

Is bitcoins the gateway to currencies of the future?

Tan Peige¹, Ameen Ali Talib^{2*}

¹Honors student, Coventry University, Singapore PSB campus

²Business School, University of Social Sciences, Singapore.

Abstract

This paper provides an overview on the viability and performance of bitcoins as a payment alternative. The history of the Crypto-currency is briefly covered followed by the operation and potential technology failure. The paper then discusses consumer acceptance of bitcoins by analyzing a survey conducted by and the positive and negative observation of the results will be discussed. Fiat Currencies, Traditional E-commerce and Alt-Coin are identified as bitcoins direct competitors and a comparison done on bitcoins against its competitors. The regulatory issues and the legality of bitcoin are also discussed.

Keywords: Bitcoin, Crypto-currency, Transaction.

Accepted on March 03, 2018

Introduction

For many years, financial intermediaries play an important role in the process of digital transaction and are deemed to be indispensable. However, in year 2008, an outline of a revolutionary technology was released by Satoshi Nakamoto. In the original paper, it describes how the technology makes it possible for users to make virtual payment between individuals and entities without going through a financial intermediary. Being merely of an idea of how future financial transaction would be conducted back then, the crypto-currency, bitcoin proven its legitimacy and viability by surpassing coin price of \$2,000 for the first time in history in 20 May 2017 [1]. With the price surge of more than 100% for the year 2017 bitcoin has once again become the hot topic in the finance industry. However, Nobel Laureate economist, Robert Shiller does not think that bitcoins has a long future despite its success and had commented that it is an amazing example of a bubble [2]. Bill Gate have also pointed out 3 criticisms of bitcoins in [3] with it being unaffordable to developing countries, lack of transaction reversal and potential anonymity issues. The anonymity nature of bitcoins also present difficult regulatory and law enforcement challenges in obtaining evidence for law enforcement purposes [4]. Therefore, this paper aims to address the following question from a payment perspective of bitcoins:

- What is consumer's acceptance of bitcoins?
- How did bitcoins perform as compared to its competitors?
- What are the current issues that bitcoins needs to resolve in order to sustain?

Early history of crypto-currency

The birth of many digital currencies was due to a rising tide of distrust in government and financial sector. The

idea of a decentralised payment system can be arguably traced back to convergence of technology development and anti-government political philosophy way back in 1990. A group of individuals who self-declared as Cypher punks was concerned that there will be an increase in the restriction by the authorities to the access to cryptographic tools and protocols that were powerful in blocking digital messages and information [2]. These tools were seen by the cypherpunks as a positive development to loosen government's control and able to fundamentally change the nature of organisations and governments interference in financial transactions. The Cypher punks also held the philosophical beliefs that any individual who has the desire for privacy should create it rather than hoping that it will be given by government and organisations out of benevolence [2]. In the late 1990s, what is deemed to be the direct precursor to Bitcoin was developed. However, Bit gold, despite its innovative idea, was unable to solve the double spending problem due to the reluctance by the developer, Nick Szabo, to incorporate a controlling central authority to further develop the program [2].

The problem of double spending

The problem of double spending remained as a challenge for many liberal developers until the first version of Bitcoin was launched at the start of 2009. It is said that any viable means of exchange must have a limited supply. Physical forms of exchange like precious metals and modern bank notes could not be easily reproduced due to the anti-forgery countermeasures rooted within. However, this is not the case for Crypto-currency; it is too easy for someone to replicate the information that does not have a physical form. Someone who uses crypto-currencies for payment would be able to keep a copy and pay someone else. This problem, that is deep-rooted to crypto currencies, is known as the double spending problem.

Operation of bitcoin: How it solve the double spending problem?

Bitcoin is a Crypto-currency and bitcoins would not have existed without it [5]. The reason was because the Bitcoin system has originally devised three cryptographic tools which is the Public Key Cryptography to handle transaction, the Hash Function to secure information in block chain and Symmetric Key Cryptography to protect the private keys in the users’ wallet. Bitcoins can be referred to a chain of transactions between owners where each owner is identified by a public key which serve the pseudonym purpose [6]. Not limited by the numbers of addresses, owners’ activity in a set of addresses will not be inherently tied to the other set of addresses and the owner’s offline identity. To kick start a transaction, the previous owner of the bitcoin signs a hash of transaction using the secret key that corresponds to the address to obtain the bitcoin and address of the next owner. As every single transaction references the earlier transaction, forming a chain, it makes adding the signature to the set of transactions that constitute the bitcoins possible. This chain also allows owners to verify the validity of a bitcoin through the checking the validity of the signature [6].

Potential technology failure and fundamental challenges

Despite its clever design, bitcoins like many other technologies face the problem of potential technology failure and fundamental challenges which will be discussed in this section.

Anonymity failure

The transactions of bitcoins are signed instead of encrypted [7]. Coins are transferred over the Bitcoin networks and kept within the block chain in the clear. Therefore, these transactions are not anonymous but pseudonymous as the sending and receiving parties’ public keys are recorded in the transaction. As bitcoins transaction is transparent, it is possible for someone to link these public keys to the user’s identity. Grinberg has also explained that is possible for individual to post identifiable account numbers online that can be traced down to the its user and therefore the undoing of the anonymity of the system might also be possible by using statistic techniques and some trackable accounts [8]. It is expected that such exposure to cause damage in bitcoin’s value which is a concern for many consumers and merchants. Researchers emphasized that the lack of privacy is an issue that requires attention when it comes to payment or value transaction by providing communication, storage and even end-to-end encryption [7].

Transaction standards

Limited by the scope of design, the bitcoin block chain is governed by a non-complex scripting language to work for simple payment instructions. However, for bitcoins to convey rich organization remittance, a well-structured field and code words are required. Therefore, it is necessary to structure the transaction to convey smart contracts [9].

Denial of service

Even though the fact that bitcoin is a decentralized payment system and is unlikely to result in a point of failure, but it is still possible to pose a risk in denial of service attack [10]. A denial of service attack can occur when an individual who has most of the computational power in the bitcoin mining network prevented the transactions from being processed [11]. This could cause a depression in the value of bitcoins and lead to the crumble of consumer’s confidence [12-14].

Bitcoins and Consumers

The growth of bitcoins has led to a rash of supporting companies. Coinbase, a startup for buying bitcoins, has received \$25 million in venture capital in 2013 and other companies are creating digital wallets for the use and storage of bitcoins at brick and mortar locations [15]. It is estimated to have 5.8 million and 11.5 million wallets in the bitcoins market and among them are described in Table 1 [15]. For a user to obtain a bitcoin, a digital wallet which contains both the public and private key must first be created. The private key was referred to be alike to the pin number for a debit card and it is use to confirm if the owner wants to make a transaction with the bitcoins in the wallet. The user will then have to choose between software a mobile wallet depending on individual needs. The software wallet, which is the preferred choice for most investors, is installed in the hard drive or storage device. With it being located off the network, it added an additional layer of protection from the hackers. On the other hand, the mobile wallet which allows storage on mobile device appeals more to general consumer due to the convenience when making a personal transaction [16] (Table 1).

Consumer Survey

However, despite the remarkable number of active wallets in the market, a survey done by Pricewaterhouse Coopers shown results with a worrying amount unwillingness and lack of from consumer to bitcoins [15]. According to a survey conducted by on consumers’ level of interests to use bitcoins

Table 1 . Estimated to have 5.8 million and 11.5 million wallets in the bitcoins market and among them are given in above table.

Incorporated Wallet	Register organization that offers software wallets
Custodial Wallet	The provider of wallets that take custody of other crypto-currency user’s holding by taking control of the private keys
Self-Hosted Wallet	Wallets that low users to control of private keys and that wallet service does not have access to the user’s crypto-currency funds
Large Wallet	Incorporated wallet that have more than 10 staff strengths
Wallet with Integrated Currency Exchange	Wallet provider that offers currency exchange services within the wallet interface using crypto-currency funds

for internet purchases on phone, tablet or laptop, 51% of the respondents shown interests in making internet purchases using bitcoin. On a similar survey question on how willing is the consumer to use bitcoins on internet purchases or sale transactions, the result shows that the majority 58% of the consumers are not willing to use bitcoins as a payment medium. When asked of the consumers' opinion on the top 5 benefits of bitcoins the consumer attributed it to the anonymity when making payment (15%), followed by the ease of conducting worldwide transaction (12%), instant peer to peer transaction with no financial intermediary's involvement (11%), the speed of transaction (10%), the control over money and against fraud protection (7%) and finally the last 5% of the consumers feel that no other third party can charge or pay on their behalf [15]. The survey also probes the respondent further on the reason to their lack of interest to use bitcoin as a payment medium. Results show that the consumers may have preference of other payment method (17%). There are also consumers who feel that they require more knowledge on the software (16%) while others think that it is not beneficial to them (11%). Concerns are also shown in area like security (8%), legitimacy (8%), volatility of price (8%), regulatory (7%), trust issues (7%), riskiness (6%) no intrinsic value (6%) safety (5%) and a minority of the consumers feel that bitcoin is not established long enough (5%) and thus the lack of interest [16].

Positive Observation

Faster and cheaper payment alternative

Due to the lack of physical presence, digital currencies have lower transaction cost as compared to the traditional ones. Due to its extremely small transaction fees, bitcoins starkly in contrast to the high transaction fees imposed by credit card companies. This encourages merchant from worldwide to accept bitcoins [17]. In order for consumer to switch to bitcoins from old habits, bitcoins have to fulfill its promise of being a faster and cheaper alternative payment method. However, it is still uncertain if bitcoin is delivering as it promised. Raymaekers [7] argued that Bitcoin may or may not be faster and cheaper than its traditional competitors, the conversion of regular currencies in and out of cryptocurrencies is not more convenient than using regular currencies. The experiences and expectation of users can vary, depending on the context.

Privacy

The users of bitcoins are able to stay relatively anonymous. This is possible because the transactions do not identify the payer or payee by names as the ownership of the coins was transfer from one bitcoin's address to another. A user is not limited by the number of address owned. Therefore, by using different address, it is impossible to associate all the transactions together [17].

Financial independence

The decentralized characteristic of Bitcoin means that it

is not backed by a government or central bank and therefore makes it immune to government's instability and regulations. As a result, bitcoin gains the support in countries that do not have a stable economy and is used as an alternative to the country's currency which experiences hyperinflation and capital controls. As compared to the regulated traditional currency, Bitcoin has the advantages of not alerting the authorities when transacting a large number of bitcoins. The unregulated of bitcoins also make it impossible for the authorities to freeze a bitcoin account [17].

Anti-inflation

One of the characteristic that has contribute to Bitcoin's popularity is its finite nature and the protection it offers from the traditional inflationary policies of state-backed currencies. The Bitcoin employ a feature that was once famously advocated by Meiklejohn [6] the man who made the shocking statement to abolish the Federal Reserve. It was argued that with an automated system that increases the money supply at a preset rate, the inflation would be better checked. The Bitcoin system does the same by adjusting the difficulty metric to release a set number of new Bitcoins at a predetermined rate [2]. By incorporating a finite supply of bitcoins that will eventually reach its ceiling once 21 million coins have entered circulation, it is estimated that the new coins will be minted until year 2030 [10].

Negative Observation

Lack of trust in the service provider

Due to several incidents where bitcoins were stolen and resulted in the collapse of exchanges like Mt. Gox, BitInstant and Flexcoin, it is important for consumer to be provided with the sense of security that their bitcoins will not be stolen or vanished if the exchanges were to crumble. Raymaekers identified this as a service problem instead of ingenuity of the Bitcoins protocols due to the bad sheep in the bitcoin ecosystem [7]. It is said that even the online banking application can be vulnerable to cyber-attack and that credit card can be stolen. However, the general public still trusts the bank as bank deposit guarantee scheme exist in many countries.

Theft

Another major concern of bitcoin is the frequency of its theft issue. Like another other property or asset, bitcoin can be lost or stolen. A large scale of theft of bitcoins can occur with a self-installed virus or trojan horse on the bitcoin user's hardware which will send the wallet file to the theft who created the software. An individual theft occurs when someone make an unauthorized transaction out of the owner's wallet through stealing the owner's private access key. It was observed that large scale theft often occurs at the exchanges that stored the private keys of numerous owners [17]. The most defining theft event of Bitcoin is definitely the case of MT Gox that had its auditing accounts hacked in June 2011 with the hacker trading off 50 0,000 bitcoins

in the market. This event showed the general public that bitcoin can be unsecured and easily stolen [11]. As of 2014, it was estimated that approximately US\$500,000,000 worth of bitcoin were stolen and with only US\$12.4 million of bitcoin circulating at that point of time, it means that 1 out of 16-17 bitcoin belongs to someone who stole it. Such incident can result in a confidence crisis and caused unpredictable damage to the value of the coin [18].

International crime

Due to the anonymous nature of bitcoins, it suffered a highly visible connection to criminal activities which includes attacks and extortion on businesses, child and sexual exploitation, illicit drugs distribution, terrorism and trafficking of weapons [19]. The Federal Bureau of Investigation has also expressed concern with regard to bitcoin being used on dark web which is the network of illegal website that is used for child pornography, sex trafficking, and money laundering the sales of drugs [17].

Volatility

Bitcoin's high volatility has always been a serious concern for many. The numbers of bitcoins that are circulating and the number of merchants who are accepting it as a form of payment medium is small. Therefore, the limited liquidity could mean that the value of bitcoin can be affected by a small event or trade [17]. The value of bitcoin has proven to be wildly volatile since the year the programmer Satoshi Nakamoto introduced it in the market. It was said that a Norwegian man who had spent approximately US\$27 for 5,000 bitcoins in year 2009 and had promptly forgotten about the investment. However, 4 years later, the man rediscovered bitcoin and found that the 5,000 bitcoins that were worth merely US\$27 back then were then worth over US\$866. Governments like China and France had also expressed concern on the volatility of bitcoins [12-14].

Potential bubble crisis

There is an ongoing concern by economist that bitcoins exhibit all the system of a bubble. As compared to real life currencies that have intrinsic value of the currency of the individual or entity issuing the money, bitcoins have no independent value due to the reason that they are not back by an individual [20]. According to the Efficient-Market-Hypothesis (EMH), it is not possible for bitcoins to sustain its value. The hypothesis states that the market value of the asset is equivalent to its best available income flow value it will generate. Because bitcoins are not value generating and have no intrinsic, it must appreciate in value to ensure that users are still willing to hold on to the coins. Therefore, it falls in precisely what the EMH defines as a bubble which is an appreciation that is endless, without any earning flow [17]. It has also been identified that bitcoin as a self-described currency. However, it was observed that most of the bitcoin users have acquired it as a form of investment rather than having the intention to purchase goods and services. One

potential risk that is faced by the investors arises when someone who possessed the knowledge of the loss of bitcoin and trade it with the information and the low liquidity of bitcoins indicate that trade may have an impact on the coin's value. There is also observation that bitcoins users may be more susceptible to risk than traditional investors due to the level of professionalism and objectivity as shown in the biasness in the positive news of bitcoins. Due to the high risks that exist in the investment of bitcoins, regulatory like the SEC, issued warning investors warning the investment may have a higher risk of fraudulent or high-risk investment schemes [17,21,22].

Bitcoins and its competitors

Consumers have also shown preference for other alternate payment method in the survey conducted [15]. This section will explore the competition faced by bitcoins in the market.

Bitcoin and fiat money

Hileman and Rauchs results have showed that despite the increase in the acceptance of crypto currencies from merchants worldwide, it still appears that bitcoins are still not primarily used as a day to day payment medium [18]. Luther [19] has also identified that the biggest obstacle to the wide adoption of bitcoins is the incumbent money problem. It is explained that almost everyone in the world is already using fiat money and that the decision to use bitcoin is the decision to stop using fiat money. Thus, the situation resulted in the problem of switching cost and network effect favor the status quo. Fiat Money defined as a currency that is established as money by governments' laws and regulations. The word fiat is derived from a Latin word that means "In the sense of order". The term switching cost was referred to as the necessary cost required to transit from the incumbent money to bitcoin. That could include the cost to retool vending and automated teller machines, to update current menus and transaction records and the need to learn, think and calculate the new unit of account. Therefore, with the high switching cost, bitcoin has to be sufficiently better than the incumbent money to warrant the switch [19]. In addition to warranting the switching cost bitcoin has also need to be sufficiently better than the incumbent money to warrant the coordination cost. This is due to the problem of network effect that occurs when the value of goods and services is dependent on the total number of those who are using it.

Bitcoins and traditional e-commerce

Apart from the incumbent money problem bitcoins also face challenges from the traditional e-commerce and is unlikely to have remarkable performance in this market. Grinberg said that the fundamental features of bitcoins could turn out to be a liability rather than asset [8]. This is due to the reason that the general public usually has no issue with anonymity that bitcoins provide and have preference to compare prices of goods and services in real life currencies due to familiarity. These are also the consumers who have

less concern of the inflation of the money supply by the Federal Reserves. In fact, there are more concern on the fact that bitcoins has no built-in anti-fraud capabilities whereas its competitor, PayPal has spent millions of dollars in ensuring customer’s safety against fraud. Therefore, like DigiCash, GoldMoney, Pecunix and Web-Money there is likelihood for bitcoin to not be particularly competitive in the traditional e-commerce marker due to the lack of competitive advantages, managerial incompetency and dubious legality with that Grinberg said, the bitcoin may be competitive in the micropayment market where consumer has lesser concern on pricing in a familiar currency [8]. Bitcoin have a competitive advantage in this market due to its low transaction cost. However, it could still be difficult for it to sustain unless it is able to offer something that the traditional service cannot as said by Grinberg [8] when bitcoins was compared to the traditional payment system [7]. Bitcoin service providers at large show inferiority to its traditional competitors in terms of reliability, availability and the customer support extended by the large organization that manages the traditional e-commerce payment system. For example, Bitcoin’s current

performance of seven transactions per second is far from its competitors, credit card for example, who can perform 10,000 of transaction per second. It was also said that the Bitcoin’s broadcast, distributed verification and central record approach is very resource extensive causing it to be less efficient, confidential than the point to point transfer of its traditional competitors [6].

Bitcoins and Alt-Coins

On top of the challenges posed by incumbent money and traditional e-commerce, bitcoins also face challenges from other crypto currencies, which is also known as alt-coins [9]. After bitcoins early success, the alt-coin exploded into the market and as of April 2017, the crypto-currencies that are largest after bitcoin in terms of market capitalization [18] (Table 2 and Figure 1).

The Figure 1 shows that Bitcoin is still the dominant player in the Crypto-currency market in terms of capitalization. However, the dominant player’s market capitalization had dropped to 72% in March 2017 from 80% from March 2016. It is shown in the figure that ETH has cut into bitcoin’s

Table 2. The crypto-currencies that are largest after bitcoin in terms of market capitalization are mentioned in table.

Ethereum (ETH)	<ul style="list-style-type: none"> Official launched in 2015 and has drawn considerably interests from many developers and institutional actors Featured a decentralized computing platforms with its very own Turing Complete programming language Blockchains record script are executed by every patriating node which is activated via the transaction with native cryptocurrency ether
Dash	<ul style="list-style-type: none"> Cryptocurrency that is focus on privacy Targets to offer anonymous digital cash with the use of ring signature Block rewards are shared equally between miners and master nodes 10% of the earned revenue proceeds to fund development, community project and marketing
Monero (XMR)	<ul style="list-style-type: none"> Launched in 2014 with a substantial rise of market of in 2016 Uses ring signatures, confidential transactions and stealth addresses to provide anonymous digital cash by obfuscating the origin, transaction amount and destination
Ripple (XRP)	<ul style="list-style-type: none"> Uses global consensus instead of blockchain Protocol used by institutional actors like large banks and money service business Token serves as a currency bridge between national currency pairs and for spam attack prevention

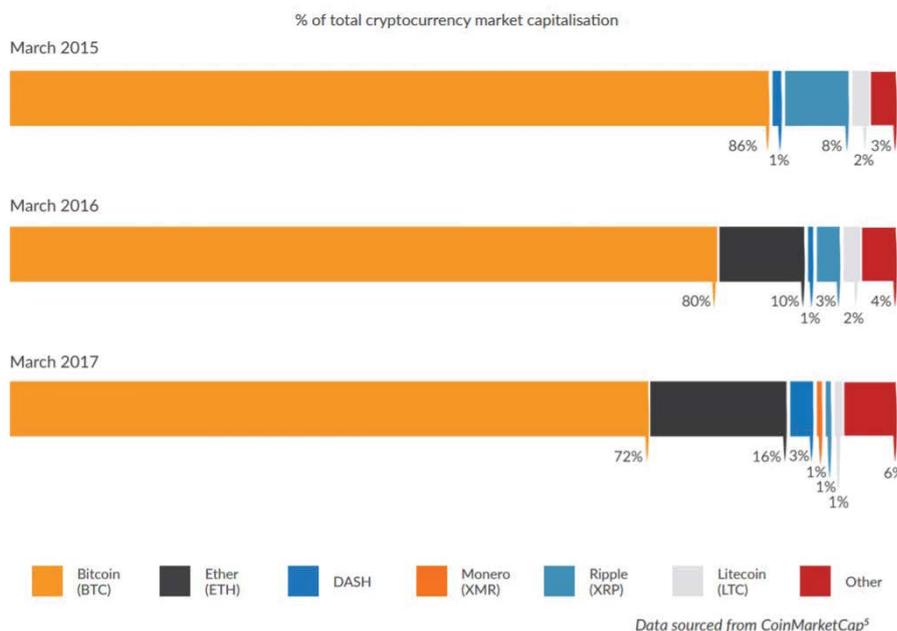


Figure 1. % of total crypto-currency market capitalization.

market capitalization and has established itself as the second largest Crypto-currency in the market while the other Crypto-currency has doubled its market capitalization from 3% in March 2015 to 6% in March 2017 [18] (Figure 2).

Constituted a combined of 4% of the total Crypto-currency market capitalization, privacy-focus cryptocurrencies Dash and XMR has become increasingly popular and have also experienced the most significant growth in terms of price. There are also signs of recovery for the price of ETH since the attack on ecosystem. Generally, all the cryptocurrencies have experience increase in the price within this timeline [18] (Figure 3).

When competing against the average daily of transactions, Bitcoins beat the competing cryptocurrencies hands down and remained as the most widely used Crypto-currency in the market and the results remained the same with

Table 4 where Bitcoin gain the support from the majority of wallets,exchanges and payment service providers that participated in the success of Bitcoins as compared to its competitors suggest that it enjoys a substantial first-mover advantage [18] (Figure 4).

Being the most familiar Crypto-currency in the market to user, Bitcoin is an obvious choice for anyone who is considering to use Crypto-currency as a payment medium and users will be able to enjoy relatively low switching cost. This is because the force that discourage consumer from making a switch from fiat money to bitcoins will encourage those who have already made the switch to stay with bitcoin and discourage consumers to switch to alt-coins [19].

Regulations and Risk

It was said that despite bitcoins being more resistance

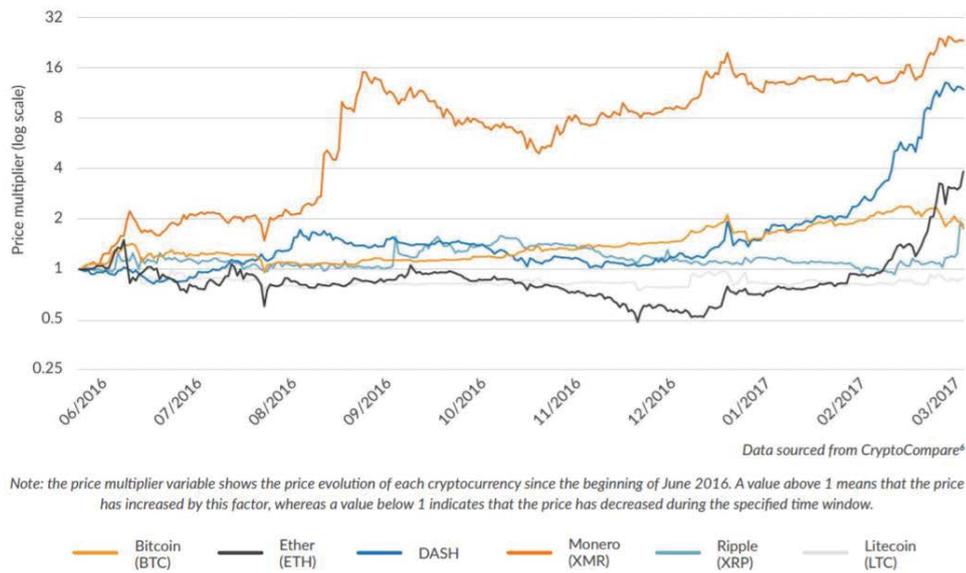


Figure 2. Market price of crypto-currency.

Table 3. Average daily of transactions for largest crypto-currencies.

	Bitcoin	Ethereum	Dash	Ripple	Monero	Litecoin
Q1 2016	201,595	20,242	1,582	N/A	579	4,453
Q2 2017	221,018	40,895	1,184	N/A	435	5,520
Q3 2018	219,624	45,109	1,549	N/A	1,045	3,432
Q4 2019	261,710	42,908	1,238	N/A	1,598	3,455
January-February 2017	286,419	47,792	1,800	N/A	2,611	3,244

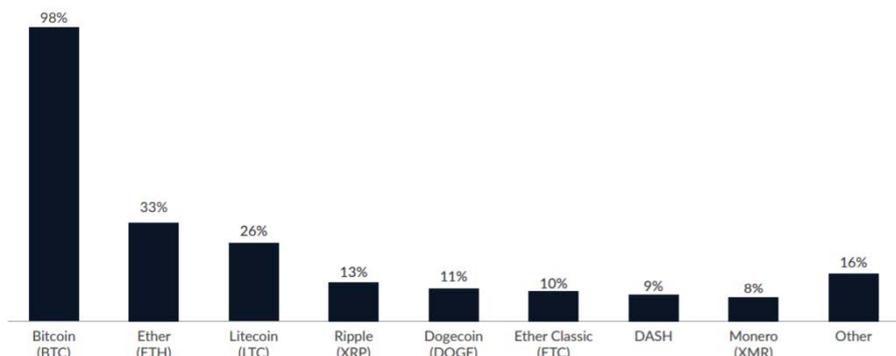


Figure 3. Crypto-currencies of choice among participating exchanges.

to government attacks due to its decentralized nature, many individuals and entities are still anxious about its legal status. The potential use of crypto currencies for criminal activities and the risks that are imposed to the consumers are the primary concerns of the regulators. The fact that bitcoin exist in a legal grey area may lower its demand [19]. This can be further support in the results of as there is indication of consumer’s reluctance to use bitcoins due to its regulatory issues. Therefore, the crypto currencies service provider has the obligation to comply with applicable regulation to ensure the safety and protection of the consumer in order to gain confidence in the services. As highlighted in several bitcoins service providers saw the importance of consumers’ confidence and risk management and consulted Chief Compliance Officer to professionalize the services further to achieve wide adoption and commercial success. It is also understood that he regulatory framework of the crypto currencies has to be evolving fast and be very divergent [21]. Researchers had identified over 70 risks of crypto currencies and some example will be illustrated in the diagram below [23,24].

Legality

Even though that the crypto currencies are not directly regulated since it is not under the control of any specific government, regulation still applies to the currency exchange and crypto currencies. According to BitLegal the legal status of bitcoins in 74 countries show the majority of 84% in the Permissive range, 11% being contentious and the remaining 5% of the countries being hostile to bitcoins [21]. Only few countries have gone as far as declare bitcoins as illegal bitcoins, however, is not a legal tender. The fact it is not a legal tender does not mean it cannot be used for payments. It just means there is no protection for either the consumer or

the merchant [25,26]. Below is a consolidation of the over the years regulations of five countries that are in the permissive range. The regulations of crypto currencies are fast evolving and new regulations could have been introduced since writing this paper (Table 3) (Figure 5).

Discussion

It was identified in the literature review that the Bitcoins is the first crypto currency that is able to provide a solution to the double spending problem and have also shown some competitive advantages over its competitors. It is believed to be a cheaper and faster alternative and provides users with privacy and financial independence through its anonymity and decentralized characteristics. And as compared to fiat currencies, it protects the users from inflation and may be useful for consumers in countries where inflation rates are soaring high. The survey by researchers showed that consumers are aware of these advantages. However, the participants in the survey have also showed to be wary of the potential risk associated with bitcoins and their acceptance is also reduced with each risk [15].

Firstly, for bitcoins to be adopted in day-to-day use, the price stability of the coins is an important factor to be taken into consideration when businesses and consumers make plans on savings and consumption. However, it was found out in the literature review that bitcoins is highly volatile [9] and its value can be affected by a small event or trade [17]. For example in 2014 the Public bank of China (PBOC) ordered commercial banks and payment companies to close bitcoin trading accounts in 2 weeks’ time [23]. Furthermore in February PBOC issued a statement that it would block access to all domestic and foreign crypto currency exchanges and ICO websites [22]. Such risks could potentially discourage

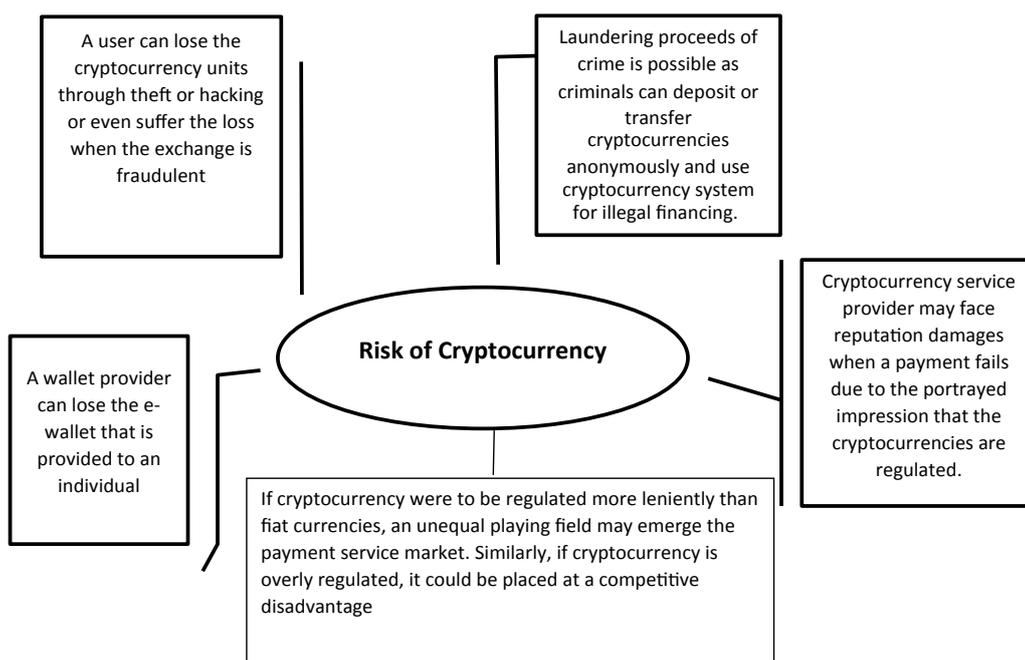


Figure 4: The researchers had identified over 70 risks of cryptocurrencies and some example will be illustrated in the diagram.

Table 4. The regulations of crypto-currencies are fast evolving and new regulations.

Country	Year	Regulations
United State (Legal)	2013	Bitcoin is classified as a convertible decentralized virtual currency by the US treasury
	2014	Treated as property and general rules for property transaction applies
	2016	<i>Federal Judge</i> Alison Nathan ruled that "Bitcoins are funds within the plain meaning of that term".
Australia (Legal)	2014	(Australian Taxation Office, 2014) Viewed Bitcoins as neither money nor a foreign currency. It does not fall within the category of financial supply for goods and services tax (GST) purposes but it will be treated as an asset for capital gains tax (CGT) purposes.
	2017	Double taxation of digital currencies removed.
China (Legal)	2013	People's Bank of China banned local banks from handling transactions involving the Bitcoin.
	2013	People Bank of China and 5 other government ministries issued an official notice which states that bitcoins may not be used as a currency.
	2017	People's Bank of China and 5 other government ministries joined force to enter China's Bitcoin exchanges to conduct on-site inspections.
	2018	Nine China's Bitcoin exchanges were invited to a closed-door meeting by People Bank of China and 3 Bitcoin exchanges namely BTCC, OKCoin and Huobi made announcement to upgrade AML system according to laws & regulations and will pause bitcoins withdraw during the upgrade. Initial coin offerings (ICO) banned in September 2017. Crackdown on bitcoin mining.
Japan (Legal)	2014	Japan's government announced that Bitcoin is not a currency as it does not fall under the currency prescribed by the Civil Code and prohibited financial institutions and exchanges from dealing in bitcoins.
	2017	Japan to recognizes Bitcoin as Currency Starting April 2017. Bitcoin's exchanges in Japan will be required to follow strict anti-money laundering (AML) and Know Your Customer (KYC) requirements, along with annual audits.
Singapore (Legal)	2013	The Monetary Authority of Singapore (MAS) spokesperson warned consumer against Bitcoin's trading that consumer may not be an identifiable party responsible for them to seek recourse if Bitcoin cease to exist.
	2014	The MAS to regulate cryptocurrencies intermediaries for money laundering and terrorist financing risk. <u>Tax Treatment</u> Mode of Payment – Businesses that accept or pay bitcoins for its goods or services should record the sale based on the open market value of the goods or services in Singapore dollars.

potential consumers and merchants in transacting with bitcoins. Secondly, the anonymity characteristic of bitcoins that was identified to be one of its competitive advantages is unfortunately found to be also a liability in this paper [17]. As this feature makes it extremely useful to conduct illegal transactions and criminal activities, it put bitcoin into bad light and make consumer not want to be associated with bitcoins. It was also discovered by Grinberg that most consumers do not have issue over anonymity and inflation and make it difficult for bitcoins to make an impact in the traditional e-commerce market [8]. The potential anonymity failure could cause damage in the value of bitcoins and greatly affect businesses and consumers who are holding the coins [7]. Currently, most countries are accepting bitcoins as a form of payment medium [21] but due to governments and other associates concern in its risks, regulations are inevitable. The regulations on the bitcoins exchange could potentially offset bitcoins competitive advantage as transaction may need to be more transparent and transactions fees are expected to increase due to increase cost. Price of the bitcoins can also potentially be affected by regulatory news on bitcoins due to its volatility which will affect business and consumer greatly [27]. However, these tumbler are necessary for bitcoins to sustain in the longer run as cleared regulatory are needed to reduce the numbers of criminal activities and risk so ask to safeguard consumer's interests. Thirdly, bitcoins show inferiority when compared to traditional payment system and is not likely to make it in the traditional payment market unless it is able to offer what consumers considered as value adding services which for example, Anti-fraud capabilities and customer support [8]. Bitcoin also needs to improve on

its transaction performance to compete with competitors like credit cards that can perform 10,000 transactions per seconds to attract the support and interest from businesses with high transactional volume [7]. When compared to the other crypto currencies [28-32]. Bitcoin has the obvious first-mover advantage as compared to alt-coins in terms of market capitalization, market price, average daily transactions and being the preferred crypto currency of choice [33-36]. The first mover advantage has allowed bitcoins to create barrier of entries to other crypto currencies and resulting in consumer having less incentive to experiment with other crypto currencies if bitcoins works well [24]. However, for bitcoins to maintain its first mover advantages, it needs to be flexible and adjust to the needs of its customer and keep on making improvement as the market changes [37-39].

Conclusion

Bitcoins are not legal tender and are not issued by any regulatory body. There is no legal requirement to receiving bitcoins as consideration; any use of bitcoins as form of payment is discretionary and there is no protection. The normal transaction conditions for a currency tend to be safety, flexibility, smooth operability and reasonable controlled predictability of exchange value variation. One of the issues with bitcoins is its volatility and unpredictable exchange value [40]. This makes pricing and payments with bitcoin problematic. Holding gains and losses could be magnified. The exchange price of transactions could vary a fair deal depending on timing of transaction. Experience tells us in countries where there are sustained periods of hyperinflation and currency volatility, transactions and prices tended to

be in foreign currencies. We have seen this happening in Cambodia and in Lebanon. China is one of the largest traders of bitcoin and the authorities have been taking steps to crack down its' usage. The international community in recent years has been imposing more stringent controls on international funds transfers. This is mainly to curb money laundering and counter terrorism as to block funding of terrorist groups. The anonymity of bitcoin transactions could make the international regulatory bodies uncomfortable. These are possible risks bitcoin as a payment option could face in future. Although the use of bitcoins is mostly for speculative purpose, it still shows potential as a viable payment alternative. However, currently it is still unlikely for bitcoins to replace its competitors as the dominant player in the market due to its lack distinctive advantages for businesses and consumers to replace the current familiar processor. Therefore, it is recommended for bitcoins to benchmark itself to its competitors and to show remarkable improvements in areas like building in an anti-fraud capability to protect consumer against fraud and thief and to make up against the lack of regulation. Also, in order to attract the support of organizations that have huge transaction volume, it is also important for bitcoins to improve the performance in its transaction speed per second to handle larger amount of transaction. Lastly, despite the governments' effort to regulate the bitcoin exchanges, it is also important and recommended for businesses and consumers to watch the market closely due to the price volatility of the bitcoins so as to not suffer losses or in more serve circumstance, be a victim of the bubble crisis.

References

1. Bovaird C. History is made: Bitcoin prices top \$2,000 to set new all-time high coin desk. 2017.
2. Wenker N. Online currencies, real world chaos: The struggle to regulate the rise of bitcoins. *Rev Law Politics*. 2014.
3. Trautman LJ, Harrelb AC. Bitcoins versus regulated payment system: What gives? *Cardozo Law Review*. 2017.
4. Torpey K. Bill Gates criticisms of bitcoin-blockchain agenda with inside bitcoins-news, price and events block chain agenda with inside bitcoins- news, price, events. 2014.
5. Franco P. *Understanding bitcoin*. Wiley. 2014.
6. Meiklejohn S. A fistful of bitcoins: Characterizing payments among men with no names. *Communication of the ACM*. 2013.
7. Raymaekers W. Cryptocurrency bitcoin: Disruption, challenges and opportunities. *Journal of Payments Strategy and Systems*. 2014.
8. Grinberg R. Bitcoin: An innovative alternative digital currency. *Hastings Sci Technol Law J*. 2011.
9. Slattery T. Taking a bit out of crime: Bitcoin and cross-border tax evasion, *Brooklyn J Int Law*. 2014.
10. The Economist. Money from nothing. Print edition. *Finance Econ*. 2014.
11. Quenston A. The biggest bitcoin hacks and thefts of all time. 2016.
12. CoinDesk. Bank of france warns of bitcoin's volatility. 2013. <http://www.coindesk.com/bank-of-france-follows-china-warn-bitcoin-volatility/>
13. CoinDesk. Bitcoin in China: An insider's view. 2015. <http://www.coindesk.com/bitcoin-in-china-an-insiders-view/>
14. CoinDesk. Bucks to bitcoin: top exchange platform fees compared. 2015. <http://www.coindesk.com/bucks-to-bitcoin-top-exchange-platform-fees-compared/>
15. Coopers P. Digital disruptor: How bitcoin is driving innovation in entertainment, media and communications. *Consumer intelligence series*. 2014.
16. Small S. Bitcoin: The Napster of currency. *Houston J Int Law*. 2015.
17. Swartz ND. Bursting the bitcoin bubble: The case to regulate digital currency as a security or commodity. *Tulane J Technol Intellect Property*. 2014.
18. Hileman G, Rauchs M. Global cryptocurrency benchmarking study. *Cambridge Center for Alternative Finance*. 2017.
19. Luthar WJ. Bitcoin and the future digital payments. *The Independent Review*. 2016.
20. European banking authority. EBA opinion on virtual currencies. EBA. 2014.
21. BitLegal. BitLegal-Welcome. 2017. <http://bitlegal.io/list.php>
22. Seth S. Is Bitcoin banned in China. *Investopedia*. 2018.
23. Chao D, Lingling W. China cracks down on Bitcoin. 2014.
24. Szczepanski M. Bitcoins market, economics and regulation. *European Parliamentary Research Service*. 2014.
25. Weisenthal J, Shiller R. *Bitcoin-Business Insider*. 2014.
26. Singapore press holdings ltd. co. Bitcoin users beware MAS, *Business News-Asia One*. 2013. <http://www.asiaone.com/business/bitcoin-users-beware-mas-0?nopaging=1>
27. Russell J. China is reportedly moving to clamp down on bitcoin miners. *Tech Crunch* 9th January. 2018.
28. Monetary authority of singapore. MAS to regulate virtual currency intermediaries for money laundering and terrorist financing risks. *Singapore*. 2014.

29. NEWSBTC. Japan officially recognizes bitcoin as currency starting April NEWSBTC. 2017. <http://www.newsbtc.com/2017/04/02/japan-officially-recognises-bitcoin-currency-starting-april-2017/>
30. Nihon KS. Bit coin 'not currency' first government opinion. Nihon Keizai Shimbun. 2014.
31. IRS Virtual currency guidance, virtual currency is treated as property for US federal tax purposes; general rule for transaction. 2014. <https://www.irs.gov/uac/newsroom/irs-virtual-currency-guidance>
32. London JP, Melbourne GT. Virtual currency: Bits and bob. Economist. 2011
33. Inland revenue authority of singapore. Income tax treatment of virtual currencies-IRAS. 2017.
34. FinCEN. Statement of jennifer shasky calvery, director, financial crimes enforcement network, united states department of the treasury. 2013.
35. Commonwealth of Australia. Budget 2014: Backing Innovation and Fintech. 2017. <http://www.budget.gov.au>
36. Connell J. What has happened to bitcoin in china so far. 2017. <https://news.bitcoin.com/happened-to-bitcoin-in-china-2017/>
37. China daily information co. PBOC warns of bitcoin volatility. 2017. http://www.chinadaily.com.cn/business/2017-01/07/content_27887369.htm
38. Business Insider. \$500 Million worth of bitcoin has been stolen since 2010. 2014.
39. CBS Interactive Inc. Bitcoin and the future of money- CBS News. 2014.
40. Australian taxation office. Tax treatment of cryptocurrencies in Australia specifically bitcoin. Australian Taxation Office. 2014.

***Correspondence to:**

Ameen Ali Talib
Head of Applied Projects
University of Social Sciences
Singapore
E-mail: ameentalib@suss.edu.sg