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To Identify the Challenges and Opportunities Associated with Virtual Currency

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Abstract:- The aim of this research work is to analyse the concept of virtual currency and identify opportunities and threats for virtual currency and its users in the modern world. This research work presents a comprehensive review of the literature as well as primary empirical evidence. Primary empirical evidence has been gathered through a self-administered research questionnaire from a sample of 367 participants. These participants have been recruited through convenience sampling technique and are all users of virtual currencies. The questionnaire has helped to identify current opportunities and challenges of virtual currencies from the perspective of its users.

Keywords:- *Virtual Currencies; Viternity Project; Characteristics of Virtual Currencies; Threats and Opportunities.*

I. INTRODUCTION

With advances in communication and information technologies, traditional ways of exchanging goods and services are rapidly changing. In the same way, the payment systems are evolving, the ways of depositing values and the means used for this purpose [1, 2]. One of those technological innovations that have been explored little in Colombia is the emergence of virtual currencies as a valid medium of exchange for daily transactions [41, 41]. In addition, payment systems that accept these virtual currencies and facilitate payments through the Internet have evolved [14, 29].

Recently, virtual currencies, and especially bitcoin, have become a subject of particular importance in the world. In the local academy, there has been little talk about the virtues and much about the vices of this means of exchange, but already many legislations recognise its potential and the need to promote its regulation (European Banking Authority cited in [49]). Some countries such as Colombia, the response from state entities was overwhelming. The Financial Superintendent of Colombia banned any transaction with virtual currencies to its supervised entities, while the Banco de la República (BR) ratified its monetary sovereignty and considered that the bitcoin is not a currency or means of payment with liberating power. This position cancels all kinds of discussion and analysis regarding a new technology, which deserves, on the contrary, to be studied in depth from different disciplines and approaches [47,40]. The reaction of these two institutions was based on the concerns caused by the various risks of the virtual currencies, as well as the concern of the monetary authorities regarding the control of the means of exchange in the country due to the increase in the use of a virtual currency outside the monetary regime. These concerns have already been considered by authors such as Tasca [43].

People have always sought - and found - ways to exchange goods and services in ways that are most beneficial to them. If one looks at the development of money as an accounting unit that has in itself a deposit of value capable of being used as a means of exchange [22], its historical development was not produced by the will of the rulers, but by the commercial needs of another nature of people [39,18]. Even today there are communities in the United States of America (USA) that use local currencies, such as Time Dollars, BerkShares or Ithaca Hours [11,3], which work just like fiat money but without the control of the federal authorities. Local currencies, as well as virtual currencies, respond to the particular needs of people, which may be contradictory to the purposes and objectives of the central monetary authorities and financial supervision [12,12].

This is how the fundamental problem of virtual currencies is their increasing use by the general public, in a non-existent regulatory framework that represents risks for those consumers and for the monetary and risk management system [48]. The lack of a complete regulation has allowed virtual currencies, and especially the bitcoin, to be used on the internet for payments in large-scale criminal activities, such as the sale of arms and narcotics and the hiring and payment of mercenaries [26,24]. But the most relevant consideration to take into account is what the massive use of bitcoin would imply for financial systems: the termination of banks as financial intermediaries for some transactions and the end of the monetary sovereignty of most states in the world [4, 26].

II. PROBLEM STATEMENT

While today's small-scale use of bitcoin does not pose a threat to the financial system, as its use and acceptance grow, its risks will increase, and already established legal and state institutions will be threatened by the social development of the economy [11,15]. It is necessary to conduct a substantive discussion on the matter so that the form of adoption or rejection is concerted and informed. The creation of such instruments could indicate that money issued by central banks is not meeting all the needs and expectations of ordinary citizens [36, 10].

While there are risks in virtual currencies, these can be managed through clear rules of the game that would allow market players to know the advantages and disadvantages of this tool that could eventually respond to the needs of citizens and even governments [10,15,3]. It should be remembered that coercion in peer-to-peer systems presents several difficulties for states, since there is no centralised institution that can be repressed to stop their activities, but it is necessary to

persecute each individual is doing operations with virtual currencies [37,36,45,47].

In that order of ideas, the general objective of the work is to identify opportunities and challenges facing virtual currencies and how virtual currencies such as bitcoin, could be used to take advantage of its benefits, mitigating its risks and without affecting the financial system and monetary sovereignty [2,48]. Furthermore, this study will also focus on identifying the role of virtual currency in the virtual world and virtual eternity [35,17]. According to Bailey (2017), Virternity project is discussed with the concepts of virtual currency and virtual currency exchange. The Virternity project is associated with an exchange network that is evenly distributed. Such a distribution network is supported by the Virternity project that works on the mechanism similar to the mechanisms of the exchange houses, however, supported the services not to be provided using the third-party services but allowing the users of the distributed network for the buying and selling of the currencies without any of the third-party services [51].

A. Research Question

What are the challenges and opportunities associated with virtual currency?

B. Research Objectives

- To explore the concept and operations of virtual currency.
- To understand opportunities for virtual currency users and virtual currency in the current world.
- To understand challenges for virtual currency users and virtual currency in the current world.

III. LITERATURE REVIEW

A. Virtual Currency

According to Dyhrberg [10], virtual currencies can be defined as the digital representation of the value that is mainly issued by the private developers. All the procedures associated with the virtual currency including obtaining the virtual currency, storing, accessing and transaction, all the procedures are carried out electronically [10]. The concept of the virtual currency is much wider and thus is based on a wide array of currencies. The virtual currency thus ranges from simple internet coupons or mobile coupons (IOUs) too much greater assets such as cryptocurrency among which Bitcoin is most commonly preferred [40,23]. Another author has further stated that these virtual currencies have their own unit of account and thus are not dominated in the fiat currency and this is how they are differentiated from the other currencies. The virtual currency is only available in the electronic form and its storage and transactions are carried out by means of the computer applications or the designed software and also by means of the digital wallets [27]. The transactions, however, are carried out over the internet through the secure and dedicated networks [18,25,49,3].

Christian and Christian [25], in his research, has discussed that represented in terms of tokens, the virtual currency relies on the system of trust, lacking a centralised regulatory authority and thus deriving their value through their underlying mechanisms. Monetary value is electronically represented in terms of virtual currency. The virtual currency, for this reason, is classified into the different types of digital money that is regulated and controlled by its developers and is used as a payment method for the members of the virtual community thus have a restricted usage [25].

As highlighted by Acharya, Andrea and Bhagyashree [31], the virtual currencies have already been discussed by the researchers. The actual ground that is provided to the virtual currency is associated with the decline in the trust of the banking sector, uncertainties associated with the currencies, decreased interests and fearing to lose the capital. Based on the benefits that have been provided by the virtual currency, a number of businesses today have already been accepting their necessary payments in the form of virtual currency and an increase has been observed in such businesses all around the world [31]. However, when compared to the real money, the virtual currency has its own advantages and disadvantages. The fact, but, cannot be denied that the virtual currency has revolutionised the world of banking and transactions by providing an insight of a new banking system that is ensuring high transparency in the banking system throughout the world [45,25,23,11].

B. Virternity Project, its Key Features and Benefits

According to Bailey, Virternity project is discussed with the concepts of virtual currency and virtual currency exchange. The Virternity project is associated with an exchange network that is evenly distributed. Such a distribution network is supported by the Virternity project that works on the mechanism similar to the mechanisms of the exchange houses, however, supported the services not to be provided using the third-party services but allowing the users of the distributed network for the buying and selling of the currencies without any of the third-party services. The importance of the Virternity project can be determined through the fact that the concept of a distributed exchange network would not only make the financial transactions efficient but less expensive as well. The concept of Virternity project has highlighted using the cryptocurrency, facilitating the entire procedure of direct buying and selling the coins and not by means of stock exchange. The implementation of virtual currency in Virternity project, however, would require the cornerstone and the necessary knowledge in form of technology being a business blockchain that has nothing to do without the internet. For a blockchain, thus, it is necessary to have an accessible working internet that would further facilitate a fair distribution of the resources. The security for a blockchain network would be provided based on the science of cryptography [51].

The success of a virtual currency is usually associated with the usage of the blockchains. The Virternity project has planned to use blockchains for its virtual currency thus, measuring the success of the currency [43,19]. Blockchain technology, today, is mostly preferred by the businesses that are thinking of the ways that can be used in order to get the maximum advantage [10, 19].

C. Challenges Associated with Virtual Currency and Virternity Project

A number of legitimates and other beneficial applications have been associated with virtual currency. Despite the fact that virtual currency focuses on cost-effective transactions, has made the financial system throughout the

world much better that has suited the global economy, the virtual currency, at the same time, has posed certain challenges as well [27,37,40,3]. According to Martins et. al., [45], the mistrust of the people over the financial system, financial institutions and the government has directed the attention of the people towards the virtual currency. The virtual currency, however, is associated with the real economy but at the same time, it has posed certain challenges and risks to the economy as well [45].

Challenges associated with the virtual currency have also been discussed by Ingram and Marcel [35], the researcher has highlighted the challenges that are particularly associated with the form of virtual currency, the cryptocurrency. The literature has already identified some of the important properties of the system including the hidden potentials. The article has discovered the attacks on the system as one of the greatest challenges being faced by the digital currency due to the fact that it is operated all by electronic and technological means [35].

Turpin [5] have highlighted that among the other challenges associated with the virtual currency, being a financial product, includes its use for criminal purposes. Terrorist financial risks along with the risks of money laundering are mainly associated with the virtual currency. Besides this, the new financial technologies are only little understood and based on this reason they often pose certain challenges for the people and for the financial institutions as well [5].

According to Khan, et al. [42], among the other challenges associated with the virtual currency includes the difficulty in regulating them in their decentralised forms. Further, the system ensures anonymity and in most of the countries, is not over-sighted by the government that further allows the misuse of the virtual currency making it more difficult to control the other challenges associated with it. These challenges are associated with the virtual currency such as the cryptocurrency due to the reason that the concept of virtual currency has been introduced considering the introduction of such an alternative currency that would be governed democratically rather than being under the control of the government [42]. The electronic currency introduced based on this fact was initially used for gaming proceeds and for the other informal value exchanges after which it was considered as a payment method for illegal weapons, stolen goods and for the choice and drugs supply as well [21,36]. This challenge, however, has been overcome by the virtual currency exchanges that are now seeking the necessary approval from the government to be regulated through licensing. Thus, the regulatory issues are among the main challenges associated with the virtual currency [42,5].

Bailey has further discussed that virternity project that is associated with an evenly distribute virtual currency exchange network has also a number of challenges associated with it. The virtual existence of the virtual money is always a question thus the Virternity project would require the development of such a path that should be practical in nature. The objective on which the Virternity project would be developed and the other systems like this are already in existence that can challenge the existence of the Virternity project, however, based on this fact it can be considered that it cannot be doubted that the Virternity project would be unachievable but it might pose the other risk and challenges such as the technological factors associated with it, for instance, the blockchain. The other challenging factors would include the secure access using the scanning technology, storing the non-financial information and usage of the blockchain for the purpose of copyright [51].

The concept of Virternity project is an encompassing idea whose implementation itself is not more than a challenge and the proposed idea, however, is definitely possible to be implemented in the near future [51]. Despite a number of challenges being faced by the virtual currency and the concept of Virternity project involving the virtual currency, it can be said that the Virternity project one implemented has the ability to take the leading position in the market thus resulting in capitalising the monetary advantage [51]. The Virternity project in this way has open the borders to the virtual world in a more cooperative way, proposing a positive outlook of the future of the finances all in the virtual realm, merging the physical and the digital world together [51].

D. Opportunities Associated with Virtual Currency

As stated by Vandervort [19], over the last several months, a significant interest has been shown by the financial institutions in the virtual currencies and based on this fact it can be said that the future for the virtual currency is bright. Among the key advantages and benefits associated with the virtual currency are decentralisation, automation, security and anonymity. These benefits of the digital currency have created several opportunities for the virtual currency. These digital currencies are associated with the blockchain technology and thus have the necessary potential to disrupt the currency [19]. As discussed by Richter, et al. [3], and the digital currency, based on the blockchain technology has the necessary potential to minimise the complexity of financial transactions and augmenting the necessary transparency as well as provided the people and the financial institutions with an opportunity to ease the entire process of financial transactions. Based on this advantage, the virtual currency as rising opportunities not only in the technology sector but in the sectors of education, government, healthcare and law etcetera [3].

According to Christian and Christian [22], the digital currency, besides this, has provided the countries with an opportunity for the formation of a more innovative and competitive banking and payment sectors further facilitating the digital currency businesses and the community users of the digital currency. The emerging concept of the digital currency has provided the countries with a further opportunity to establish themselves as the digital currency expertise for the creation of certain new channels facilitating the investments and tax procedures [22]. The virtual currency would allow the fast settlement time and with much lower charges of transmission providing with fewer barriers to cross the border trade and focusing on the development of the product supporting much effective e-commerce, finance systems and other forms of transfer mechanisms [7,47]. Sangeetha [32] have further discussed that not only would this, incorporating the virtual currency facilitate the digital transactions that would further provide the necessary support to the international financial crime investigations. The virtual currency has provided with the most innovative aspects of the

technology and further has the ability to change the ways through which the necessary value transactions are made considering the securities of the shares, communication and the distribution of the assets [32].

It has further been recognised that the technology that has been associated with the virtual or digital currency has offered a considerable promise thus making it possible for the users of the digital currency to transfer the information or value [22,1]. The information, in this way, is not only transferred securely, quickly and efficiently but at the same time, does not require the presence of any third trusted party and keep the permanent record of the financial transactions [8,19].

As discussed by Bailey in his book Virternity: The quest for virtual eternity, among the most common opportunities for the virtual currency is linked with its association with the virtual eternity. Since the virtual currency is a form of digital currency, thus the concept of the physical world can further be replaced with the idea of the virtual where the real can be altered with the virtual. The digital currency in the virtual world would provide with an idea of replacing the concepts of the truth with the digital truths. Such an idea has introduced the concept of the Virternity project that has its own key features and benefits. The concept for the implementation, however, have to face certain challenges in order to become a reality and require a proper solution to become a reality [51].

It has been stated by Zheng, et al. [15], that the money as a figure of the economy must be rightly recognised but is not well understood. With the advent of technology and the development of the new concepts associated with the monetary science, nature, as well as the functions of money or the currency, has significantly changed. The development of the monetary system is further facilitated by the development of technology and usage of internet in almost all fields [15]. The technology, in this way, has also facilitated the introduction of a certain new phenomenon of virtual currency that is also most commonly referred to as the digital currency. Although the development of the concept of virtual currency has been highly appreciated all over the world at the same time, the concerned authorities including the legislative authorities have found certain challenges and concerns associated with the virtual currency and its security [29,7]. These concerns have increased the attention of the concerned authorities towards the usage of the virtual currency in financial transactions. Despite a number of challenges that have been imposed by the virtual currency to the digital world and the challenges for the virtual currency in the digital world, a range of opportunities have also been associated with the virtual currency. Considering the opportunities, however, requires not neglecting the risks [26,46].

The risks, as highlighted by Henry, Huynh, and Gradon [49], to be considered that are associated with the virtual currency includes the financial activities being carried out illegally such as financial transactions and money laundering etcetera. Since the virtual currency is a type of digital money that does not follow certain rules and regulations and for this reason, while considering the opportunities it is also necessary to consider the risks associated with the virtual currency since this digital currency has the necessary strong potential for the development, providing the necessary facilitation and ease to the financial transaction and thus has a bright future [49]. But at the same time, it is further necessary to develop proper rules and regulations or a proper legislation under which the digital currency, throughout the world, would be operated [16,17].

IV. METHODOLOGY

Within the context of research philosophically, positivist school of thought, acceptable knowledge regarding social phenomena, such as virtual currencies, can only be gained through application of methods and ethos of natural sciences, such as statistical techniques [52]. Within this context, this study posits with positivists and assumes that in order to gain knowledge about opportunities and challenges facing virtual currencies and virtual eternity by applying methods and ethos of natural sciences. Furthermore, with the adoption of the positivist paradigm, this study has followed the deductive reasoning. The has started with collecting general observations and theories existing in literature and then continued to develop tentative hypotheses from the specific content of virtual currency users Banks and Zeitlyn [53]. The aim is to test whether theoretical debate resonates with observations and experiences of virtual currency users.

In order to achieve the aims and objectives, this study continues to adopt quantitative design. The main benefit of the quantitative design is that it matches with the positivist paradigm and deductive approach Bernard and Bernard, [54]. Furthermore, it enabled the researcher to gather objective and quantifiable data from the target population, i.e. virtual currency users, and then tested hypotheses using quantitative data. The results of this study are thus highly verifiable and therefore, show high reliability and validity [55].

The data collection method for this study was a self-administered questionnaire [56]. The first section in the questionnaire focused on gathering demographic characteristics of virtual currency users. The second section focused on identifying challenges of virtual currency and the third section focused on identifying opportunities for virtual currency. The main reason to choose questionnaire is the fact that it is the most cost-efficient and time efficient method of data collection with virtually zero costs and high rate of response. Questionnaires enabled the researcher to gather a large amount of data within less time as compared to other methods such as interviews [57].

In order to develop a sample for this study, the researcher adopted convenience sampling method and gathered email addresses of virtual currency users and then sent emails containing research background, consent form, and survey questionnaire [58]. The researcher sent 500 emails and in response 378 potential participants responded back. Upon examination, it was found that 3 questionnaires were incomplete and 8 respondents did not send consent form. These responses were excluded from sample and overall only 367 respondents were included in the study results.

The researcher used statistical techniques to analyse data gathered from respondents. The study presents results in the form of tables and graphs to show trends and opinions of virtual currency users regarding the challenges and

opportunities of virtual currency. The results in the next section have been presented using graphs and tables indicating trends frequencies of sample regarding various statements made in the questionnaire.

A number of ethical considerations were adopted by the researcher to show integrity with the research community and research participants [59]. Firstly, proper references and citations have been used to pay proper credit to the work of all authors used in this study. Furthermore, this study maintained absolute anonymity and confidentiality [60]. Furthermore, all participants were informed that participation in the study is voluntary and there are no commercial gains for participants and the researcher. The researcher has not used participants' data for any commercial purposes and the entire research process is strictly for academic purposes only [61].

V. RESULTS

A. Demographic Characteristics

The demographic characteristics of the respondents are as followed:

52% of the participants were male while 48% of the participants were females (table 1). Majority of the virtual currency users belonged to the age group 21 to 30% while the lowest number of users belonged to the age group over 50 (table 2). Regarding educational background, the survey indicates that 32% of participants were Under Graduate, 26% participants were Graduate, 27% of participants were Post Graduate, and 15% participants were PhD (table 4). Furthermore, the survey showed that 18% of respondents were students, 43% of respondents were e-commerce professionals, 12% of respondents were full-time regular employees in different industries, and 24% of respondents were freelancers (table 4). In terms of income, the results indicate that 33% of the participants earn under USD 5000, 26% of the participants earn USD 5001 to USD 10000, 14% of the participants earn USD 10001 to USD 15000, 16% of the participants earn USD 15001 to USD 20000, 8% of the participants earn USD 20001 to USD 25000, and 3% of the participants earn over USD 25000 (table 5).

B. Opportunities in Virtual Currency

- *Low Cost of Transaction*

The first opportunity identified through survey questionnaire is the fact that virtual currency enables users to minimise transaction costs. Majority of the respondents indicated that as compared to other payments methods that involve real currency has a high level of transaction costs (see table 6 in appendix A). These results are consistent with the general literature. Various authors such as Sas and Khairuddin [4] and Greene, Claire, and Shy [11] concluded that the transaction cost of virtual currency is lower than other payment methods. Bogucki [46] determined that virtual currencies represent an important economic advantage. This is due to the low cost of transfer, the universality of use or destination and the amount that is sent. In the same context, Lindman et al., [21], pointed out that transfers by one of the most popular payment systems, PayPal, are much more expensive, less secure and slower than Bitcoin (see table 7 and 8 in appendix A). The decrease in taxation is due to the minimal transaction security verification fees, which was one of the main reasons for the creation of Bitcoins [1,4]. Virtual currencies and, more specifically, Bitcoin have several advantages such as payment efficiency, low transfer costs, transfers of goods and services with minimal values (micropayments) which are difficult to sell because of taxes and transfer costs that often exceed the value of the product or service. This can be of great benefit to small and medium-sized enterprises in development [13,1].

For Dyhrberg [10], the absence of central and commercial banks, payment systems and clearing houses reduces the transaction costs borne by users and is a decisive advantage of Bitcoin vis-à-vis traditional currencies [10]. Meisser [30] estimate the average cost of Bitcoin transactions between 0 and 1% while a typical banking transaction would cost between 2 and 5%. In the blockchain, only minors are randomly rewarded. We can thus anticipate that the surplus of the users is more important in the case of a decentralised payment network than in the one that obtains it in a centralised network [30].

- *Convenient*

The results also show that the users find virtual currencies more convenient in terms of speed and ease of transaction (see table 9), physical presence (table 10), and no formalities such as bank accounts and details (table 11). Often, the literature in this field compares virtual currencies with real currencies by asking whether one-day economic development will lead to the officialization of digital currencies [29,20]. Comparing with conventional currencies, Vandervort, [19] is convinced that virtual currencies have much more advantages than paper currencies. These include the non-necessity of the physical presence of the buyer and the seller, the speed of transactions and the absence of printing costs for tickets, accounts and transportation which cost a great deal of money for taxpayer [19]. At the same time, some Canadian financial institutions (cited in [48]) offer another opinion on the subject. The Bank of Canada, for example, says that the government makes enough money through the issuance of currencies - about $ 1 billion a year, so if the use of Bitcoin increases gradually by replacing the Canadian dollar that would cause losses for the government. Royal Bank of Canada considers digital currency innovations as useless means of payment because Canadians would already be well served by current payment systems [47].

- *Virtual reality/World*

Another important use of virtual currencies indicated by users is the use of Bitcoins in the virtual world for example online gaming (table 12), trading of virtual objects (table 13), and to conduct transactions in the virtual world. Similar results have been reported by many authors. For example, Bogliolo, et al., [2] opined that the role of virtual currencies seems much more important for the virtual market. The study concluded that Bitcoin has advantages that make people competitive in the virtual market. The author believes that Bitcoin is easy to use in the virtual world and especially in online games. Bitcoins are so stable and important that they can become a currency standard for virtual games [2]. Raymaekers [16] also pointed out the importance of the circulation and popularity of virtual currencies on the internet, pointing out that the transfer

of products and services in the virtual space is growing and that with this evolution the Cryptocurrency market will also evolve [16].

- *Stability and Security*

The results also show that virtual currency users also are increasing the use of virtual currency because there are more stability and security. The results show that majority of the respondents indicated that there is higher stability (table 15), security (table 16), and immunity to inflation (table 17). However, there was also a considerable number of respondents who did not agree with these statements. Comparing these results with other studies available, it can be inferred that overall there are contradictory opinions about the stability and security of virtual currency as compared to paper currency and other digital currencies. For some authors, the cryptographic element of transfers and self-checking by the blockchain ensure a high level of security of the Bitcoin network [43,10,6,31]. But others such as Keppitiyagama [23] are highly sceptical about this. They consider the circulation of Bitcoin as a 'utopia' that puts users in difficulty. This difficulty is directly related to the possibility of losing their Bitcoins, losing their computer or having problems with the software, which may make it impossible to recover Bitcoin wallets [23]. Apart from these technical problems, Richter, et al., [3] recall that there are computer attacks against intermediaries, who play the role of Bitcoin scholarships, such as MTGOX in 2014, CAVirtex and Flexcoin that were hacked and stolen. Viruses like 'Hlux / Kelihos' are built to hack into Bitcoin wallets or to steal Bitcoins [3]. The literature explains that the popularity of Bitcoins is the cause of hacking and illegal mining of several computers. Viruses like 'Butterfly' infected more than 13 million computers in 2010 [12,7,8].

Although some authors such as Ly, [21] believe that Bitcoin is very stable and immune to inflation, several authors remain very sceptical. In this regard, the volatility of Bitcoin prices in recent years is a serious problem. The rise of larger mining companies, especially Chinese companies, which account for over 50% of the global Bitcoin market raises the question of stability, the possibility of market manipulation and a monopoly of this currency [21]. The lack of user protection against losses makes this currency less popular than conventional currencies [23,45].

- *Challenges in Virtual Currency*

The secondary research shows that there are significant risks associated with virtual currencies. For example, Pflaum and Emmeline [8] showed that Bitcoin represents a significant risk for its users. The fact that the price of this currency is not guaranteed and insured by a centralised institution, the lack of an underlying asset (such as gold) and especially the price volatility that depends on the popularity and demand currency lead to risks [8]. The problem of volatility is also reported by Deepika, Puneet and Kaur [27] who show the price variation of Bitcoin (Bitcoin was selling for USD1 in February 2011, for USD30 in June 2011, for USD5 in October 2011, for USD230 in April 2013, for USD70 in May 2013, for USD1100 in November 2013). In addition, the price has decreased and increased by several hundred dollars in 2014 and 2015 to wait for USD500 in April 2016. This research also gathered data regarding challenges associated with virtual currency [27]. Following discussion presents results and discussion of this study:

- *Low Security*

One of the first challenges indicated by the primary research is the level of security and possibility of loss of Bitcoin currency. Majority of the participants in the survey indicated that it is not possible to recover Bitcoin if the owner loses his/her private security key (table 18). Furthermore, the researcher also showed that if the owner loses his equipment (table 19) or the computer is hacked (table 20) the currency is lost. These results are exactly the same as other researchers have obtained in their research studies. For example, Chuen and Kuo, [9] explained that every account is associated with two keys. The first is totally public and allows to debit/credit the account. The second is purely private and allows the holder to initiate transactions. If the holder loses one of his keys, there is no way to recover them, the Bitcoin currency definitely lost, because it is technically impossible to reproduce them. The same is true if the computer is lost, stolen or hacked. In any case, the holder cannot return to any institution or make any insurance [9].

- *Risk of Bankruptcy*

The primary research results indicate that the majority of the users agreed that virtual currency users are vulnerable to losing their currency if their account manager/platform goes bankrupt (table 21), there is no insurance (table 22), and there is no way to recover the currency should any of the above incidents occur (table 23). Similar issues have been reported by other researchers where Matta, Lunesu, and Michele [36] showed that users face an unresolvable problem when the account manager, is hashed or goes bankrupt. There is no form of deposit insurance on Bitcoin [36]. Thus, the bankruptcy, a priori fraudulent, MtGox platform in February 2014 in Japan would have involved the disappearance of 850,000 Bitcoins [36]. Szefer and Lee [39] study the functioning of 40 platforms between 2010 and 2013 and show that 18 of them have closed involving in almost half of the cases irreversible losses for the applicants. Securing accounts and platforms is, therefore, a prerequisite for the dissemination of Bitcoin as a means of payment and a store of value. Given the difficulties in regulating traditional banks, there is the question of the regulations to be applied (probably by the Financial Stability Forum) to these platforms to protect the deposits of its users, especially if these platforms are located in regulatory havens [39].

- *No Intermediary*

The primary research also showed that lack of intermediary is also a significant challenge facing propagation of virtual currency. Majority of the research participants indicated that one of the main problems for virtual currency is that there is no intermediary (table 24). Participants also agree that although lack of intermediary reduces the cost of the transaction, yet it increases the risk of loss of virtual currency (table 25). Furthermore, participants also indicate that despite the fact that peer to peer network and transactions increase the speed of transactions, it also increases the risk of loss of

currency and consequently wealth of the users of virtual currency (table 26).

Similar conclusions have been made by other researchers and thus the results of this study are assumed to be consistent with the general literature. For example, Ponsford, [47] concluded that in a transaction in "classic" bank money, the bank intermediary can guarantee the seller the settlement made by the buyer. In a Bitcoin operation, no intermediary can assume this role since it takes place in a peer-to-peer network [47]. Mikołajewicz, Alicja, and Anna [12] referred to various incidents that reflect the aforementioned assertions. The Cypriot and Greek crises have also revealed that Bitcoin makes it possible to circumvent the regulation on the movement of capital and thus to disrupt credit institutions [12]. In the Cypriot case, in 2013, the holders of a deposit account higher than 100000 euros, in particular, the Russians, rushed on the Bitcoin to avoid participating in the lease in. In Greece, in July 2015, Bitcoin transactions increased by 300% to circumvent the bank withdrawal regulations. The peak of daily transactions was thus recorded the week of July 6, 2015, following the result of the Greek referendum according to the statistics of coindesk.com. Countries with high inflation, such as Argentina and Venezuela, which have strict regulations on dollar purchases also have a high percentage of users. Bitcoin can thus appear as a safe haven to the point of making it a kind of digital gold. However, its volatility vis-à-vis the euro and the dollar must strongly temper this argument [48,16].

The discussion above leads this study to the most controversial issue or challenge faced by the virtual currency, i.e. volatility.

- *Volatility Issues*

The questionnaire asked respondents to opine whether they have made financial losses/gains due to volatility in the virtual currency such as Bitcoins. Majority of the respondents agree that they realise that there is a high level of volatility in using Bitcoins and users have made financial losses and gains due to such volatility (see table 27). Furthermore, the questionnaire also asked users to opine whether the cost of using virtual currencies increases due to continuous monitoring and calculating Bitcoin prices. Majority of the respondents agree that continuous monitoring and calculation is a considerable cost of using virtual currencies (table 28). Finally, the majority of the respondents also agreed that there is a high level of uncertainty and thus the purchasing power of the virtual currency is unstable (table 29).

Comparing the above findings with general literature it can be observed that they match with findings in other studies. For example, Sangeetha [32] argued that virtual currency has low acceptability and Bitcoin is not ultimately accepted directly as a means of payment. In fact, the prices are first set in traditional fiduciary currencies (USD, Euros, etc.) and then converted into Bitcoins at the current exchange rate. Bitcoin is therefore not considered as a currency in its own right. It does not serve as a unit of account [32]. The main reason for this limited acceptability is its high volatility vis-à-vis major currencies (see Fig.1 and Fig.2 below).

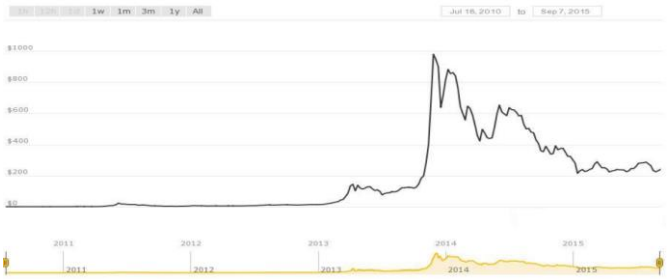

Fig 1:- Volatility in Bitcoins

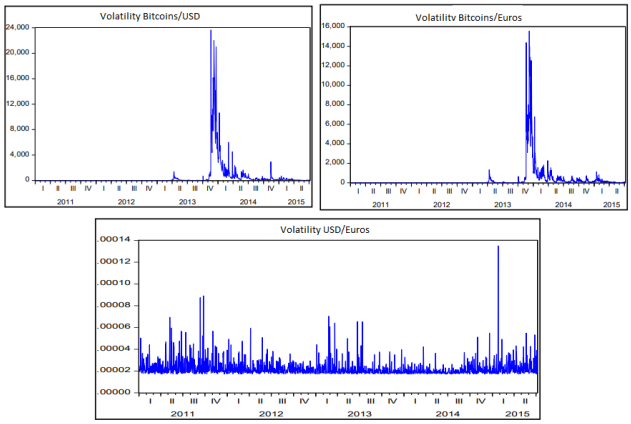

Fig 2:- Bitcoin Volatility compared to USD and Euros

The figures (1 and 2) above show that the volatility of Bitcoin is out of proportion to that of traditional currencies. This high volatility explains why Bitcoin is not used as a unit of account while the dollar and the euro area. If this were the case, merchants would be forced to continuously calculate prices, which would imply significant update costs [40]. Permanent price variability would also create uncertainty for the consumer who is used to relatively fixed prices. The high volatility of Bitcoin makes it, for now, unable to preserve value [23].

According to the statistics of coindesk.com, 1 BTC was worth 0.07 USD on 19/7/2010, 979,45 USD (+ 139991,14%) on 25/11/2013 and 239,77 USD (-75, 53%) on 7/9/2015. On the same dates, 1 € was successively 1.2957 USD, 1.3514 USD (+ 4.3%) and 1.1657 USD (- 12.26%). The purchasing power of Bitcoin is therefore highly unstable [8,15]. Its variations can expose its holders to spectacular losses or gains. Bitcoin cannot be considered a perfectly safe and liquid asset, which is the characteristic of currencies in countries where inflation is controlled [33,3].

3500 BTC are created daily, regardless of the conditions of supply and demand. There can be too many Bitcoins in circulation when the price drops and not enough when the price goes up. Hence a high volatility. If the cryptographic protocol is unassailable, the supply of Bitcoins cannot be manipulated, which would avoid any monetary illusion because of the absence of inflationary bias [41,23]. However, there is no guarantee that the growth rate of supply is economically optimal in the sense of Friedman (1960 cited in [45]).

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Another factor of volatility is the fact that any virtual currency has no intrinsic value. As concluded by a report published by the central bank of France 'Banque de France' Bitcoin is not backed by any real activity and/or underlying assets. No central bank regulates the conditions of supply and demand through monetary policy [30,43]. Its course is therefore complex to determine because, in essence, Bitcoin is "deterritorialized". It is therefore not the counterpart of any national or regional monetary base [19]. This lack of link goes beyond the proposals of the Austrian school which, if it defended the idea that legal money is issued by the state, proposed a currency attached to gold to ensure its stability [37,40,3]. An econometric study by Carroll and Victoria [14] confirms that the traditional determinants of exchange rates are not significant and speculative rumour-related behaviour may affect the price. Since its appearance, Bitcoin has been the victim of many "flash crashes" [14]. For example, on April 10, 2013, Bitcoin lost 61% of its dollar value (from the US $ 266 to the US $ 105) due to uncertainty over the conditions for resolving the Cyprus crisis. On August 19, 2015, it lost nearly 20% following the announcement of a possible fork (see above) and the massive sales of investors on the Bitfinex platform which accounts for about one-third of daily transactions of Bitcoin in dollars [41,46].

- *Bitcoin and finance*

The researcher asked respondents to compare the ability of Bitcoins in the field of finance as compared to paper-based and other digital currencies. Majority of the participants agree that due to low acceptability, Bitcoins are not being used for financing activities (table 30). Furthermore, the results also show that the majority of the participants agreed that there is no credit market for Bitcoins (table 31). Finally, the questionnaire results indicate that majority of the participants accept the fact that Bitcoins are vulnerable to speculative behaviour.

Similar results have been presented by other researchers such as Raeesi [28] who concluded that an important function of money is to allow agents to carry out financial transactions. They have access to savings vehicles, the credit market and financial markets. Banking systems operate on the principle of fractional reserves, which creates money [28]. The monetary environment proposed by Bitcoin is radically different with no fractional reserves, so no credit market or interest rate. Since each Bitcoin is unique, no duplication is possible [23]. This environment explains that the gains come today only from price changes. Hence the presence of speculative behaviour on the part of the holders of Bitcoins, according to the law of Gresham [34].

Nevertheless, conventional finance questions the development potential of Bitcoin as the denomination currency of financial transactions [35]. Since 2013, hedge funds have embarked on trading on Bitcoin. In February 2015, Crypto Facilities Ltd launched a forward that allows investors to take short and/or long positions with leverage on the Bitcoin-dollar price [41]. Since March 2015, the Financial Industry Regulatory Authority has agreed to market the first Bitcoin ETF, GBTC, on the OTC market in the United States. Since May 19, 2015, the New York Stock Exchange has been listing an index on Bitcoin, the NYXBT, and considering it as an emerging asset. Crowdfunding is also a vector for developing Bitcoin [4,3]. A growing number of start-ups are raising funds in Bitcoin again showing interest in cryptocurrency. Goldman Sachs has acted as a leader in raising funds for Circle Internet Financial, which provides services in the Bitcoin market [25,19].

Above all, traditional finance invests the field of Fintech to estimate the possible applications of cryptography. The NYSE and BBVA invested in the Coinbase platform in January 2015. The NASDAQ is testing a blockchain-based trading platform [2,13]. Raymaekers [16] anticipates that the technology used in the blockchain has the potential to alter the current financial environment. The generalisation of a peer-to-peer network in financial transactions could considerably simplify payment and settlement systems. This simplification of post-trade structures would imply savings of around 20 billion per year from 2022 [16]. The technology used by virtual currencies could, therefore, have a powerful impact on the business model of banks [4]. For Lindman et al. [20], the spread of crypto-currencies could even make credit institutions "superfluous" in the absence of reaction from them. One can also question the potential of crypto-currencies to solve, at least partially, the banking exclusion which affects today 2.5 billion people [20].

Bitcoin cannot be considered today as a currency in its own right. The absence of intrinsic value and legal tender results in a high volatility of its price which does not allow it to fulfil the traditional functions of money [8,26]. Nevertheless, the anonymity of the operations carried out and the reduction of the transaction costs can induce a development potential. In addition, the technology used for Bitcoin issuance and settlement of transactions offers opportunities for the financial system to change its practices [29,50]. In a decentralised peer-to-peer environment, such as that proposed by the blockchain, the role of banks could evolve. If virtual currencies are spreading massively in the economy, the question of their regulation, to protect users, and their impact on monetary policy will be acute [7, 20].

- *Illegal Use by Criminals and Terrorists*

The survey results showed that majority of the participants agree that virtual currencies are being used for criminal activities such as payment for drugs and other crimes (table 33). Furthermore, the results also indicate that the majority of the users agree that virtual currencies are being used for money laundering and terrorist financing (table 34). Furthermore, the results also show that the majority of the virtual currency users agree that vulnerability to misuse by criminals and terrorists is a key challenge for virtual currencies (table 35).

It can be observed that there are several studies reveal that virtual currency, and in particular Bitcoins, are widely used by criminals, especially in cases of money laundering and terrorist financing. It was interesting to see what users in our research think of these claims [38,17]. Money laundering and terrorist financing are possible through virtual currencies because of anonymity and non-traceability. Unlike users of

digital currencies who are convinced that two of the greatest benefits of this currency is anonymity and decentralisation, for law enforcement they represent a real problem [26,20]. The focus of this problem is the inability to monitor the virtual cryptocurrency market and the difficulty of investigating Bitcoin-related crimes [5]. In this sense, various government agencies in different countries have expressed their concerns and reports mentioning that Bitcoins are being effectively used for crimes and payment for petty crimes as well as major crimes such as terrorist financing [8,12]. The anonymity of Bitcoin financing is a source of threats for law enforcement agencies. In his testimony before the Senate Committee, J. Cormier of the RCMP Canada explained that the anonymity of virtual currencies is becoming a tool in the hands of criminals who constantly search for means of transfer and concealment of their illicit funds [46]. He gives as examples Silk Road and Liberty Reserve who used Bitcoin in the United States for drug trafficking. This makes this currency not only a threat to the economic integrity but also a threat to public security [49].

According to official reports by the Canadian government, although Bitcoin has several advantages, it poses a real threat to money laundering and terrorist financing. This fact is explained by the impossibility of tracing Bitcoins and identifying users [45,46]. The lack of regulation on virtual currencies and the lack of a centralised body that could provide information to the police seem to be the biggest problem for these control structures [50]. So, there is a paradox, user perceived benefits such as anonymity, the speed of transfer and decentralisation along with problems that these characteristics generate for law enforcement agencies and opportunities for criminals and terrorists [43].

According to Meiklejohn, et al. [44] who compared the informal means of transferring funds such as cash, hawala and virtual currencies. The difficulty of surveillance, the anonymity and the speed of these means represent a financial threat according to the control structures which, therefore, do not hesitate to stigmatise them [44]. At the same time, these informal practices have important benefits that contribute enormously to remittances in some areas where the financial infrastructure is not sufficiently developed [40,22]. In this regard, the Senate Banking Committee (cited by Khan, et al. [42]) has taken a stand in favour of virtual money. In light of its study, the Committee believes that the opportunities offered by digital currencies and related technologies and businesses outperform the risks they present [18,3]. Therefore, the Canadian government intends to play a significant role in the development of this technology [49].

Beyond the technological barriers to its diffusion, the most well-known uses of Bitcoin have hit the headlines and pose ethical problems. This virtual currency is often associated with the development of Darknet [21,15]. Thus, because of the anonymity of transactions, which can be total through the use of filters such as "Bitcoin fog", Bitcoin is considered as one of the preferred means of payment for acquiring illegal goods and services (drugs, identity papers, arms trafficking, murder, prostitution ...) [47,42], but also to promote the financing of terrorism, tax evasion or money laundering. These problems were revealed during the closure of the Silk Road site by US authorities in October 2013 [17,15].

VI. CONCLUSIONS

This research thus concludes that there is a significant amount of research showing that technology (the blockchain and virtual currency) offers a lot of economic advantages. Users of virtual currency are taking interest in adopting new technologies for a variety of purposes which include personal communication such as transferring videos, documents, information and images and now they are also taking interest in using technology for economic and commercial transactions. One of the main benefits for users is low transaction cost [30,13]. Digital currency technology can be used in the delivery process of public services and also applied to the financial system for the creation of a new, more modern and secure national payment system [15,46].

Furthermore, this research also concludes that people take interest in virtual currency because they need it for a variety of purposes in the virtual world. Virtual currency is required for virtual gamers, social media and virtual trade markets, and users even pay real money to buy virtual currencies. These results are highly consistent with broader literature as many authors have reached the same conclusions as shown in the previous section.

This research concludes that the results and discussion about the stability and security of virtual currency as compared to paper currency and other digital currency is contradictory and lacks universal concord. Some authors highlight various benefits of virtual currency and assessed that there are higher stability and security, however, there are also other authors who have highlighted a wide variety of risks associated with the virtual currency that make them less stable and insecure and higher risk for its users.

Despite the various benefits of virtual currencies such as Bitcoins, a range of weaknesses and limitations have been identified which in turn generate threats and challenges for its users. The results and discussion indicate that there are significant risks to the security of virtual currencies users can lose their currency without the possibility of recovery due to various risks which include loss of private key, theft of computer or other devices, and hacking incidents. In addition, the bankruptcy of account manager is also a significant risks and literature reveals a number of incidents after which virtual currency users lost a significant amount of currency simply because the account manager went bankrupt and there was no possibility to recover the loss. Due to the lack of intermediaries in virtual currencies, there is a significant risk that users may lose their currency and investment because there is no bank or intermediary to provide guarantee and insurance for transactions. In addition, another important challenge for virtual currency and its users is a high level of volatility. Since Bitcoins are not accepted as a direct means of payment and the prices are first set on traditional fiduciary currencies and then converted into Bitcoins, therefore virtual currencies are unstable and volatile and are vulnerable to speculation. Due to high volatility, Bitcoins are not being used as a unit of account as paper currencies are.

Furthermore, another important challenge for virtual currencies is the inability to be used in financing activities as real currencies are. The main function of money is to enable actors to carry out financial transactions but virtual currencies are not unit of account and there are no credit market or financial market for virtual currencies. Nevertheless, various institutions have seen opportunities in virtual currencies and different initiatives have been taken by Financial Industry Regulatory Authority (USA), the New York Stock Exchange, and Goldman Sachs, among others. Finally, one of the main challenges faced by virtual currencies is the misuse by criminals and terrorists. There have been significant and valid concerns raised by various law enforcement agencies in different countries including the USA and the UK that virtual currencies provide considerable opportunities for money laundering and terrorist financing. For virtual currencies to develop and grow and dominate in the world, this challenge is one of the critical ones for its image in the minds and perceptions of current and potential users. Unless it is safe and secure as well as free from criminal activities, it is unlikely that virtual currencies will overpower paper currency and other digital currencies.

REFERENCES

[1]. Raymaekers, Wim. "Cryptocurrency Bitcoin: Disruption, challenges and opportunities." Journal of Payments Strategy & Systems 9.1 (2015): 30-46.
[2]. Bogliolo, Alessandro, et al. "Virtual currency and reputation-based cooperation incentives in user-centric networks." Wireless Communications and Mobile Computing Conference (IWCMC), 2012 8th International. IEEE, 2012.
[3]. Richter, Chris, Sascha Kraus, and Ricarda B. Bouncken. "Virtual currencies like Bitcoin as a paradigm shift in the field of transactions." The International Business & Economics Research Journal (Online) 14.4 (2015): 575.
[4]. Sas, Corina, and Irni Eliana Khairuddin. "Design for Trust: An exploration of the challenges and opportunities of bitcoin users." Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. ACM, 2017.
[5]. Turpin, Jonathan B. "Bitcoin: The economic case for a global, virtual currency operating in an unexplored legal framework." Ind. J. Global Legal Stud. 21 (2014): 335.
[6]. Ly, Matthew Kien-Meng. "Coining Bitcoin's Legal-Bits: Examining the Regulatory Framework for Bitcoin and Virtual Currencies." Harv. JL & Tech. 27 (2013): 587.
[7]. Nazir, Mohamed, and Carrie Siu Man Lui. "Opportunities and challenges for real money trading in virtual world." (2014): 182-188.
[8]. Pflaum, Isaac, and Emmeline Hateley. "A bit of a problem: National and extraterritorial regulation of virtual currency in the age of financial disintermediation." Geo. J. Int'l L. 45 (2013): 1169.
[9]. Chuen, David Lee Kuo, ed. Handbook of digital currency: Bitcoin, innovation, financial instruments, and big data. Academic Press, 2015.
[10]. Dyhrberg, Anne Haubo. "Hedging capabilities of bitcoin. Is it the virtual gold?." Finance Research Letters 16 (2016): 139-144.
[11]. Greene, Claire, and Oz Shy. "E-cash and virtual currency as alternative payment methods." Journal of Payments Strategy & Systems 8.3 (2014): 274-288.
[12]. Mikołajewicz-Woźniak, Alicja, and Anna Scheibe. "Virtual currency schemes–the future of financial services." Foresight17.4 (2015): 365-377.
[13]. Dyhrberg, Anne Haubo. "Bitcoin, gold and the dollar–A GARCH volatility analysis." Finance Research Letters 16 (2016): 85-92.
[14]. Carroll, John M., and Victoria Bellotti. "Creating value together: The emerging design space of peer-to-peer currency and exchange." Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing. ACM, 2015.
[15]. Zheng, Zibin, et al. "Blockchain challenges and opportunities: A survey." Work Pap.–2016 (2016).
[16]. Raymaekers, Wim. "Cryptocurrency Bitcoin: Disruption, challenges and opportunities." Journal of Payments Strategy & Systems 9.1 (2015): 30-46.
[17]. Sas, Corina, and Irni Eliana Khairuddin. "Design for Trust: An exploration of the challenges and opportunities of bitcoin users." Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. ACM, 2017.
[18]. Al-Saqaf, Walid, and Nicolas Seidler. "Blockchain technology for social impact: opportunities and challenges ahead." Journal of Cyber Policy 2.3 (2017): 338-354.
[19]. Vandervort, David. "Challenges and opportunities associated with a bitcoin-based transaction rating system." International Conference on Financial Cryptography and Data Security. Springer, Berlin, Heidelberg, 2014.
[20]. Lindman, Juho, Virpi Kristiina Tuunainen, and Matti Rossi. "Opportunities and risks of Blockchain Technologies–a research agenda." (2017).
[21]. Lindman, Juho, Virpi Kristiina Tuunainen, and Matti Rossi. "Opportunities and risks of Blockchain Technologies–a research agenda." (2017).
[22]. Jaag, Christian, and Christian Bach. "Blockchain technology and cryptocurrencies: Opportunities for postal financial services." The Changing Postal and Delivery Sector. Springer, Cham, 2017. 205-221.
[23]. Keppitiyagama, Chamath. "Bitcoins are Here to Stay: Are We Ready?." (2017).
[24]. de Caria, Riccardo. "A Digital Revolution in International Trade? The International Legal Framework for Blockchain Technologies, Virtual Currencies and Smart Contracts: Challenges and Opportunities." Modernizing International Trade Law to Support Innovation and Sustainable Development. UNCITRAL 50th Anniversary Congress. da verificare, 2017.
[25]. Jaag, Christian, and Christian Bach. Cryptocurrencies: New opportunities for postal financial services. No. 0052. 2015.
[26]. Richter, Chris, Sascha Kraus, and Ricarda B. Bouncken. "Virtual currencies like Bitcoin as a paradigm shift in the field of transactions." The International Business & Economics Research Journal (Online) 14.4 (2015): 575.

[27]. Deepika, Er Puneet Er, and Er Rajdeep Kaur. "Cryptocurrency: Trends, Perspectives and Challenges."
[28]. Raeesi, Reza. "The Silk Road, Bitcoins and the global prohibition regime on the international trade in illicit drugs: Can this storm be weathered?." Glendon Journal of International Studies/Revue d'études internationales de Glendon 8.1-2 (2015).
[29]. Nigam, Ashutosh. "Emerging Challenges and Issues Peer to Peer Cryptocurrency Payment System with Special focus on Bitcoin."
[30]. Meisser, Luzius. "Bitcoin-A Promise of Freedom." Next Generation Finance. U Lempka R. Stallard, PD (2013). Next generation finance: adapting the financial services industry to changes in technology, regulation and consumer behaviour. Petersfield, Hampshire: Harriman House Ltd (2013).
[31]. Acharya, Shubhashree, Andrea Thomas, and Bhagyashree Pani. "Volatility of Bitcoin and Its Implication to be a Currency." (2018).
[32]. Sangeetha, Ms R. "ISSUES AND CHALLENGES OF CRYPTOCURRENCY–A CRITICAL APPROACH." International Journal of Research in Humanities, Arts and Science: 91.
[33]. Daj, Alexis. "Virtual Currencies–monetary policy dilemmas and regulatory challenges." Bulletin of the Transilvania University of Brasov. Economic Sciences. Series V 10.2 (2017): 217-222.
[34]. MATANOVIĆ, ALEKSANDAR. "Blockchain/Cryptocurrencies and Cybersecurity, Threats and Opportunities." the 9th International Conference on Business Information Security (BISEC-2017). 2017.
[35]. Ingram, Claire, and Marcel Morisse. "Almost an MNC: Bitcoin Entrepreneurs' Use of Collective Resources and Decoupling to Build Legitimacy." System Sciences (HICSS), 2016 49th Hawaii International Conference on. IEEE, 2016.
[36]. Matta, Martina, Ilaria Lunesu, and Michele Marchesi. "Is Bitcoin's Market Predictable? Analysis of Web Search and Social Media." International Joint Conference on Knowledge Discovery, Knowledge Engineering, and Knowledge Management. Springer, Cham, 2015.
[37]. Francis, Evan. "Bitcoin: Not So Scary." (2015).
[38]. Giungato, Pasquale, et al. "Current Trends in Sustainability of Bitcoins and Related Blockchain Technology." Sustainability9.12 (2017): 2214.
[39]. Szefer, Jakub, and Ruby B. Lee. "Bitdeposit: Deterring attacks and abuses of cloud computing services through economic measures." Cluster, Cloud and Grid Computing (CCGrid), 2013 13th IEEE/ACM International Symposium on. IEEE, 2013.
[40]. Asharaf, S., and S. Adarsh, eds. Decentralized Computing Using Blockchain Technologies and Smart Contracts: Emerging Research and Opportunities: Emerging Research and Opportunities. IGI Global, 2017.
[41]. Kadyrov, R. E., and I. V. Prokhorov. "Regulating cryptocurrencies: new challenges to economic security and problems created by individuals involved in the schemes of laundering cryptocurrencies-generated profits." KnE Social Sciences 3.2 (2018): 383-393.
[42]. Khan, Burhan Ul Islam, et al. "A compendious study of online payment systems: Past developments, present impact, and future considerations." International Journal of Advanced Computer Science and Applications 8.5 (2017): 256-71.
[43]. Tasca, Paolo. "Digital currencies: Principles, trends, opportunities, and risks." (2015).
[44]. Meiklejohn, Sarah, et al. "A fistful of bitcoins: characterizing payments among men with no names." Proceedings of the 2013 conference on Internet measurement conference. ACM, 2013.
[45]. Martins, Sergio, and Yang Yang. "Introduction to bitcoins: a pseudo-anonymous electronic currency system." Proceedings of the 2011 Conference of the Center for Advanced Studies on Collaborative Research. IBM Corp., 2011.
[46]. Bogucki, Brianna. "Buying Votes in the 21st Century: The Potential Use of Bitcoins and Blockchain Technology in Electronic Voting Reform." Asper Rev. Int'l Bus. & Trade L. 17 (2017): 59.
[47]. Ponsford, Matthew P. "A Comparative Analysis of Bitcoin and Other Decentralised Virtual Currencies: Legal Regulation in the People's Republic of China, Canada, and the United States." HKJ Legal Stud. 9 (2015): 29.
[48]. Hurich, Petter. "The virtual is real: An argument for characterizing bitcoins as private property." Banking & Finance Law Review 31.3 (2016): 573.
[49]. Henry, Christopher S., Kim P. Huynh, and Gradon Nicholls. "Bitcoin awareness and usage in Canada." Journal of Digital Banking 2.4 (2018): 311-337.
[50]. Alcantara, Christopher, and Caroline Dick. "Decolonization in a Digital Age: Cryptocurrencies and Indigenous Self-Determination in Canada." Canadian Journal of Law & Society/La Revue Canadienne Droit et Société 32.1 (2017): 19-35.
[51]. Bailey, David Evans. "Virternity." (2017).
[52]. Babbie, E. R. (2015). The practice of social research. Nelson Education.
[53]. Banks, M., and Zeitlyn, D. (2015). Visual methods in social research. Sage.
[54]. Bernard, H. R., and Bernard, H. R. (2012). Social research methods: Qualitative and quantitative approaches. Sage.
[55]. Brinkmann, S. (2014). Interview (pp. 1008-1010). Springer New York.
[56]. Bryman, A. and Bell, E., (2011) Business Research Methods, 3rd edition, Oxford: Oxford: University Press
[57]. Bryman, A. (2015). Social research methods. Oxford university press.
[58]. Bryman, A., and Bell, E. (2015). Business research methods. Oxford University Press, USA.
[59]. Bryman. A. (2012) Social Research Methods, 4th edition, Oxford: Oxford University Press
[60]. Clarke, A. E., and Charmaz, K. (Eds.). (2014). Grounded Theory and Situational Analysis: Sage Benchmarks in Social Research Methods: History, Essentials and Debates in Grounded Theory. Sage.
[61]. Cohen, L., Manion, L., and Morrison, K. (2013). Research methods in education. Routledge.

II. Appendix A – Survey Results

Demographic Characteristics

Table 1	Gender
Male	52%
Female	48%
Table 2	Age
less than 20	21%
21 to 30	33%
31 to 40	18%
41 to 50	15%
over 50	13%
Table 3	Education
Under Graduate	32%
Graduate	26%
Post Graduate	27%
PhD	15%
Table 4	Profession
Students	18%
e-commerce	43%
Full time Employee	12%
Freelancer	24%
Others	3%
Table 5	Income
Under USD 5000	33%
USD 5001 to USD 10000	26%
USD 10001 to USD 15000	14%
USD 15001 to USD 20000	16%
USD 20001 to USD 25000	8%
over USD 25000	3%

Opportunities for Virtual Currencies

Transaction Cost						
Table 6	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currencies have low transaction costs	24	48	1	9	18	100
Table 7	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currencies have low transaction costs than Paypal and similar payment platforms	23	50	5	9	13	100
Table 8	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currencies have low transaction costs than banking payment methods	28	39	3	13	17	100
Convenience						
Table 9	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual Currencies are more convenient as compared to paper currency because the transfer is faster and easier	23	43	4	15	15	100
Table 10	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual Currencies are more convenient as compared to paper currency because transaction does not require physical prescence	28	44	4	21	3	100

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of sender and receiver						
Table 11	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual Currencies are more convenient as compared to paper currency because parties do not require bank acocunts and other requirements	19	38	3	24	16	100
Use in Virtual World						
Table 12	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
People use virtual currencies in virtual world transactions for example in Virtual games	20	42	4	18	16	100
Table 13	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
People use virtual currencies to conduct trade of virtual objects at social platforms and virtual markets	22	45	3	10	20	100
Table 14	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
People often buy virtual currency by paying real currency to use it in virtual world	25	45	3	23	4	100
Stability and Security						
Table 15	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
virtual currencies are more stable than paper currencies and other digital currencies	24	45	5	7	19	100
Table 16	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
virtual currencies are more secure than paper currencies and other digital currencies	22	48	4	15	10	99
Table 17	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
virtual currencies are immune to inflation	25	35	4	21	15	100

Challenges for Virtual Currencies

Security						
Table 18	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
it is impossible to recover Bitcoin currency if the owner loses his/her private security key	22	46	5	11	16	100
Table 19	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currency is vulnerable to theft of computer and other equipment	23	36	5	13	23	100
Table 20	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currency security is vulnerable to cyber criminals and hackers	17	46	5	18	14	100
Bankruptcy						
Table 21	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currency users may face loss of wealth if account manager goes bankrupt	12	43	3	19	23	100
Table 22	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currency users have no insurance on Bitcoin	25	47	3	11	14	100
Table 23	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)

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Virtual currency users are unable to recover their currency in case of bankruptcy	16	35	4	25	20	100
No Intermediary						
Table 24	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
there is no guarantee for traders in virtual currency as there is for paper currency traders provided by banks and other intermediary	24	45	1	23	7	100
Table 25	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
despite the fact that lack of intermediary reeduces transaction cost, the risk for virtual currency increases	23	35	9	16	17	100
Table 26	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
despite the fact that peer to peer network and transactions increase the speed of transactions, it also increases the risk of loss of currency and consequently wealth of the users of virtual currency	14	37	11	23	15	100
Volatility						
Table 27	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currency users have made financial losses and gains due to high level of volatility in currencies such as Bitcoins	21	43	2	24	10	100
Table 28	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
continuous monitoring and calculation is a considerable cost of using virtual currencies	22	40	8	12	18	100
Table 29	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
the purchasing power of virtual currency is unstable because of uncertainty and volatility in prices	21	35	10	23	11	100
Bitcoin and Finance						
Table 30	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
one of the challenges of Virtual currency is that it can not be used for financing activities	17	38	12	23	10	100
Table 31	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
an important limitation in virtual currency such as bitcoins is that there is no credit market	23	38	12	12	15	100
Table 32	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
one of the main challenges faced by bitcoins is that it is vulnerable to speculative behaviour	23	36	13	13	15	100
Money Laundering and Terrorist Financing						
Table 33	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currencies are being used for criminal activities such as payment for drugs and other crimes	17	41	13	17	12	100
Table 34	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
Virtual currrencies are being used for money laundering and terrorist financing	10	43	12	17	18	100
Table 35	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total (%)
vulnerability to misuse by criminals and terrorists is a key challenge for virtual currencies	21	35	10	16	18	100