Role of Bitcoin on Economy

Anu Singhal, Aqila Rafiuddin

***Abstract*— This paper is an outcome of the exploratory study on the perception and role of Bitcoin in the economy and its impact on society with a special emphasis on Dubai. The overall reaction is mixed towards different variables from various groups in the sample. This paper highlights and discusses the issues on both sides of bitcoin particularly in interest of financial institutions and economists with a prospective transformation, with an application of advance technology, and revolution with a digital currency.**

***Index Terms*— Bitcoin, Cryptography, Digital currencies, Economy Dubai, Smart City, Islamic Banking**

I. Introduction

BITCOIN is an important term which is actively reported by various media agencies and discussed amongst the likes of economic and financial analysts. What is Bitcoin? It is a digital currency which serves as a decentralized financial open source software and provides an optimal combination of cryptography (hence, the term cryptocurrency for Bitcoin is also apt), digital encryption, online transactions and peer-to-peer networking. It can be used for transaction of money or as a protective cache or depository of digital money and is free of service charges.

"Mining" [1] in the world of Bitcoin is transaction processing, in which transaction records of current Bitcoin public ledger, known as blocks, are added to the record of past transactions, known as the block chain. Bitcoin provides a reward in exchange for the mining services provided by several "miners" throughout the world. This is a necessary incentive, as without the miners, the Bitcoin technology wouldn't be able to operate. For being an effective miner, specialized & high-performance equipment is used. For even more efficient use of resources, mining "pools" are created. A mining pool is basically a number of miners mining on blocks as a group. Even though the blocks are mined faster, the rewards have to be divided in proportion to the efforts put in by individual miners as compared to the entire group.

The network generates a maximum of 50 bitcoins per block and this number decreases over time with the usage of the software, and it is thus designed such that no more than 21 million bitcoins [2] exist in the world. This is a contrast to traditional money which is unlimited and prone to over- printing.

The concept of Bitcoin was originally described and proposed by Wei Dan in 1998 [3], who conceptualized this cryptocurrency to be an alternative to traditional money which is currently centralized, and government-backed. The first official implementation of this concept was conceived [4][5] and published in 2009. Bitcoin has been drawing the attention of media, academicians, economists and practitioners.

The concept of money began with barter, progressed to the first metal money in 1000 B.C. which continues to be in practice in the form of paper money and metal coins. It has also evolved enough to be represented by plastic in the form of credit cards, ATM cards, and so on which in turn has been supported by physical payment machines of banks. Online banking has also found its way to the computers of many, and by extension, mobile banking has also come into play. In the ascent of money, several currencies exist in the world. Due to the fact that majority of the countries in the world have their own currency, there are about 167 currencies as of 2012. The advent of a global currency has divided the society into three groups: those who are against Bitcoin, those who are in support of Bitcoin, and the largest of these groups, those who do not know about Bitcoin.

A bitcoin's price is calculated by its supply and its demand. Owing to the fact that the market for Bitcoin is currently small, because from the total limited bitcoins owned by people across the globe only 34% are active as of

2013, the price of a bitcoin is volatile because small amounts of money are sufficient to waver the market price.

Dubai is one out of seven Emirates that make up the United Arab Emirates (U.A.E.). Dubai is to host Expo 2020 under the theme of "Connecting Minds, Creating the Future". Dubai government has launched a plan to transform U.A.E. to a Smart Country which is a seven year plan, and to transform Dubai to a Smart City which is a three year plan. This research attempts to use these two goals and align them with what Bitcoin has to offer, and also outlines and emphasizes how the use of Bitcoin can advance the economies of other countries in a similar way.

It would seem that the reasons for a global currency, as suggested by Bitcoin, are political and social in nature. Citizens and the government attach sentiment and pride to what represents their nation which includes their flag, anthem and even their currency. "Some people are tempted to view such symbols as they do their flags and national constitutional documents, and the loss of such symbols can be considered as a national loss" [6].

Anu Singhal is a fourth year student pursuing B.E. Computer Science in BITS, Pilani – Dubai campus. (e-mail: anusinghal@hotmail.com)

Aqila Rafiuddin is a Ph.D. research scholar in BITS, Pilani – Dubai campus. (e-mail: aqila@dubai.bits-pilani.ac.in

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II. Literature Review

As compared to other areas in the financial system Bitcoin is in its nascent stage and relatively studies are limited. Currency has continuously evolved over the past centuries across the globe as per regulations and the value according to the exchange rate fluctuations.

The architecture of Bitcoin has a margin of error has been allowed for fraud because it has been treated as an unavoidable and inevitable factor [4]. Bitcoin uses the concept of global digital single currency which allows for cryptographic proof in lieu of trust, and solves the problem of over-printing of traditional money that contributes towards inflation, amongst several other benefits [7]. It also keeps a record of each transaction in what is called a block chain, which acts as a public ledger for each transaction ever made, and so each bitcoin has a history that can be traced. Four variables regulation, security, acceptance and accessibility are identified in the ecosystem of Bitcoin in general [8] along with human factor and the technical factor. The six elements of human factor are users, companies, exchanges, associations, miners and investors.

There is a need for a common single currency for all 191 nations by 2024 and a global monetary union to collectively save the transaction fees.

This work depends on the research of an economy and analyzing the impact that Bitcoin will have on it. For the researcher's convenience because of limited resources, the economy of Dubai has been chosen as a case study. Dubai has launched its strategy towards becoming a "Smart City", in three years' time through the links of all government services and providing them for easy access and free use, available and efficient through the use of smart devices. It aims to link administration, public safety, and education and health care sectors. Keeping in accordance with Dubai's vision of a "smarter" economy and its inclination towards making a hub for Islamic economy in the Middle East, a survey is conducted to explore the impact on Islamic Banking. Irrespective of banking practices, this work can be extrapolated to the economy of another country with respect to its environment and financial and economic conditions.

Islamic Banking is governed by the principles of Shari'ah. According to the studies [9] it is summarised in that money is either precious or food, is abundant and freely available, is durable and does not spoil or corrode, has intrinsic value, exists in creation and acts as a medium of exchange. In this research, it is also attempted to judge the degree to which Bitcoin is in alignment with these principles.

Bitcoin is a global currency and it is much cause for debate worldwide. The research has unveiled several advantages that come with such a financial model. One of the most basic benefits would be to the common citizen who plans on sending and receiving money. In the current situation they are made to pay heavy taxes for international transactions, which is a problem that Bitcoin solves for the citizens. For the same reasons, even multinational corporations stand to benefit from the said advantage. Vancouver is home to the first Bitcoin Automatic Teller Machine (ATM). Mitchell Demeter of Bitcoiniacs, the firm that installed the ATM, said, "Right now, if I wanted to send you $5,000, and say you're in Toronto, it would take three to five days for a wire transfer to come through and it would cost me $35, and it would cost you a fee. With Bitcoin, I can send you that money instantly and it would cost pennies" [10]. With a staggering number of different currencies, money exchange tends to come with transaction fee as well as a service charge for institutions that carry out the service. The elimination of multiple currencies can save a lot of resources and cut unnecessary spending. This is not just a theory but also a practice in some parts of the world [11] [12] [13]. The best example of single currency is Euro ease of financial transactions between the European Union members. The European Commission estimated that due to the adoption of a single currency 13 to 20 billion of Euro were saved annually [14]. Free trade is prohibited by the difference in currency exchange rates, neighboring countries that operate under a common currency tend to trade and exchange more often with each other.

III. Objectives

As per the discussions and forum on bitcoin it is understood that all the stakeholders in the society have expressed mixed opinion which are predominantly negatively biased reports.

It is inferred that though Bitcoin may have its drawbacks like every new technology does, it can serve as a great tool from social, economic and financial point of view. Therefore this research and work is an attempt to project on both sides of the Bitcoin taking into both internal and external factors into consideration.

- Perception of the Bitcoin amongst individuals
- Impact of bitcoin in the economy of Dubai

IV. Purpose and Scope of Research

The purpose of this work is to explore the use of Bitcoin to further the cause of technological advancement, encourage free trade and transactions, and store monetary sums in a safe repository, while reviewing various aspects of Islamic Banking and assessing whether Bitcoin is compliant with the reviewed principles, and keeping with the vision of a technologically advanced economy. The scope of this research is limited to the population of Dubai to understand growth prospectus in the GCC region. The findings of this research are not limited to Dubai, as the location is a case study not the subject of study. This work can be appropriately be used for the economies of other countries, keeping economic variables in mind.

V. Methodology and Data Collection

This paper is an exploratory study through questionnaire method based on purposive sampling technique which divides the sample into two groups of society – corporate or business respondents and individual respondents. On the basis of perception of Bitcoin, the sample divided itself into those who are pro-Bitcoin, those who are anti-Bitcoin, those who are neutral about Bitcoin and those who are unaware of

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it.

The sample has been surveyed through a detailed questionnaire that assesses the basic awareness of Bitcoin and the questions are designed to highlight identified variables.

The mode of survey is e-mail and telephonic discussions or personal face-to-face meetings to collate data. This form of interaction also reduces the overall cost of the research and keeps with the time limitations. The former instrument has been chosen for effective data collection and its analysis.

The survey method has been used to assess the awareness of digital currencies, particularly Bitcoin, in Dubai, opinions of professionals in economic and financial fields on the impact of bitcoin on the economy in general and with respect to Dubai, the compliance of Bitcoin with the preferred Islamic Banking solutions in Dubai, and to gauge their responses to the four variables of the Bitcoin ecosystem such as acceptance, accessibility, regulations and security. This information and analysis of it is essential for a comprehensive understanding of the market requirements in Dubai as well as worldwide and Bitcoin's compliance with it.

The sample size is 70 and has been divided equally into the aforementioned two groups.

The sample pool consists of economic and financial professionals, multinational enthusiasts of Bitcoin phenomenon from over the world, executives of financial firms in Dubai. Along with this pool, some industries of Dubai that have already adopted Bitcoin practices by accepting bitcoins as a mode of currency, are also surveyed and assessed based on their experience and judgment. The mode of survey is e-mail and face-to-face discussions or personal meetings to collate data. This form of interaction also reduces the overall cost of the research and keeps with the time limitations. The former instrument has been chosen for effective data collection and its analysis.

In the first group of corporate users, economic & financial professionals, top level managers and executives of companies like ABB, Noor Bank, Emirates Business Management, Citibank, Dubai Investment Properties LLC, Scientechnic, Intercoil, Al Islami Foods, Joy Alukkas and several other multinational companies were included. This category of respondents directly impacts the regulation and acceptance of Bitcoin. Along with this pool some industries of Dubai, like First Mobile Wallet FZ LLC, that have already adopted Bitcoin practices by accepting bitcoins as a mode of currency are also surveyed and assessed based on their experience and judgment. The questions are formulated in a logical progression commencing with basic questions to judge the awareness of the sample on the topic of Bitcoin, because one of the aspects of this research is to gauge what professionals know and perceive Bitcoin to be. If the sample has a basic understanding of what the technology is, and a basic comprehension of digital currencies, then the questions progress to more complex issues and stimulate flow of thought. The questionnaire is divided into two sections. Section A attempts to comprehend the respondent's knowledge of Bitcoin. Section B consists of questions about the application & impact of combining Bitcoin with Islamic Banking and Bitcoin's level of compliance with Shari'ah principles.

The second group of respondents is individual users and consumers that form the market base for Bitcoin. They are not expected to have any prior understanding of Bitcoin or its field. The questions have been designed in a logical progression starting from simple questions that attempt to understand first, the scope that Bitcoin has in terms of online transactions, and second, the awareness of the said technology. The questionnaire is divided into two sections. Section A records the respondent's time spent on the Internet, the purpose of it and their frequency of using online transaction facilities. Section B attempts to understand the respondent's level of awareness of Bitcoin.

The questionnaires have been circulated through E-mail, LinkedIn, and Facebook.

VI. Statistical Tool

Hypotheses have been framed to explore the identified variables, followed by testing of the hypotheses through t-test. Three hypotheses have been formulated, of which t-test is applied to the first two:

H1: There is a significant difference in the mean value of nature of work between the corporate and individual users in terms of awareness of bitcoin.

H2: There is a significant difference in the mean value of corporate and individual users in terms of trust & growth.

H3: Corporate users believe in the potential of application of Bitcoin in Islamic banking. .

VII. Results and Discussion

Table I: Statistical Analysis of Hypothesis H1

Mean	Standard Deviation	T-Value	p Value
34.0	10.1	0.08	0.945*
33.0	20.0		

Significant at 95 % confidence level

Table II: Statistical Analysis of Hypothesis H2

Mean	Standard Deviation	T-Value	p Value
33.0	14.1	-1.14	0.459*
44.50	2.12		

Significant at 95 % confidence level

Hypothesis H1 enables a comparative analysis on whether the nature of a respondent's work – business professional or student or part-time worker – affects his/her awareness of the concept of Bitcoin. The P-Value is 0.945 as shown in Table I, and hence this hypothesis has failed to be rejected. From the analysis of the survey results, it is apparent that those who are professionals in the area of business, finance or economics have better awareness of Bitcoin as compared to students or part-time workers.

Hypothesis H2 attempts to draw a correlation between trust & growth. Both groups of the sample pools have

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exhibited that where there is trust in Bitcoin as a mode of payment and a form of currency, there is a positive expected growth. This is visible in Table II, and since the P-Value is 0.459, the hypothesis H2 has failed to be rejected. Therefore, irrespective of the nature of their work, those who believe Bitcoin is secure also believe in its growth.

The third Hypothesis H3 measures the respondents' belief in Bitcoin being accepted in Islamic Banking. As there hasn't been much development in the research of Bitcoin & Islamic Banking, respondents are generally unsure about the degree to which Bitcoin complies with Shari'ah principles. This is evident from Fig. I as majority of the respondents were fence-sitters when they were presented with the question, "In the next 5 years, do you think Bitcoin will be adopted by Islamic Banking institutions?" Since this question has been presented only to the corporate or business professionals, it has been considered appropriate to not use t-test for this particular hypothesis. 73% of the respondents say they can't say whether or not Bitcoin can be accepted in Islamic Banking, whereas 15% say it won't be and 12% sat it will.

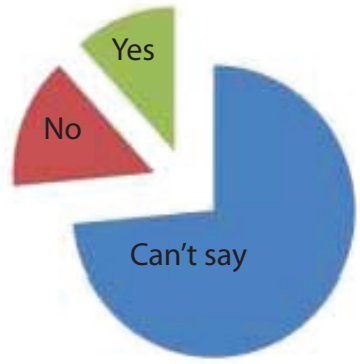

Figure I: Pie chart analysis of Hypothesis H3

VIII. Applications

This work has shed light on the various social, financial and economic benefits of using Bitcoin as a single global currency. Bitcoin is a technology that dates back to five years, its application has been noticed and actively practiced since early 2013 or late 2012.

There are several enthusiasts of bitcoins in the Dubai and they use them to carry out transactions to propagate its use in the Emirate. It is a reality, yet Bitcoin hasn't received much publicity apart from the largely negative speculation of the media. There are, although, several Bitcoin enthusiasts and they have strong views to support the use of bitcoins as a currency, a form of money and a medium of exchange. It has several entrepreneurs promoting the potential of this currency as it is tax-free. Many start-ups prefer to deal and transact in bitcoins owing to the fact that it does not add up to the costs they already have to endure. The process of globalization is unstoppable, as has been seen by the advent of Internet and E-mail even though many didn't believe in them to begin with.

In several ways, it can be inferred that use of digital money is more secure than traditional money. Firstly, traditional money is at risk of causing hyperinflation. Hyperinflation is an economic event that occurs due to rapid rise of market prices. Money supply is a theory that suggests hyperinflation is due to increasing amounts of money which is not supported by proportional growth in output. During the Global Economic Crisis of 2008, the U.S. Federal Reserve decided to introduce the concept of Quantitative Easing. Quantitative Easing is a monetary policy that banks employ to stimulate economic growth by electronically creating currency and then buying assets with it. Traditional money can cause this problem because of its unlimited supply and centralized authority. Bitcoin on the other hand has a finite number of 21 million bitcoins that can be generated and is fully decentralized. The technology is programmed to accept a particular rate at which bitcoins are generated and how they are created, so there is no way to "create" currency. Therefore, any attempts to intervene in the system and simulate an event analogous to 'Quantitative Easing' will be unsuccessful. Secondly, controlled supply of currency can prevent inflation. Inflation is subject to the laws of supply and demand. Since Bitcoin is a decentralized monetary system, if demand were to drastically drop or reduce to nothing, the currency would be rejected and would not be cause inflation. The second parameter for inflation to occur is supply, and since it is established that the number of bitcoins is finite we can infer that supply is constant and fixed. However, this very fact that gives Bitcoin the upper hand is argued to be its flaw. It is pointed out that since Bitcoin is finite and will soon become scarce, it resembles gold in that respect. This means that rarity will cause the population to save rather than spend, which in turn contributes to economic depression. Therefore, it is apparent that to make further progress in the adoption of bitcoins as a reliable currency, the technology must evolve and deal with its loopholes. Warren Buffet claims that Bitcoin may not last the next 10 to 20 years, and that it is not a durable means of exchange. Entrepreneur Ryan Selkis proposes the insurance of Bitcoin and its safety with his project, Inscrypto. Inscrypto aims to reduce or eliminate Bitcoin volatility by separating Bitcoin as a currency and Bitcoin as an investment. Hence, characteristics like traceability and finiteness are both benefits and risks of Bitcoin as of now.

The benefits of Bitcoin are many, but several loopholes have also been identified by economists and government officials. While many conclude that Bitcoin has a low inflation risk, others reason that Bitcoin is deflationary. Since the number of bitcoins in the world will be a finite number of 21 million, this would eliminate risks of However, for it to be backed by a Central Bank, or a government, the population has to use it more and the media will have to report the benefits of using Bitcoin instead of giving more concentration that required on controversies.

As Dubai launches its strategy towards a Smart City, taking steps towards gaining a comprehensive knowledge of the positive and negative aspects of bitcoins will prove to be significantly helpful and will usher in the use of facilities without having to pay service charges or exchange currency rates.

Bitcoin roughly fits into the definition of money as per Islamic teaching. It is abundant and freely available, and

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making more money out of money transacted is also not practiced as there is no tax involved, unless the transaction is required to speed up. Bitcoins are durable and do not get spoilt or corroded. If the government would like to practice Islamic Banking through bitcoins and wants to regulate it such that bitcoins don't sponsor things that they do not condone or deem worthy, then a solution for that would be to put a constitution in place for authorizing loans, investments and funding. When these policies are put in place, they provide a certain degree of control when it comes to transactions involving activities that Islamic Banking does not preach. The practices of Islamic banking are appreciated in many parts of the world, and an optimal combination of both Bitcoin and Islamic Banking can result in an open economy and one that is not bound by barriers of fees or taxes.

In this work, a case study of Dubai has been researched. During the research, two goals of Dubai were analyzed which were the seven year plan for a smarter U.A.E. and the three year plan for a smarter Dubai. Firstly, for a smarter U.A.E. of strategies launched [21], these are relevant for this case study:

1. GDP to grow by 65% in seven years
2. Education Sector to be Smarter
3. Housing applications to be processed and completed within 2 years
4. Health Sector to be smarter
5. Logistics to be smarter

Research unfolded several ways that Bitcoin can be used for achieving these goals. From approximately Dh67 billion in

2001, the GDP leaped to Dh134 billion in 2009 and then it swelled to an all-time high of Dh146 billion in 2011 [22]. This rise of GDP boosted the trade sector which in turncaused growth in the non-oil economy of U.A.E., including shopping malls, retail sector, online trading, etc. Since it is apparent from the figures that the trade sector forms a major part of U.A.E.'s GDP, it can be inferred that online trading and retail are booming industries. Through the use of Bitcoin technology, not only can faster and cheaper transactions take place online, but also bitcoins can be a simpler means of shopping in outlets. In 2011, Dubai attracted 9 million tourists from all over the world, is home to a bustling Cruise Business to over twenty countries, and draws immense number of tourists from Eastern Europe, Africa, the Indian Subcontinent and the Americas to its souks, lavish shopping malls and Dubai Duty Free amongst many other things. This number of tourists is projected to become 25 million tourists in the year 2020. In such a diverse and large population, where floating population is more than static population, there is a staggering amount of currencies and exchanges involved which inhibits purchase and transactions to a certain extent. However, if it were to be a single global currency there would be no boundaries set by currency conversion rates and charges. Hence, shopping will be more enjoyable and the industries are expected to grow to their potential. Education, health and logistics sectors can be made smarter by introducing payment through bitcoins. As stated previously, the number of global tourists in U.A.E. can stand to benefit from such facilities if they have no barriers in currency conversion. Education can be made smarter by attracting overseas teaching through online Bitcoin payment. This is an added incentive as it is a global currency and there is no conversion involved. The money is kept safe in virtual wallets of teachers, and there are multiple software and websites that offer this facility. Logistics include land, air and sea infrastructure. The costs of logistics for the government will be subsidized if it deals in a single currency, instead of losing time & resources while converting the currencies of large amounts of money. Secondly, for a smarter Dubai the strategies relevant to the study are as mentioned:

1. Smart Transport
2. Smart Economy

These goals can be reached faster using bitcoins. For smart transport, the tourist aspect is that when residents or non- residents don't necessarily have Dirhams. Instead they tend to have their local currency which is converted. They are also likely to not have cars or a private means of transport. If they are to use Dubai's efficient and well-connected public means of transport, then conversion of currency is involved yet again. The goal of the government is to carry out all these transactions on a smart device. Bitcoin has a lot of potential to be the answer the government is looking for. Several websites have virtual wallet software that work in sync with bitcoins. Anyone from any part of the world can have a virtual wallet and bitcoins. This wallet is saved on smart devices in the form of an application or can be accessed on the website in the browser of the smart device. Since the government wants to make its services available on smart devices, Bitcoin provides a fitting solution to do this without any currency conversion or extra charges or taxes. Dubai Taxis are also rapidly moving embracing technology by providing free Wi-Fi to customers riding their cabs. There is also an interactive screen which uses this Wi-Fi to enable shopping to customers while they travel. These taxis are actively used by tourists who arrive from airports, and they can avail the facilities of booking hotel rooms, travel packages, and even online retail shopping. All this can be synced and integrated through the use of bitcoins which will encourage customers to shop and not be alien to the currency.

The second strategy is to have a smarter economy. Vancouver in Canada has revolutionized money transaction by installing the world's first Bitcoin automatic teller machine (ATM) in October 2013 [23]. Installing similar ATMs across the city will certainly contribute towards reaching the goal of a smarter economy. Spending power of the customers will increase and therefore push the budget line further to accommodate higher levels of purchase. A propagation of these ATMs will induce more of the population to recognize Bitcoin as a currency and a valid medium of exchange. The result of this case study on Dubai is not only subject to the economy of Dubai. This can be superimposed for the economy of other countries by adjusting the variables according to the financial situation of the respective country.

This aspect research is not limited to Islamic Banking, but generally to the economy of a country irrespective of their banking practices. Bitcoin stands for globalization and

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stands to be a revolution in economic history if it is adopted optimally with a combination of effective security and regulation.

IX. Conclusion

Bitcoin has potential to replace traditional money. In order to do that, it must first evolve into a more secure form of money. Liaising with other forms of online payment and involving the government in insurance policies for protection against theft, are suggested steps for Bitcoin to grow out of its volatile stage. Bitcoin can possibly be protected in a way that is analogous to the protection of depositors by the bank through Federal Deposit Insurance Committee (FDIC), thereby minimizing the risks of theft.

According to the findings of the present work it is concluded that changes brought in the society are adapted gradually and rapid progress can be possible only through the efforts of showing all the stake holders the benefits of the possibility of a single currency.

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