Zealand, Canada, EU, and the US. Each competition committee and regulators of those countries are now working closely to solve this issue.
[83] Bank, Innovation in Retail Payments Worldwide: A Snapshot Outcomes of the Global Survey on Innovations in Retail Payment Instruments and Methods 2012.
[84] *M-Phesa* in Kenya for instance, is centralized by a telecommunication provider. For details see Corporation, Mobile Money Study. 2011.

Control over the players

Control over the players can be laid into two different layers. The first layer is control over the central bank having functions as: (1) the operator of high value payment systems, (2) regulator, and (3) overseer of both high value and retail payment systems.[85] This control is mostly defined by hard laws of public laws in form of particular acts of the country, giving the powers to the central bank to regulate and oversee payment systems. In most cases, the acts also define the power of the central bank to operate high value payment systems, but this is not all the case.[86] The common acts regulating this power are the central bank acts and/or payment systems acts. In some cases, they are also regulated in other acts such as banking act, fund transfer act, or commercial act.

The second layer deals with the control over the players other than the central bank in the payment industries. These are issuers, operators and, if any, acquirers, as well as merchants. As the public laws give the power to the central banks to regulate and oversee the payment systems, there are subsequent regulations promulgated by the central banks in order to implement the laws. Mainly, the central banks enact regulations on how payment systems can be operated and how the regulators oversee the market.

A part of the second layer also involves private laws: rules applied both among the players and between the players and the users, in form of contracts or agreements between the parties, terms and conditions to use payment products, and provisions between the issuers and merchants. For certain type of instruments such as debit and credit cards, there is also code of conduct adopted by network owners to rule the rights and obligations between parties (including merchants but excluding consumers).[87] This conduct plays an important role in day-to-day operation of such credit and debit card systems.[88]

3.2.3 Peer-to-per Network Currency Compared to Existing Payment Instruments

Peer-to-peer network currency such as Bitcoin shares quite many characteristics to those of existing retail payment instruments in particular e-money.[89] However, there are major distinctions that make this peer-to-peer currency different from the existing payment

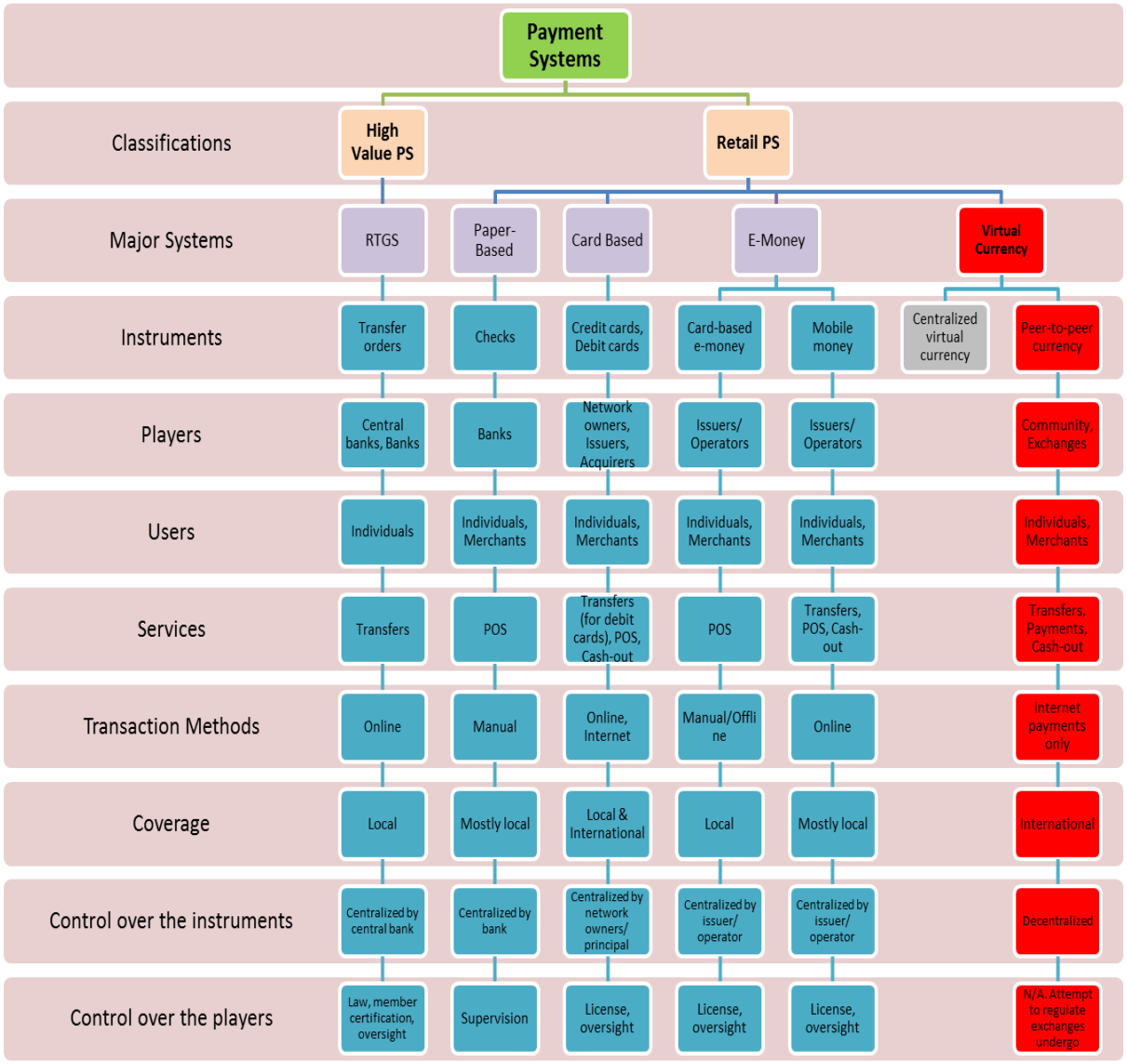
[85] For an insight of the role of the central bank in retail payments see for instance Stuart E Weiner and Julian Wright, *The Federal Reserve's Role in Retail Payments: Adapting to a New Environment*, Fourth quarter 2008 ECONOMIC REVIEW (2008).
[86] There are at least four countries in the world where the high value payment systems are not operated by the central banks, but mandated to other institutions under the oversight of the central bank.
[87] For instance Visa Regulation and MasterCard Rule.
[88] Debate over the importance of ruling interchange fees in Australia, Canada, EU and US for instance base on regulation adopted by these code of conducts.
[89] ECB, Virtual Currency Schemes. 2012.

instruments.[90] That is why this paper put peer-to-peer network currency under the ´label´ virtual currency rather than under e-money.[91] Furthermore, it is worth stressing that not all virtual currencies are peer-to-peer or decentralized currency such as Bitcoin. There are also centralized virtual currencies in existence.[92]

The common features of the payment instruments that peer-to-peer network currency shares with are those under groups of "users" and "services".[93] Both groups of "users" and "services are used by individuals and merchants, representing the two-sided market. As for services, both peer-to-peer currency and existing payment instruments can be used for payments & transfers, point of sale transactions, and cash-out for real money. The distinctions lay on the remaining features: the "instruments", "players", "methods of transaction", "control over the instruments", and "control over the players". These elaborations are provided on **Table 3**, followed by explanations of each significant feature.

[90] For technical characteristics of virtual currency such as Bitcoin, see David Allen Bronleewe, Bitcoin Nfc (2011) The University of Texas at Austin).
[91] For a brief introduction on virtual currency including Bitcoin, see Susan A Berson, *Virtual Money*, 99 AMERICAN BAR ASSOCIATION JOURNAL (2013).
[92] For instance PayPal, Apple Pay.
[93] See explanation under Section 3.3.2.

Table 3. Comparison of the features of peer-to-peer network currency to those of the existing payment systems instruments



Source: Author

Instruments

It is by design that the instrument used by peer-to-peer network currency for transactions is different from the instruments o the existing payment systems.[94] Instead of using physical medium such as transfer orders (for RTGS), checks (for paper-based instruments), cards (for credit, debit cards and e-money), or mobile phone (for mobile

[94] Based on the genuine design of peer-to-peer network currency, which is no need for central counterparty (decentralized) or physical instrument. See the original paper of Bitcoin design: Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*. For more advance reading about Bitcoin and its problems, see Paul H. Farmer Jr., *Speculative Tech: The Bitcoin Legal Quagmire & the Need for Legal Innovation*, 9 JOURNAL OF BUSINESS & TECHNOLOGY LAW (2014).

payments), peer-to-peer currency such as Bitcoin uses computer file for transactions.[95] Therefore, physical appearance to perform transactions is not necessary.

Players

There are neither central banks nor financial institutions as intermediaries in peer-to-peer currency system. The players involved are only the community consisting of individuals as the users, and the exchanges.[96] However, it is also true that in this case the exchanges could be categorized as intermediaries. The fact that the exchange companies charge fees for its services also supports their position as intermediaries. One of the earlier reasons for inventing such a currency was that because the intermediaries´ fees in the financial systems are getting higher and higher, it is not economically making any sense to do small value transactions. Therefore, there is the need for a new payment mechanism that enables small value transactions with only small fees.[97] However, since the community of peer-to-peer network currency such as Bitcoin is getting bigger and bigger, the existence of institutions such as exchange companies as intermediaries is also getting more important. Thus, this might can be seen as the reduction of the earlier ideas in omitting intermediaries within the payments systems. Furthermore, there is the rise of consumer's needs to connect some part of peer-to-peer currency systems to financial institution such as banks to make it easier to use.

Methods

Perhaps, this is the most obvious of the disadvantages of peer-to-peer network currency if one intends to widely use such currency as a medium exchange. For instance, although claimed as the most popular peer-to-peer network currency, Bitcoin can only be used for the Internet transactions,[98] whereas the most other payment instruments have a physical appearance and therefore can be easily used for day-to-day transactions. Although some see this feature as benefits, because the transactions will be anonymous and relatively convenient to perform without leaving the computer desk for instance,[99] medium exchanges will always rely on their widely acceptances to be flourished.[100]

---

[95] E. Karame G. O. Roeschlin M. Scherer T. Capkun S. Androulaki, *Evaluating User Privacy in Bitcoin*, LECTURE NOTES IN COMPUTER SCIENCE. (2013).
[96] Grinberg, MILKEN INSTITUTE REVIEW, (2012).
[97] Sathosi Nakamoto, *A Peer-to-Peer Electronic Cash System,* BITCOIN, http://bitcoin.org/bitcoin.pdf and http://nakamotoinstitute.org/bitcoin/ (last accessed 29 May 2015).
[98] *Internet Coinage: Why Bitcoin, the Anonymous Online Monetary Tool Favoured by Drug Dealers and Tax Evaders, Is Soon to Be the Banking Industry's Newest, Biggest Threat*, 126 MACLEAN'S. (2013).
[99] id. at.; Morgan E. Peck, *The Cryptoanarchists' Answer to Cash - Bitcoin Has Resurrected the Dream of Private, Irreversible Online Transactions*, 49 IEEE SPECTRUM (2012).
[100] Network externalities theory.

Coverage

As for the coverage, peer-to-peer network currency is the most advantageous instruments. To a certain degree, such crypto currency like Bitcoin can be used across the world, from wherever the owner's position to wherever the receivers located. It is totally borderless, sharing the advantages of others payments conducting via the Internet.

Control over the instruments

Another advantage of peer-to-peer network currency is that the system is decentralized. It needs no central counterparty but using peer-to-peer network. This puts to the users the full control of every single currency they have and every single transaction they make. This has been seen as the most advantageous scheme in any transaction ever, but due to the facts that majority people have no sufficient knowledge on information technology and the Internet this could lead to the conditions that consumers left unprotected.

Control over the players

To define control over the players in peer-to-peer network system, we firstly need to define the control over the players in the existing payment instruments. As having previously mentioned, such control is determined by public laws and private laws. On Section 4, it will be described that the most control over the players in peer-to-peer network systems is defined by private laws. Therefore, there is lack of adequate public laws controlling the operation of peer-to-peer network currency.

4. Regulating Peer-to-peer Network Currency

4.1 Lessons from Peer-to-peer Network File Sharing: Napster

Analytical Comparison between Napster and Bitcoin

The case of Napster, a peer-to-peer network file sharing popular in early 2000s provides an interesting lesson to learn for peer-to-peer network currency such as Bitcoin. Napster was shut down by government in 2001 following the decision adopted by the 9th circuit court of appeal, for infringing the US Copyright law. Before shut down, Napster had approximately 60 million of users in 2000, with total assets amounted to around USD80-USD150 million. Napster was alleged for contributory and vicarious copyright infringement,[101] supported by evidence that 86% files shared and downloaded via Napster were protected by copyright, in which 70% of those files was owned by the plaintiff who brought the case before the court. In the end, Napster failed to defense itself using fair use

[101] Crews, Case Summary a&M Records, Inc. V. Napster, Inc.: Implications for the Digital Music Library. 18 September 2001.

and ISP save harbor.[102] After shut down, Napster was brought back with some modifications in compliance with the law, including to impose subscription and payment royalties. However, this 'adjusted' innovation lost its power to attract consumers.

Why Napster? Napster and Bitcoin have many things in commons: radical innovation, beneficial to users, and questioned before the laws. **Table 4** below provides a detail analytical comparison of Napster to Bitcoin. To summarize, the most important features of both systems are as the following.

Firstly, both systems are decentralized, using peer-to-peer network mechanism, and therefore no need for central server (except for Napster in which the central server was used only for indexing).[103] This feature is claimed as the most innovative parts of both inventions, as the biggest benefits come from these features.[104] Secondly, both Napster and Bitcoin are beneficial to the users in which the existing systems[105] failed to do so. Napster provided free and speedy file sharing between individuals,[106] while Bitcoin enables low-cost and fully controlled payments.[107] Thirdly, both systems have massive users and promising futures. For instance, before being shut down in 2001 Napster assets were valued around USD80-150 million, while by the end of 2013 Bitcoin values were amounted to USD9.89 billion. Lastly, both were questioned before the laws. Napster was accused for copyright infringement (and finally shut down after series of investigations), while Bitcoin is struggling with local authorities who allege the use of Bitcoin for criminal activities such as drug dealing, money laundering and tax evasion.[108]

Table 4. Analytical comparison of Napster to Bitcoin

No	Facts/Issues	Napster	Bitcoin
1	Type of technology	Peer-to-peer network file sharing	Peer-to-peer network currency
2	Creator	Shawn Fanning (Path)	Satoshi Nakamoto (pseudo name)
3	Characters	Decentralized; no central database	Decentralized; no central counterparties

[102] A & M Records, Inc. V. Napster, Inc. 239 F.3d 1004 (9th Cir., 2001).
[103] Mark CeniteMichelle Wanzheng WangChong Peiwen & Germaine Shimin Chan, *More Than Just Free Content: Motivations of Peer-to-Peer File Sharers*, Volume 33 JOURNAL OF COMMUNICATION INQUIRY (2009).
[104] *Id*. at.
[105] Transfer via banking systems which are claimed to be high cost.
[106] CeniteWangPeiwen & Chan, JOURNAL OF COMMUNICATION INQUIRY, (2009).
[107] COX, Bitcoin and Digital Currencies. 2013.
[108] Reports from GAO, FBI, and SEC: Virtual Economies and Currencies: Additional Irs Guidance Could Reduce Tax Compliance Risks. (2013);Directorate of Intelligence, (U) Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Deterring Illicit Activity. 2012;COMMISSION, Ponzi Schemes Using Virtual Currencies. 2013.

No	Facts/Issues	Napster	Bitcoin
4	Benefits of technology	Free; speedy file sharing	Low-cost payments; speculative investment
5	Central server	No (only for indexing)	No, all transactions broadcasted to network
6	How to use	Download and upload; need membership	Store and payments; need wallet
7	Number of users; value	± 60 million in year of 2000; asset was valued around USD80-150 million	± 12 million Bitcoins in Nov 2013; worth of USD9.89 billion
8	Current conditions	Shut down in 2001 following the decision of the 9th circuit court of appeal	Facing some difficulties with local authorities
9	Allegation	Infringing Copyright Law (contributory and vicarious infringement)	Used to illicit activities: drug dealing, money laundering, tax evasion
10	Trivia of accusation	86% files at Napster were protected by Copyright; 70% owned by Plaintiff	Illegal trading on Silk Road only accepted Bitcoin for payments; its anonymousness makes it easy to use by criminals; difficult to trace
11	Defense; result	Fair use and ISP save harbor; rejected by courts	Now start to (widely) use in day to day activities; on-going progress (except Thailand and China which already banned it)
12	Related Laws	Copyright law	Laws on legal tender, payment systems, anti-money laundering and terrorism financing, criminal law
13	Resolution	Modified the systems to include subscription and payment royalties	Depends on the regulatory intervention, but the community definitely needs to cooperate with the authorities.

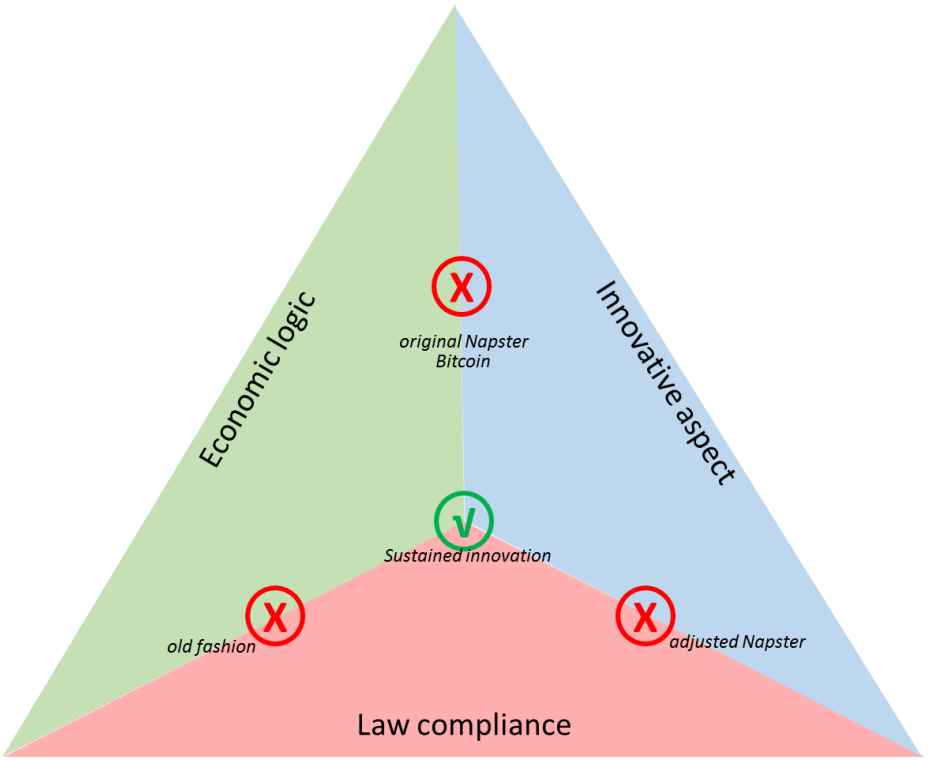
Source: Author

Lesson Learned from Napster

From Napster, one could learn that to be sustainable an invention needs to satisfy the following three rules of thumb.[109] As described on **Figure 2**, we call it *the triangle of a sustained innovation*. These rules of thumbs encompass three compulsory elements: *economic logic*, *innovative aspects*, and *law compliance*.

[109] These rules of thumb are generated from the case of peer-to-peer file sharing, Napster and some general frameworks on innovations.

Figure 2. Triangle of a Sustained Innovation



Source: Author

The first rule is that to flourish such an invention has to be not only radically innovative but also economically beneficial to the users. Once Schumpeter said that *"Economic logic prevails over the innovation".*[110] The Napster case represented this rule best because the original version of Napster provided a lot of benefits to the users as a free and speedy peer-to-peer file sharing.[111]

The second rule of thumb is that any innovation against or violated the law is most likely to be hindered. Napster was shut down by government for violating copyright law (contributory and vicarious infringement).[112] Napster tried to use ISP safe harbor for its defense. Although the defense seemed making any sense, Napster failed in so doing as defending a case before the law needs beyond common sense. This rule also applies to pee-to-peer network currency such as Bitcoin. As previously mentioned, Bitcoin is struggling all over the world against local authorities.[113] The accusations are, *inter alia*, the use for illicit

[110] ANDREW G HALDANE, The Future of Payment Systems. 2008.
[111] See in Matei Ripeanu, Peer-to-Peer Architecture Case Study: Gnutella Network (Department of Computer Science, The University of Chicago 2002).
[112] A & M Records, Inc. V. Napster, Inc. 239 F.3d 1004 (9th Cir., 2001).
[113] Among others: china, Thailand, US, and EU member states. See elaboration on Section 2.

activities such as drug dealings, tax evasion, money laundering.[114] These crimes are mostly violating criminal laws as well as laws on money laundering and terrorism financing. To some extent some conducts also face problems dealing with consumer protection law. Learning from Napster, in order to be sustainable Bitcoin has to cooperate with local authorities to comply with the laws. The earlier stances coming from both Bitcoin community and foundation stating that Bitcoin needs no cooperation with government or the statement that Bitcoin is not money and therefore government has to step away have to be reduced. Bitcoin is a system used to transfer something worth for money. It is beneficial to the users, economy and society by providing a new transfer system that the existing systems lack to do so. As Napster experienced, if Bitcoin fails to comply with the laws, it might be in a danger.

The last rule learned from Napster is that the 'revised' or adjusted innovation in compliance with laws will not always serve the economic logic best. The modified systems might lose their benefits. As Napster did, such invention could lose its power to attract users. Thus, to modify the invention in order to comply with the law, one has to meticulously scrutinize any options in which the economic benefits are kept maintaining.[115] For this case, the first rule of thumbs generated from Schumpeter's theory applies, that *economic logic prevails over innovation.*

4.2 Lessons from Payment Systems

4.2.1 Laws Applicable to Existing Payment Systems Instruments

Law applicable to payment systems is one of the main discussions when assessing a payment system. In the 10 core principles for payment systems initiated by CPSS-BIS, and is widely adopted by authorities around the world recently, the legal framework of payment systems is the first principle to meet. Such principles state that the system in payment systems must have adequate legal frameworks for its operation.

Using public and private laws approaches, the laws applicable to payment instruments are as the following.

Public Laws

As for public laws, there are three categories of laws applicable to payment instruments: (1) general laws, (2) criminal laws, and (3) anti/money laundering laws. General laws cover the day-to-day operation of payment systems such licensing and oversight. It is

[114] See report from FBI, GAO, and SEC. See also letters to US Senate, each from the US Department of Treasury, Department of Justice, SEC, Department of Homeland Security, and the Federal Reserve Banks.
[115] However, this is easy in theory but difficult to materialize.

common that payment systems providers are obliged to get any licenses before conducting their operation. The license terms also give confirmation that such providers will designate themselves under the oversight of the authorities. General laws on payment systems are mainly in the forms of the central bank law or payment systems law. To some countries the absence of these kinds of laws forces them employing the banking laws or commercial laws.

The applicability of general laws in payment systems is deemed not sufficient in dealing with the criminal actions. Thus, there is also criminal law applicable in companion with the general laws. Criminal laws in these terms can be in the forms of particular law on criminal sanctions or merely provisions within the payment systems or the central bank laws ruling certain criminal activities in the payment systems. Each country employs different approach.

The last but not least is the laws on anti-money laundering. These laws require all financial service providers to, as the minimum level, (1) obtain license from the authorities to conduct any business activities involving financial activities such as remitting money, (2) apply due diligence procedures to their customers (previously known as know-your-customer principles), including to verify and collect customers' identifications, and (3) report any transactions that could be indicated or likely committed to money laundering (suspicious transactions).

Private Laws

Private laws applicable to payment instruments are in the forms of code of conduct or payment network 'regulations', contract between parties including merchants, and terms and conditions for the use of payment instruments. In some cases, the market players also agree on certain or common rules in form of standardized provisions or bye-laws, a set of rules drafted and agreed by all players or the representatives of the players.[116] These type of laws complement the public laws. If the private laws contradict to the public laws, the late laws prevail.[117]

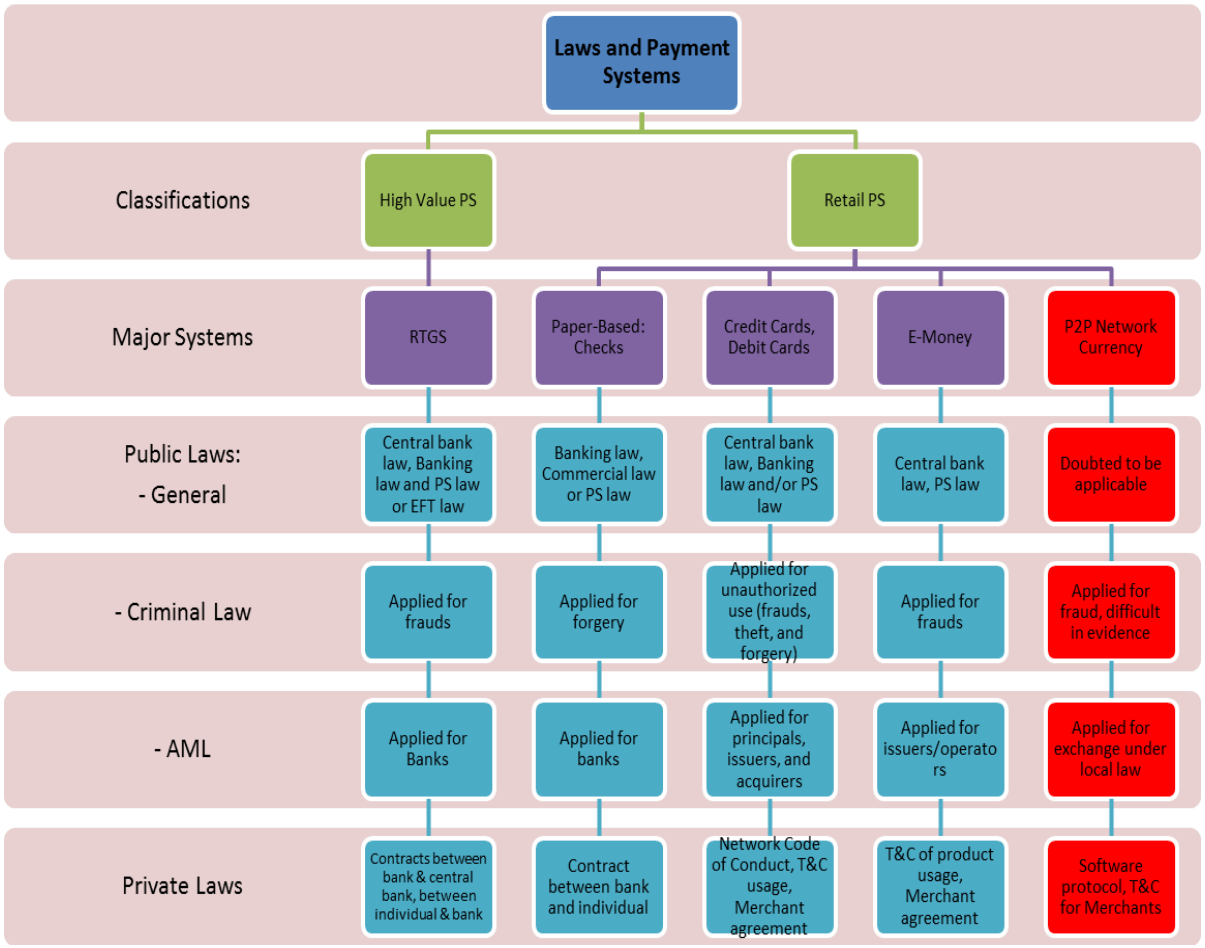
4.2.2 What Laws Applicable to Peer-to-peer Network Currency?

The next questions is what laws applicable to Bitcoin? **Table 5** outlines what laws applicable to payment systems instruments including Bitcoin.

[116] Canada for instance just adopted credit card rules agreed by credit card industry in 2012. See Campbell. T: Give credit to card rules, removing ban on card surcharges would hurt consumers. National Post, (Feb. 20, 2013), pp FP11.

[117] Maxim law stating *"lex superior derogate legi inferiori",* superior law prevails over inferior law. In general, public laws or laws enacted by authorities are indeed superior compared to private laws.

Table 5. Laws applicable to payment systems instruments and Bitcoin



Source: Author

First of all, there is a doubt that general laws applicable to payment systems are also applicable to Bitcoin. The European Central Bank (2012) already assessed that Bitcoin falls beyond the scope of Payment Systems Directive.[118] Moreover, it is also difficult to apply E-money Directive to Bitcoin since all prerequisite conditions required by the Directives are not fully satisfied by Bitcoin.[119] This Directive requires three criteria to define electronic money. Firstly the e-money should have value stored electronically. The value has been issued in exchange of funds received by the issuer and should have par value. Lastly, it is used for payments to parties other than the issuer. It is difficult for Bitcoin to satisfy the second criteria, that it has been issues in exchange of real money since the originating of Bitcoin comes from mining. Furthermore the value cap for e-money at least at par is also not

[118] See again ECB, Virtual Currency Schemes. 2012
[119] *Ibid*, pp. 43.

applicable for Bitcoin as we know that Bitcoin's value totally depends on the demand and supply and therefore is not pegged to certain currency.

The next question on the applicability of public laws will be, is it really deemed necessary to employ criminal laws to Bitcoin? As the theft to personal Bitcoins and attacks to exchange systems recently occurred, the needs to bring criminal laws to the table are emerging. Thus, it is more likely that criminal laws are also applicable to criminal activities such as fraud in Bitcoin systems. The problems in applying the criminal laws will be in providing the evidence to support the allegation of the crimes.

The next issue is dealing with anti-money laundering laws. Considering the steps recently initiated by some authorities in anti-money laundering laws it is quite obvious that anti money laundering laws applied to some parts of Bitcoin activities in particular to exchange providers.

Lastly, what kind of private laws are applicable to Bitcoin? An early assessment of Bitcoin systems shows that private laws applicably to Bitcoin are recently very limited. Such laws only consist of software protocol and terms and conditions applicable to merchants wishing to accept Bitcoin for goods or services. It has not yet standardized or organized.

4.3.2 Approaches in Regulating Peer-to-peer Network Currency

Public Laws

The possible approaches[120] can be taken by the authorities are: (1) amending the existing general laws either the central bank law or payment systems law to enable the authorities to regulate and oversee peer-to-peer network currency, (2) enforcing consumer protection law in particular dealing with civil liability, and (3) enforcing criminal laws for illicit activities and anti-money laundering laws. However, these approaches do not bear no consequence at all. Detail approaches and pros and cons are outlined on the **Table 6**, followed with the discussions on the major issues.

[120] This discussion is fully based on the elaboration of the previous sections. Thus, it is deemed not necessary to repeat what has been explained, but straightly draw a discussions.

Table 6. Possible approaches for hard laws and their pros and cons

Concerns	Authorities	Public Laws			
		Type of Laws	**Possible Approaches**	**Pros**	**Constraints**
Price, financial and payment systems stability	Central banks and financial authorities	Central bank law, payment system law	Amending the existing laws	Certainty	– Too early – Lead to high cost for the market – Hinder the innovations
Consumer protections	Other financial authorities, trading & exchange, consumer protection	Civil and criminal liability for fraud	Enforced	– Consumer protected – Lead to certainty – Supporting innovation	– Local enforcement – Difficulties in providing evidences
Illicit or criminal use	Intelligence, homeland security, AML authorities, justice	Criminal laws, AML laws	Enforced	Preventing further criminal use.	– Local enforcement – High cost for the market as well as authorities.

Source: Author

Amending the existing general laws is actually not desirable.[121] Although it will bring certainty[122] to the authorities since they will gain power over the peer-to-peer network currency, it has several constraints. It is going to be too early to amend the laws. Amending the laws at this early stage will lead to the high cost for the industry since they have to obtain any license and comply with all rigid regulations as done by banks now. The market of this currency has not yet big enough to worry that it will create disturbance to price stability, financial market stability, or payment systems stability, as has been shared by the central banks. The constraints to amending the laws at this stage are over its benefit.

The second approach is whether or not to enforce laws on consumer protections. Enforcing consumer laws will have benefits not only to the consumer but also to development of the virtual currency. But this is not easy. As outlined in the **Table 6**, enforcing the consumer protection laws will at least face two severe problems: the enforcement will give effect to the domestic players only, and there will be some difficulties in providing the evidence. Local enforcement for consumer protection will basically against the nature of Bitcoin that can be and have been cross-border transacted. It will perhaps not be as efficient as expected. Providing evidence is something else. Since the nature of Bitcoin is irreversible,

[121] In most countries, amending law is not simple. It is time consuming, expensive and exhausting.
[122] The better off is the legal certainty needed, both by the market players as well as the consumers

and there is no central counterparty controlling the transactions, it would be very difficult to prove that a crime has occurred.

The last approach is to enforce the criminal laws and anti-money laundering laws. Since the nature of these laws are applied only within their own jurisdictions, and as the nature of Bitcoin is decentralized without any central counterparty, the application of these laws will be limited only to the certain Bitcoin players located under jurisdictions of the laws. Furthermore, considering that Bitcoin players only consist of the community and the exchanges, the applications of criminal laws and anti-money laundering laws will only be effective to the exchange companies. From pros and cons analysis, the constraints of applying these laws are actually exceeded the benefits. However, it has been the nature of these laws in particular criminal laws that they will only be applicable when the crimes occur (ex-post).

Private Laws

The possible approaches for private laws are: (1) creating code of conduct, (2) strengthening the existing terms and conditions among the parties, and (3) adding the warning and disclaimer provisions, and education clauses. Detailed outline on the possible approaches for the private laws and their pros and cons is provided on the **Table 7**.

Table 7. Possible approaches for private laws and their pros and cons

Concerns	Private Laws			
	Type of Laws	**Possible Approaches**	**Pros**	**Constraints**
Price, financial and payment systems stability	n/a	Code of conduct from the community	– Self-enforced, least government intervention – Support the use and developments of Bitcoin	– Building from the scratch – Effective to some degree
Consumer protections	Terms & condition on the use of software and exchange	– Code of conduct from the community	– Self-enforced, least government intervention – Support the use and developments of Bitcoin	– Building from the scratch – Effective to some degree
		– Strengthen the existing terms and conditions	– Cheap – Bring more clarity and transparency	– Less effective
Illicit or criminal use	Terms & condition on the use of software, exchange as well as merchant activities	– Code of conduct from the community	– Self-enforced, least government intervention – Support the use and developments of Bitcoin	– Building from the scratch – Effective to some degree
		– Add warning and disclaimer provisions – Education clause	– Transparency – Cheap	Less effective

Source: Author

5. Conclusion

A peer-to-peer network currency such as Bitcoin in general meets characteristics to constitute money under economics theory: unit of account, means of payment, and monetary unit. Under legal philosophy, the theory of contractual agreement between economic agents will endorse Bitcoin as money. However, under other theories Bitcoin lacks of act of will of sovereign and validity from the state to constitute money. The need of state 'endorsement' to constitute money also supported by modern law on legal tender.

Furthermore, a peer-to-peer network currency basically shares some common characteristics with the other retail payment instruments. It is used by individuals and merchants, representing the two-sided market of the payment systems, and it can be used to perform many transactions such as transfers, point-of-sale and cash-out for real money. However, it has also many distinct features compare to the other payment instruments. Among others are (1) instead of using physical medium such as those used by other payment

instruments such as checks or cards, Bitcoin uses encrypted computer file, (2) while traditional payment instruments involve many parties such as principals or network owners, issuers or operators, and often acquirers, Bitcoin system only involves the community itself and the exchange service providers, (3) the use of Bitcoin limits to the Internet transactions only while other payment instruments can be used manually or online, (4) it has quite extensive coverage since Bitcoin can be used internationally/cross-border, and (5) it is decentralized while other payment systems are centralized.

As to measures available in dealing with peer-to-peer network currency, two lesson learned are available: from peer-to-peer file sharing Napster, and from existing payment systems.

From Napster, three rules of thumb apply. These rules employ three compulsory elements: economic logic, innovative aspects, and law compliance. The first rule is that that to flourish an invention has to be (radically) innovative and economically beneficial. This represents Schumpeter's theory that *"Economic logic prevails over the innovation*. The second rule is that any innovation against or violated the law is most likely to be hindered. Napster was shut down for violating Copyright law. The last rule is that the 'revised' or adjusted innovation in compliance with laws is not always serve the economic logic best. So to modify the invention in order to comply with the law, one has to meticulously scrutinize any options in which the economic benefits are preserved.

Lessons from existing payment systems to regulate peer-to-peer network currency appear mainly in forms of public laws and private laws applicable to payment systems. Public laws consist of general laws in payment systems which could be law on the central bank or law on payment systems, consumer protections laws, criminal laws and anti-money laundering laws; while private laws applicable to payment systems are code of conduct for the industry or bye-laws, contracts between system operator and participants, merchant agreements and terms and conditions for the use of the products. Outlining from the public laws and private laws applicable to payment systems it can be concluded that the laws applicable to Bitcoin are as the following. As for public laws consisting of general laws in payment systems it has been doubted that existing general laws are applicable to Bitcoin. There is lacking in central bank law as well as payment systems law in regulating peer-to-peer network currency. As for consumer protection laws, criminal and anti-money laundering laws, they might be applied with some difficulties or difficulties. On the other hand, private laws applicable to Bitcoin are very limited in existence. They are only terms and condition on

the use of Bitcoin software, terms and conditions from the exchange providers and terms and conditions applied to the merchants.

Approaches can be taken by the authorities are as follows. As for public laws: (1) the approach to amend existing law on the central bank or payments systems at this early stage is not yet necessary, the constraints of this approaches are way over the benefits as it will lead to the high cost of the market and at the end hinder the innovation, (2) the approach to enforce consumer protection laws has more benefit the consumer and support the development of the market, yet it will create limitation on the enforcement and difficulties in providing evidence, and (3) although it will not be in favor of the market, the approach to enforce criminal and anti-money laundering laws will likely occur; furthermore, it is the nature of these laws to step in when there is indication on criminal activities although the applications of these laws will be not easy. As for private laws, approaches can be initiated by the market players in forms of: (1) the introduction of code of conduct for the industry, (2) strengthening the terms and conditions applicable for software usage, exchange providers as well as merchant activities by adding warning and disclaimer provision and education clauses. This private laws approaches have advantages in keeping the peer-to-peer network industry under self-regulatory frameworks.