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## Financial Implications of Crypto Currency (Bitcoin) for the Ghanaian and Other Economies

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### **Abstract:**

*In January 2009, the whole world was introduced to a new financial invention called Bitcoin. This coin is intended to accelerate globalisation of the financial market. Significantly, the inventor is credited as the first to succeed in solving the double-spending challenges associated with digital currency. Prior to the invention, a white paper about the bitcoin was authored and released in 2008 under the name, Satoshi Nakamoto. However, the name, Satoshi Nakamoto, remains a mystery; the original inventor of the bitcoin remains a mirage to the financial world. Some analysts believe a pseudonym, rather than an original name, was used in creating the bitcoin. The main purpose of this research was to assess the financial impact of crypto currency, specifically bitcoin, on the Ghanaian and other economies across the globe. The systematic exploratory technique, an example of the mixed methods approach to scientific inquiry, was adapted for this research. Data required for the conduct of this research were obtained mainly from secondary sources. These included text books, journals, newspaper publications, and digital currency markets. Findings from the research revealed divergent views on the prospects of bitcoins in the medium- and long-term: some experts believed a bitcoin would soon trade at 1BTC: US\$12,000 while others believed the future of the digital currency cannot be predicted with relative ease, what would become of the bitcoin in the medium- and long-term. The findings revealed some price volatilities in the bitcoin market. This notwithstanding, the digital currency has made remarkable strides in value since 2009 till date. The study recommended the need for governments to introduce measures that would ensure anti-money laundering, and “know-your-customer” controls; reduce the level of anonymity and privacy to eventually minimise use of bitcoins in criminal activities. There is the need for intelligence agencies of governments to engage the services of individuals who are technologically savvy to understand, operate and control the bitcoin system, which is technologically more complex than most of the computer systems used in day-to-day operations in various organisations. Institutions of higher learning and professional bodies could integrate the study of crypto currency into individual business related programmes.*

**Keywords:** Bitcoin, bitcoin exchange, crypto, crypto currency, digital currency market, and virtual currency market

### **1. Introduction**

On 3<sup>rd</sup> January, 2009, the whole world woke up to a new financial invention called Bitcoin. Prior to this, a white paper about the bitcoin was authored and released in 2008. The white paper was published on Networking P2P Foundation. This coin is intended to accelerate globalisation of the financial market; it is intended to remove most, if not all, the bottlenecks witnessed in the financial world. A bitcoin is described as a crypto (hidden) currency; it is a medium of payment with universal acceptance. The original inventor of the bitcoin remains a mirage to the financial world (anonymous, n.d.).

However, the name used in the publication of the white paper and eventually “carried on” to the day of invention of the bitcoin by financial connoisseurs is Satoshi Nakamoto. Stated differently, Satoshi Nakamoto is believed to have created the original reference of the bitcoin and its implementation; this person is believed to have authored the white paper in 2008. The first block chain database was devised as part of the implementation process of the bitcoin. Eventually and significantly, the inventor is credited as the first to succeed in solving the double-spending challenges associated with digital currency. The name, Satoshi Nakamoto, remains a mystery. Some analysts believe a pseudonym, rather than an original name, was used in creating the bitcoin (Hodge, 2018).

Bitcoin is believed to be the maiden globally decentralised digital currency (anonymous, n.d.; Yellin, Aratari & Pagliery, n.d.). That is, the first payment system without sole administrator; and without a central bank. There are no middlemen required in bitcoin transactions. This implies no banks are required in the transaction process. This underscored the significance of the present research, that is, to examine how the activities of bitcoin operators affect the investments of individual and corporate investors; and the effect of their activities on the revenue mobilisation efforts of governments of various economies across the globe.

### 1.1. Background of the Study

Discussion in this section is presented under the following sub-headings: measurement of bitcoins, markets for bitcoins, and historical prices and value of bitcoins.

#### 1.1.1. Measurement of Bitcoins

Anonymous (n.d.) and Yellin et al.(n.d.) note bitcoins are measured in multiples of a satoshi. Its ledger started on 3<sup>rd</sup> January, 2009; and has a supply limit of 21,000,000; the computer algorithm ensures there are no more than 21,000,000 bitcoins in circulation. Each bitcoin can be divided into different fractional parts; each bitcoin can have a fractional part of up to eight (8) digits. This means a bitcoin can be divided into 100,000,000 units ( $1 \div 100,000,000 = 0.00000001$ ). A unit of bitcoin is called satoshi. The smallest unit in a bitcoin is the satoshi (0.00000001 BTC). A bitcoin with a fractional part up to three (3) digits is called a millibitcoin ( $1 \div 1,000 = 0.001$  BTC).

#### 1.1.2. Markets for Bitcoins

In order to sustain and consolidate gains from the bitcoin market, several exchange market places have been established to facilitate its trading activities. Notable among these include Bitfinex, Mt. Gox, Coinbase GDAX, Bitstamp, Coinone, Kraken, Bitcoin Suisse, Xapo, LocalBitcoins, ShapeShift, Changelly, Ripple, Litecoin, Dogecoin, Monero, BitGo, Airbitz, WazirX, Zebpay, Unocoin, LakeBTC, Coined, Coinsecure, BitQuick, BitcoinFundi, Wirex, TradeSatoshi, BTC100, BitcoinToYou, Mercado Bitcoin, Luno, itBit, Coinfloor, Bitsane, RippleFox, USD X, Allcoin, Cryptomate, Bitcoin Indonesia, BX Thailand, Bitso, bitFlyer, CEX.IO, OKCoin.cn, Korbit, Bithumb, Gatecoin, LiteBit.eu, Jubi, CHBTC, TuxExchange, BitBay, BitMarket, BTER, Liqui, Cryptopia, Exmo, LiveCoin, HitBTC, GDAX, Bittrex, and Poloniex, among others (Coinpedia.org, 2018). These markets allow traders to buy and sell bitcoins using currencies of different countries. Collectively, the foregoing markets are often called Bitcoin Exchanges.

The leading bitcoin exchange in China is called BTC China. In Japan, Mt. Gox exchange dominates the bitcoin market. These two exchanges record strong volumes of bitcoin trading at the global level. Other bitcoin exchanges with greater investor participation include Coinbase GDAX, Bitstamp, Blockchain, and Bitfinex.

Data gathered from the Blockchain's website revealed as at October 2013, there were about 11.9 million bitcoins in circulation. The total number of bitcoins in circulation as at 15<sup>th</sup> January, 2018 was 16.8 million. This represents 80% ( $(16.8 \text{ million} \div 21 \text{ million}) \times 100\% = 0.8 \times 100\% = 80\%$ ) of total bitcoins mined (21 million). This implies there are only 4.2 million bitcoins left to be circulated. In percentage terms, this translates into 20% ( $(4.2 \text{ million} \div 21 \text{ million}) \times 100\% = 0.2 \times 100\% = 20\%$ ). However, it is very likely the number of bitcoins would not be increased beyond its current threshold of 21 million; Satoshi Nakamoto has not given any indication of further increase in volume of bitcoins.

#### 1.1.3. Historical Prices and Value of Bitcoins

Value of the bitcoin relative to the United States Dollar has evolved over the years. For instance, as at July 2010, 1 bitcoin (BTC) was traded for US\$0.08. Earlier in the same month, 1 BTC traded for US\$0.008. This translates into 900% ( $(US\$0.08 - US\$0.008) \div US\$0.008 \times 100\% = 900\%$ ) increase in price over the period. Bitcoin continued to gain prominence among local and international traders as a unique medium of exchange, and between February 2011 and April 2011, 1 BTC exchanged for US\$1. On 8<sup>th</sup> July, 2011, there was a surge in value of the bitcoin; 1 BTC exchanged for US\$31. This financial peak was followed by a "bubble burst:" as at December 2011, 1BTC traded for US\$2. The bitcoin regained "momentum" and exchanged for 1BTC: US\$13(La Monica, 2013).

However, the foregoing development did not impact negatively on the financial effervescence of the bitcoin. In April 2013, the value of bitcoins increased from 1 BTC to US\$266. In a matter of days, the value plummeted to 1BTC: US\$54. Later in the same month (April 2013), the value surged to 1BTC: US\$150. The value remained unchanged until June 2013 when it decreased to 1BTC: US\$70. At the close of day on 24<sup>th</sup> October, 2013, 1BTC exchanged for US\$233.40. This was a considerable increase (about 233.43%) relative to the exchange rate (US\$70) around June 2013 (La Monica, 2013).

For the first time in the history of the bitcoin, 1BTC exchanged for more than US\$3,000 on 5<sup>th</sup> August, 2017. Barely a week later, that is, on 12<sup>th</sup> August, 2017, 1BTC traded for more than US\$4,000. On 14<sup>th</sup> August, 2017, 1BTC was exchanged for US\$4,400. In September, 2017, 1BTC traded at US\$5,013.91. As at 5<sup>th</sup> March, 2018, 1BTC was equivalent to US\$11,455.50, representing a staggering increase in price of more than 128.47% ( $(US\$11,455.50 - US\$5,013.91) \div US\$5,013.91 \times 100\% = 1.28474 \times 100\% = 128.474\%$ ) over the six-month period.

### 1.2. Problem Statement

One of the newly introduced investment vehicles in the financial markets across the globe is the bitcoin. It is believed to be one of the fastest medium of growing one's investment in the financial world. Although many investment pundits have hailed the digital currency as a useful investment tool, it is fraught with many challenges; investors in the digital currency markets are prone to risk inherent in technological challenges. In recent years, it is uncommon to hear of a hack into the system of a digital currency company by predatory hackers, resulting in loss of huge sums of money often quantifiable in the United States dollars, to the hackers. Sanger (2012) and Kasner (2015) note failure on the part of management of digital currency markets to identify and develop strategies that would protect their systems would have dire consequences for the industry and investors. This corroborates Baboo and Kumar (2013) who found the absence of adequate security measures could have strong negative implications for firms in the virtual currency industry. For instance, in 2016, the system of Bitfinex, one of the Bitcoin Exchanges in the world, was hacked into and bitcoins worth tens of millions of dollars were loss to hackers. Also, 2018, the system of Coincheck, a Japanese digital exchange, was

hacked into, resulting in the loss of investments worth US\$530 million. The target, however, was the Singaporean-based NEM coins exchange.

The general business problem is the inability of Bitcoin Exchanges in the digital currency markets to develop and implement measures that would curb, significantly, security breaches; and ensure the valuable investments of investors are adequately protected. Bertot, Jaeger and Hansen (2012) believe firms in the virtual currency industry require novel strategies to effectively avert the activities of predatory hackers who periodically hack into their systems to deny investors of their valuable investments. Though evidence of the problem exists, there are no studies to clearly establish the financial implications of bitcoins for economies.

The specific business problem is the level of employee skills and training needed in information technology digital currency control application for various Bitcoin Exchanges in the crypto currency industry to minimise the incidence of huge investment losses to hackers. The present study sought to examine how the activities of digital currency markets affect the financial development and growth of economies, including Ghana.

### *1.3. Research Objectives*

#### 1.3.1. General Objective

The main objective of this research was to assess the financial impact of cryptocurrency, specifically bitcoin, on the Ghanaian and other economies across the globe.

#### 1.3.2. Specific Objectives

Specifically, the research sought to achieve the following objectives:

- Examine the measurement module and value of bitcoins.
- Evaluate the economic benefits and challenges associated with use of bitcoins.
- Analyse regulatory measures on bitcoins.
- Make recommendations for successful adoption and implementation of the bitcoin for rapid socio-economic development and growth of the Ghanaian and other economies.

## **2. Literature Review**

The topic underpinning the present study is the "Financial Implications of Crypto currency (Bitcoin) for the Ghanaian and Other Economies." The main purpose of this research was to examine the financial impact of the activities of the crypto currency industry, specifically bitcoin markets, on the Ghanaian and other economies across the globe. A review of existing literature in the study area is presented in this section; a synthesis of literature for the current research is presented in this section. In a scientific inquiry such as this, it is imperative to identify a relationship between the reviewed literature and research objective or objectives; and between the literature review and the research problem. It behooved the researcher to ensure these relationships exist; and this is evidenced in the current research. The main question that undergirded the research was: "What are the financial implications of crypto currency (bitcoin) for the Ghanaian and other economies?" Data required for the literature review were obtained from text books, journals, newspaper publications, and digital currency markets. The following key words were used to generate relevant information from the Google Search Engine and other databases: bitcoin, bitcoin exchange, crypto, cryptocurrency, digital currency market, and virtual currency market. Discussions in this section were categorised into the following sub-themes: benefits of bitcoin, challenges associated with use of bitcoins, and regulatory measures on bitcoin. The discussions contributed significantly to the purpose of the research, that is, the identification of regulatory measures that would enhance the positive financial contribution of the crypto currency industry to the growth of the Ghanaian and other economies across the globe.

### *2.1. Benefits of Bitcoins*

Several reasons have been ascribed to justify the use of bitcoins as a reliable means of exchange in local and international transactions (Price, 2016; Reutzell, Hochstein & Higgins, 2018; Rooney, 2013; Yellin et al.). Some of these reasons include first, the absence of potential middlemen such as banks and other deposit-taking financial institutions. This allows traders to avoid the challenges associated with using banks for business transaction purposes. Second, financial activities and transactions of bitcoin are not regulated by central banks; the sanctions or approvals of central banks are not required to use the bitcoin. Here, strict supervision and imposition of taxes and charges through the commercial banks are avoided.

Third, using mobile apps and computers, traders could circulate bitcoins among themselves. The mode of transmission is not distinct from what pertains in the realm of digital cash transaction system. Like mobile money transactions, bitcoins limit the amount of money not in circulation in various economies; bitcoins reduce, considerably, the amount of money kept in personal vaults in homes and offices. It is envisaged bitcoin and other digital currencies would ensure the financial inclusion of more than 2.5 billion under-banked individuals across the globe. As noted earlier, there are over 16.8 million bitcoins in circulation. Given the price of each bitcoin at US\$11,455.50 (as at 5<sup>th</sup> March, 2018), there is about US\$192,452,400,000 (US\$11,455.5 x 16,800,000 bitcoins = US\$192,452,400,000) in circulation through bitcoin trading in various economies across the globe.

Fourth, individuals and organisations seeking to book hotel accommodations for leisure and business purposes could conclude such transactions on Expedia.com, using bitcoins. Fifth, institutions and families seeking to acquire furniture for offices and homes could finalise their transactions on Overstock.com, using bitcoins. Sixth, parents and young adults interested in acquiring Xbox games and other products could purchase them, using bitcoins.

Seventh, bitcoin is a strong substitute for credit cards; it makes local and international payments easy given that strings and regulations attached to banking activities are virtually non-existent in this case. Small- and medium-sized businesses could employ bitcoins in their transactions since they do not attract fees and charges. Eighth, bitcoin facilitates trade and business within and among economies: individuals are able to conclude transactions with relative ease; necessary goods and services for trade purposes are obtained devoid of stringent foreign currency bottlenecks.

Ninth, bitcoin serves as a major source of wealth creation for investors. Like gold, other valuable minerals and stable currencies, individuals invest in bitcoin with the expectation that it would surge in value to increase return on their investments. As an example, an individual who bought 100 bitcoins when each was trading at 1BTC: US\$13, and held on till when each was trading at 1BTC: US\$11,455.50 would derive US\$11,442.50 ( $US\$11,455.50 - US\$13.00 = US\$11,442.50$ ) from the investment in each bitcoin. In all, the investor would be US\$1,144,250 ( $US\$11,442.50 \times 100 \text{ bitcoins} = US\$1,144,250$ ) richer. With an initial investment of US\$1,300 ( $US\$13 \times 100 \text{ bitcoins} = US\$1,300$ ), the investor would earn US\$1,145,550 ( $US\$11,455.5 \times 100 \text{ bitcoins} = US\$1,145,550$ ) as total return on investment; and net return on investment of US\$1,144,250 ( $US\$1,145,550 - US\$1,300 = US\$1,144,250$ ).

Finally, trading in bitcoin serves as a major source of investment; proceeds from investment in bitcoins could contribute to economic growth. In our earlier example, an individual with an initial investment of US\$1,300 as at December 2011 could be worth US\$11,455.50 as at 5<sup>th</sup> March 2018. Similarly, an investor who purchased 200 bitcoins when it traded at 1BTC: US\$0.008 would have invested US\$1.60 ( $US\$0.008 \times 200 \text{ bitcoins} = US\$1.60$ ) at the investment date. Today, this investor is worth US\$2,291,100 ( $US\$11,455.50 \times 200 \text{ bitcoins} = US\$2,291,100$ ); the return on his or her investment is US\$2,291,098.40 ( $US\$2,291,100 - US\$1.60 = US\$2,291,098.40$ ).

As noted earlier, an investor could purchase a satoshi (fraction) of a bitcoin; one is not obligated to buy a full bitcoin. As an example, though a bitcoin sells at US\$11,455.50 at the time of preparing this write-up, an investor is at liberty to buy say, US\$10, US\$20, US\$100 or US\$5,000 worth of satoshi (a fraction of the bitcoin); the investor is at liberty to purchase a full bitcoin at US\$11,455.50 or in multiples of bitcoins, that is, two or more bitcoins. These investments could contribute significantly to the overall gross domestic product (GDP) of the implied economy. The implication is a country stands to benefit a great deal from successful transactions in bitcoin trading.

## 2.2. Challenges Associated with Use of Bitcoins

In spite of the merits associated with use of the crypto currency as a universal medium of exchange in business transactions, Pagliery (2013), Romm (2018), Sanger (2012), and Yellin et al. believe it is fraught with some setbacks. One of the major setbacks is security concerns. The advent of improved technology has brought in its wake some challenges including hacking, among others, which could affect, negatively, the investment fortunes of existing and potential investors. For instance, in 2016, the system of Bitfinex was hacked into by predatory hackers. This resulted in loss of over US\$10 million in bitcoins. Also, on 26<sup>th</sup> January, 2018, the system of a Japanese digital exchange, Coincheck, was hacked into, resulting in the loss of US\$530 million. The target, however, was Singaporean-based NEM coins. There are instances where clients' bitcoins have been fled with by some firms on the bitcoin exchange.

In addition, holders of bitcoins have the opportunity to purchase goods and service on anonymity; buyers could purchase products without disclosing their identity; transactions require only use of wallet identity numbers. This may sound refreshing to "genuine" traders who would like to "hide" their identity in the Internet market essentially, for security reasons. However, in times of theft, it may be difficult to trace the perpetrator or perpetrators for redress. Anonymity has made bitcoin exchanges appropriate hub for some individuals to engage in illicit activities and purchase drugs, which hitherto, may not be sold to those buyers. Thus, bitcoin exchanges promote the culture of substance abuse; the exchanges allow individuals to trade in socially unapproved substances. Some individuals hide behind the cloak of bitcoin's anonymity to hire assassins, engage in sex trafficking; and trade in child pornography. Trading in bitcoins is carried out in a virtual environment. Unfortunately, an investor's bitcoin wallet could be destroyed by a virus, or the investor may accidentally delete the information from the system (Yellin et al.). This may lead to loss of total investment. Again, individuals with little or no knowledge in the use of computer and its related software may find it difficult to participate in the transactions. At best, potential investors with deficiency in the use of computer could rely on others to conclude their transactions. This may lead to password disclosure to third parties and eventual dissipation of an investor's total investment by the former.

Unlike bank accounts, investments in bitcoin are not backed or guaranteed by the central banks of economies in which they are traded. In the United States of America, the Federal Deposit Insurance Corporation (FDIC) guarantees a standard refund limit of US\$250,000 per FDIC-insured bank, and per category of ownership in times of liquidation of a bank. The FDIC insures deposits based on types of ownership and title of accounts held by depositors. In Ghana, no such amount has been predetermined. However, in times of liquidation, the Central Bank intervenes to ensure amicable settlement of any financial impasse between the bank and its depositors.

Also, it is believed bitcoin exchanges serve as a "fertile" ground for terrorist groups to mobilise funds for their nefarious activities. Funding activities of Al-Qaida, Boko Haram, Islamic State in Syria (ISIS), terrorist groups in Iraq, Afghanistan and Pakistan, among others, has been a source of worry to the international community; funding the activities of terrorist groups clandestinely thwarts global efforts aimed at ensuring cease fire and promoting peace across the globe. The ability to trade on grounds of anonymity stems the financial tide in favour of the terrorist groups. Stated differently, bitcoins afford some individuals and groups the opportunity to engage in money laundering, a financial transaction with widespread condemnation from most economies throughout the world.

Further, the activities of bitcoin traders are not regulated by central banks. As a result, it becomes difficult for various economies, through their central banks, to determine volumes of trade in bitcoins and the amount to be charged in taxes to support government activities. Indeed, the activities of bitcoin investors could boost economies through GDP growth, emanating from increased investments. However, direct tax revenue mobilisation by the government may not be derived since investors are not under any direct obligation to pay taxes on their financial gains. Besides, governments have little or no control, over the bitcoin and its related transactions.

Globally, most economies utilise the following monetary aggregates: M0, M1, M2, M3, among others. In Ghana, the following monetary aggregates are in vogue: M1, M2, and M2+. The Bank of Ghana terms M1 as the money supply or narrow money. It consists of currency with the public (that is, currency outside the banking system) and demand deposits. In Kenya and many other economic jurisdictions, definition of M1 includes time deposits. M2 is termed by the Bank of Ghana as the total liquidity or broad money. It includes M1 plus quasi-money which comprises savings deposit, time deposits, and certificates of deposit with the deposit-money banks (DMBs). M2+ is the broader definition of money; it comprises M2 plus foreign currency. Foreign currency is denoted by (+). Ghana uses M1, M2, and M2+ to target her macro-economic objectives (Inkoom, 2009).

One of the numerous efforts geared toward strengthening and improving the financial sub-sector's contribution to GDP growth is encouraging the general public to increase the aggregation of money that passes through the banking system. That is, discouraging the growth of M1 monetary aggregate in the financial system. Evidently, the prevailing bitcoin system does not support the foregoing cause; bitcoin transactions do not require middlemen – no banks are required to initiate and finalise transactions – this affects the volume of money that passes through the banking system.

Stalnaker (2013) reveals the world's largest bitcoin exchange is located in China. Also, Baidu, one of the largest Internet firms in the world, is incorporated in China. Baidu, Incorporated integrates and uses bitcoins. Though refreshing news to the People's Republic of China, there are dire financial implications for other countries across the globe. For instance, should ownership of the largest bitcoin exchange translate into highest share in bitcoin ownership (say, 50.1% or more), China stands the chance of influencing bitcoin-related transactions and controlling the digital currency across the globe.

Value of the Chinese Renminbi relative to the American Dollar is low. However, holding large volumes of bitcoins would help China to reduce the value of American Dollars in her possession; fewer bitcoins would be required to pay off huge amounts in American Dollars. Similarly, strong stakes in bitcoins would allow China to exert economic influence in Africa; China could purchase more commodities from Africa at relatively "low" prices due to value of the bitcoin. Thus, African and other continents' economies stand to lose a great deal from China's strong interest in the digital currency.

Sporadic surge in value of the digital currency could worsen the plight of already-weak currencies of some economies on the African continent. As at 5<sup>th</sup> March, 2018, 1BTC traded for US\$11,455.50. The implication is the United States may face challenges in concluding oil contracts with oil-producing countries that have no membership in the Organisation of Petroleum Exporting Countries (OPEC), and denominate their crude oil in bitcoin: more dollars would be required to pay for the same number of barrels of crude oil in bitcoins.

### *2.3. Regulatory Measures on Bitcoin*

As stated in the preceding section, bitcoin transactions are mostly unregulated. However, countries such Australia, Japan, China, the United States of America (USA), Canada, Venezuela, Russia, South Korea, Switzerland, European Union and the United Kingdom (UK), India, Singapore, South Africa, Ghana, and Nigeria have begun considering regulations to avert any financial tsunami by the digital currency operators. These countries believe they must take proactive steps to protect the investment purse of their citizens and foreign investors within their jurisdiction. This initiative is expected to address the issue of lack of control over the cryptocurrency. Regulatory measures adapted by each of the foregoing economies are explained, briefly, in the following section.

#### 2.3.1. Australia

In 2015, the Australian government decided to adopt a "hands-off" approach to the regulation of cryptocurrencies in the country. However, in August 2017, the Commonwealth Bank of Australia was saddled with a financial scandal. This compelled the Australian government to revise her initial stance from hands-off approach to adaption of more stringent rules to regulate digital currency and anti-money laundering as pertained in other jurisdictions such as Japan. The following affirms the position of the Australian Taxation Office (ATO) on bitcoins:

Transacting with bitcoin is akin to a barter arrangement, with similar tax consequences. Our view is that bitcoin is neither money nor a foreign currency, and the supply of bitcoin is not a financial supply for goods and services tax (GST) purposes. Bitcoin is, however, an asset for capital gains tax (CGT) purposes. (ATO as cited in Nelson, 2018, para. 25)

Contrary to the stance of the Australian Taxation Office, lawmakers from the Labour and Coalition Parties, the two leading political parties in Australia, have called on the Reserve Bank of Australia (RBA) to accept cryptocurrencies as an official form of currency. Presently, Australia lacks a clear-cut policy on cryptocurrency, and this had an adverse effect on the performance of the economy towards the end of 2017: Australian crypto currency brokers stopped making deposits in Australian dollars.

#### 2.3.2. Japan

Nelson (2018) reveals regulatory measures on crypto currency in Japan are neither stringent nor liberal; Japan appears to be more receptive to the activities of crypto currency operators than its neighbours such as South Korea and

China. Japan is believed to be the investment hub of crypto currency operators who find regulatory measures in other Asian countries hostile and unfriendly.

Plans are underway to introduce a crypto currency called J-pop band in Japan. However, it is uncertain if the Japanese government would approve this novel digital currency. The Japanese interest in crypto currencies suffered a setback, following the predatory hack on 26<sup>th</sup> January, 2018 of a Japanese exchange, resulting in the loss of about US\$530 million worth of NEM coins. This development raised public uproar and the need for the Japanese Financial Services Agency (FSA) to ensure close supervision on digital currency trading in the country.

### 2.3.3. China

Adaptation and implementation of crypto currency in China increased significantly in 2017. That is, in 2017, the adoption of the digital currency in China was higher than recorded in any other country across the globe. In 2017, bitcoin miners in China constituted over 50% of the total bitcoin mining population throughout the world. However, in the midst of the sporadic surge in digital currency trading, the Chinese government is strongly committed to weeding out corruption and discouraging capital outflows (Nelson, 2018; Stalnaker, 2013).

As part of measures aimed at achieving the foregoing objectives, the Chinese government, in January 2018, introduced strict rules to regulate crypto currency operations in the country. For instance, there is a ban on initial coin offerings (ICOs), all bank accounts related to crypto currency exchanges have been frozen, bitcoin miners have been prevented from continuing with their activities, and a nationwide ban on mobile and Internet access to all cryptocurrency-related activities and transactions has been rolled out. The sudden change in stance related to crypto currency operations in China has surprised many digital currency analysts.

However, the surprise among analysts is assuaged by the fact that these measures were adopted strategically by the Chinese government to resolve important economic issues, that is, stamp out corruption and discourage capital flight.

### 2.3.4. United States of America (USA)

In 2013, the United States Senate raised concerns about the rapid growth of bitcoin in the financial space; the Senate thought it necessary to assess the effectiveness of the decentralised digital currency that has attracted global attention. To this end, in November 2013, the United States Senate Committee on Homeland Security and Government Affairs began hearing from various stakeholders as a step towards crafting laws to regulate the activities of bitcoin exchanges in the country (Pagliery, 2013; Nelson, 2018).

Contrary to its initial stance, the United States Senate, earlier in 2018, deemed it appropriate to dialogue with stakeholders in the bitcoin industry before drafting comprehensive laws to regulate the digital currency. However, in recent times, some lawmakers have raised concerns about the “geometric” increase in value of the bitcoin. The United States Justice Department believes it requires the assistance of other government agencies and civilians to apprehend criminals who operate through the bitcoin system. Some authorities in the United States have bemoaned the possibility of the digital currency becoming equivalent to a bank account in Switzerland; and have expressed interest in partnering other G20 member nations to avert its occurrence.

Lawmakers in the United States have expressed reservations about new developments in the bitcoin market, that is, the introduction of initial coin offerings (ICOs), which involve raising funds through the use of digital tokens. The lawmakers believe the existing Federal laws must be beefed up to effectively deal with fraud and theft that maybe associated with use of the digital currency. In the United States, it is hoped through concerted efforts of the Justice Department, Commodity Futures Trading Commission, Securities and Exchange Commission, and Senate Banking Committee, among others, a comprehensive legislation could be passed to regulate, effectively, activities of the digital currency industry. However, users of bitcoin in the United States have urged government to stay clear of the digital currency system, so it could flourish (Bitcoin Magazine, 2018; Nelson, 2018; Reutz et al., 2018; Romm, 2018).

Some academic researchers in the United States affirm the crypto currency is endowed with innovative potentials and that, any attempt by the authorities to impose burdensome regulations on its usage in the country could push it outside its borders. Some financial pundits believe bitcoins are on a powerful upward trajectory; and any attempt to derail its forward movement in the financial market may be an exercise in futility; what is required are regulatory measures to devoid the digital currency of harmful socio-economic effects.

### 2.3.5. Canada

Canada holds an enviable record in the world of digital currency: it is the first country in the world to enact a national law on digital currencies; on 19th June, 2014, the Canadian Parliament approved Bill C-31 on digital currencies after weeks of several hearings and testimonies by key stakeholders. In Canada, the Financial Consumer Agency (FCA) does not accept digital currencies as a legal tender, save Canadian bank notes and coins. Nelson (2018) describes Canada as the most transparent country (with the exception of Switzerland) when it comes to understanding and appreciating laws related to the crypto currency industry (Nelson, 2018).

Generally, authorities in Canada are not strict on digital currency regulations; periodic regulatory requirements and guidance are issued to facilitate the activities of traders and investors in the digital currency industry. For instance, on 24th August, 2017, the Canadian Securities Administration (CSA) released regulatory notice on the potentials of applying Canadian securities laws to digital currencies; the CSA released regulatory notice on digital currency trading and marketplace operations; and provided participants in the digital currency market with guidance on how to effectively analyse the regulatory requirements (Nelson, 2018).

Some key stakeholders in Canada have expressed misgivings about use of the term, cryptocurrency. As an example, on 25th January, 2018, Mr. Stephen Poloz, Head of the Central Bank of Canada, expressed his objection to use of the term, cryptocurrency. He argued cryptocurrencies are crypto, but not currencies; cryptocurrencies have no intrinsic value and could therefore, not be analysed as assets; they could at best be described as securities. Canada is an official member of the North American Securities Administrators Association (NASAA), which believes the risk of fraud associated with trading in digital currencies is high (Nelson, 2018).

### 2.3.6. Venezuela

In 2017, the Venezuelan government compiled a detailed registry of digital currency miners as a significant step towards cracking down on digital currencies and arresting free fall of the Venezuelan Bolivar. As at December 2017, the Venezuelan Bolivar was virtually unusable, following international restrictions and sanctions imposed on the regime of President Nicolás Maduro by advanced economies such as the United States of America.

In order to liberate the Venezuelan economy from the shackles of international restrictions, the President Nicolás Maduro-led government announced the introduction of a digital currency called petro, which is backed by the country's oil. The state-approved crypto currency would allow Venezuela to become a strong force to reckon with in the world of digital currency; it would allow Venezuela to emerge among global economies with progressive regulations on digital currency (Nelson, 2018).

### 2.3.7. Russia

Prior to September 2017, the Russian Federation adapted a soft stance which allowed "qualified investors" to trade in digital currencies. In September 2017, Head of the Central Bank of Russia, Elvira Nabiullina, announced the central bank's unpreparedness to regulate digital currencies as a medium of payment for goods and services. The head noted the central bank was equally not prepared to regulate digital currencies as a foreign currency equivalent. These statements assured investors of a progressive hands-off approach to the regulation of the digital currency industry in Russia (Nelson, 2018).

However, pronouncements by the Head of the Central Bank of the Russian Federation was short-lived on 8<sup>th</sup> September, 2017 when Alexei Moiseev, the Russian Federation's Deputy Finance Minister, disclosed at a Moscow Financial Forum that use of digital currencies as a medium of payment is not yet legal in Russia. He noted the existence of a legal vacuum, which requires redress to affirm the status of digital currencies in the Russian economy.

On 11<sup>th</sup> October, 2017, the stance of the Deputy Finance Minister of the Russian Federation was corroborated by President Vladimir Putin when he catalogued potential risks associated with cryptocurrencies. He described digital currencies as an avenue for tax evasion and spreading of fraudulent schemes; a hub for financial laundering and funding of terrorism activities; and a conduit for possible victimisation of Russian nationals.

The Finance Ministry in the Russian Federation, on 28<sup>th</sup> December, 2017, outlined some regulatory measures, including taxation on digital currency ventures. Again, on 11<sup>th</sup> January, 2018, President Vladimir Putin supported this call by affirming the need for regulatory measures for the digital currency industry in the near future. However, President Vladimir Putin acknowledged the current prerogative powers of the Central Bank of the Russian Federation in the administration of cryptocurrencies until new and strict legislation is introduced to regulate the digital currency market.

A draft law on Digital Financial Assets was published by the Finance Ministry of the Russian Federation on 25<sup>th</sup> January, 2018. The final version of the law is expected to establish clearly procedures for initial coin offering (ICO); affirm the legal regimes for digital currencies and mining; and provide a clear definition for tokens. However, political opponents in the Russian Federation such as Mr. Boris Titov have described the draft law as excessively strict; and tougher than proposed legislations in countries such as Armenia, Belarus, Japan and Switzerland. Mr. Titov believes the Russian Federation would be better off not adapting anything than to implement such legislation (Nelson, 2018).

In December 2017, Belarus introduced legislation on cryptocurrencies called the Digital Economy Development Ordinance. The content of the Belarusian legislation is more investor-friendly than the legislation proposed by the Russian Federation. As a result, some officials of the Russian Federation including Alexei Moiseev believe the implementation of stringent legislation on the crypto currency industry may result in capital flight from Russia to neighbouring economies such as Belarus.

### 2.3.8. South Korea

South Korea was one of the economies with strong presence in the digital currency space. It became an attractive destination to crypto currency investors following the introduction of strict regulations in China in the latter part of 2017. However, investors' hope of continually friendly investment environment in South Korea suffered a setback in January 2018, as top officials in the South Korean government became divided on future regulatory measures to adapt for the crypto currency industry. The officials are divided on the type of information to clarify and declare; the accuracy of information that is circulated; and whether to allow limited or broader implementation of digital currency legislation in the economy (Bitcoin Magazine, 2018; Nelson, 2018).

On 23<sup>rd</sup> January, 2018, the Korean government began enforcing a legislation that does not permit use of anonymous accounts in trading in digital currencies. There are six Korean banks with branches in the State of New York in the United States of America. To further clamp down on the activities of crypto currency traders, the Korean government, on 26<sup>th</sup> January, 2018 requested for customer information on accounts related to digital currency trading in the six Korean bank branches from the New York State's Department of Financial Services (DFS). This resulted in massive sell-offs of digital currencies on 30<sup>th</sup> January, 2018 (Bitcoin Magazine, 2018; Nelson, 2018).

However, the request of the Korean government was not granted by the New York State's Department of Financial Services. Some industry analysts believe the reluctance of the Department of Financial Services would deal a major blow to the South Korean government's efforts at implementing tougher rules on the crypto currency industry.

### 2.3.9. Switzerland

On 18<sup>th</sup> January, 2018, the Swiss government established an initial coin offering working group. The purpose of this group is to ensure the legal certainty of the crypto currency industry is enhanced; the integrity of the Swiss financial sector is maintained; and to ensure the implementation of technology-neutral regulation. The initial coin offering group is expected to do due diligence and submit a report to the Swiss Federal Council by the end of 2018 (Nelson, 2018).

The Economics Minister of Switzerland, Mr. Johann Schneider-Ammann, recently (on 18<sup>th</sup> January, 2018) affirmed his country's readiness to become the crypto-nation. The State Secretary at the Finance Ministry, Jörg Gasser, notes the Swiss government's interest in observing a prosperous initial coin offering market, but not based on compromise of standards; or compromise on integrity of the financial market.

The foregoing pronouncements are not surprising; Switzerland is noted for maintaining progressive attitudes on the rights of individuals in banking; similar rights are being granted investors in the digital currency industry. The seemingly relaxed digital currency regulation in Switzerland may make the nation attractive to investors from other jurisdictions where there are clamp downs and strict regulatory measures on crypto currency trading (Nelson, 2018).

### 2.3.10. European Union and the United Kingdom (UK)

The European Union, just like the United Kingdom (UK), has not presented final legislation on digital currencies and their related activities. However, the European Union and the United Kingdom have demonstrated strong commitment to the adaption of rules to regulate digital currencies. Regulatory initiatives by the two bodies include report of suspicious activities while due diligence is effectively conducted on traders in the crypto currency industry. Like South Korea, the European Union and the United Kingdom are seeking to end anonymity for digital currency traders to curb tax evasion and money laundering, among other legally unapproved financial transactions (Nelson, 2018).

On 18<sup>th</sup> December, 2017, Mr. Pierre Moscovici, the European Union Commissioner, stated the European Union's unreadiness to regulate bitcoin. However, on 20<sup>th</sup> December, 2017 Vice President of the European Commission, Mr. Valdis Dombrovskis, noted price volatility of bitcoins exposes consumers and investors to risk such as liability gaps, market manipulation, operational and security failures, and complete loss of investment.

Although there is little evidence to suggest use of digital currencies in money laundering, the United Kingdom, through its Treasury, has begun negotiations to allow the inclusion of some wallet providers; and platforms of digital currency exchange in regulation related to counter-terrorism financing and anti-money laundering.

Mr. Bruno Le Maire, the French Economic Minister, has announced his country's resolve to create a working group to regulate digital currencies. Also, a Board Member of the German Bundesbank, Mr. Joachim Wuermeling, has suggested the need for effective regulation of cryptocurrencies at the global level.

On 22<sup>nd</sup> January, 2018, Mr. Dombrovskis predicted a bubble in bitcoin trading. And on 25<sup>th</sup> January, 2018, Prime Minister Theresa May of the United Kingdom called for a serious look at the crypto currency industry since it could serve as a safe financial "haven" for criminals. Plans are far advanced to ensure the exit of Britain (Brexit) from the European Union by March 2019. However, this arrangement has no effect on the collaborative efforts of the two aimed at clamping down on activities of crypto currency traders, which decelerate economic development and growth (Nelson, 2018).

### 2.3.11. India

According to Nelson (2018), the Republic of India is described as a cash-reliant economy. That is, most business transactions are concluded on cash basis. However, the "appetite" for digital currency trading assumed a greater dimension in the Indian economy until early 2018 when the government introduced more stringent regulatory measures to clamp down on the activities of traders.

The Indian government argues the digital currency industry is a fertile ground for tax evasion, proliferation of illegal activities, and sponsoring of terrorist activities, among others. These notwithstanding, digital currency traders in the domestic Indian economy do not believe the more stringent rules adapted by the Chinese government would be replicated by the Indian government.

### 2.3.12. Singapore

In December 2017, the Monetary Authority of Singapore (MAS) warned traders of the dangers of speculating in the digital currencies market, especially when the price of bitcoin was at its peak. As noted earlier, on 26<sup>th</sup> January, 2018, the system of Coincheck, a Japanese virtual exchange, was hacked into by predators and \$530 million worth of investment was lost to the hackers. It is believed the hackers' initial target was NEM coins based in Singapore. These challenges notwithstanding, authorities in Singapore are hopeful of the successful development of the virtual currency market, if the necessary checks and balances are effectively put in place. The authorities believe with the current wave of strong regulations across the globe, a meltdown of the digital currency market as witnessed in the case of Lehman Brothers is quite remote (Nelson, 2018).

Tharman Shanmugaratnam, the Singaporean Deputy Prime Minister, believes the existing laws in Singapore do not make clear distinctions between transactions that are completed using digital currency, fiat currency or "other novel ways of transmitting value." The foregoing statement suggests the acceptance of digital currencies such as bitcoin as a legal tender in the Singaporean economy.

### 2.3.13. South Africa

Over the past decade, the South African Rand has been subjected to several devaluations by successive governments. Strong economic ties between South Africa and China seem to have an effect on their respective currency; the South African Rand has a direct relationship with the Chinese Renminbi. For instance, a devaluation exercise by the South African government in 2015 resulted in about 26% drop in value of the Rand with a corresponding 2% drop in the value of the Renminbi.

Generally, South Africa's position on digital currencies is progressive. In 2014, the Reserve Bank of South Africa issued a paper stating the country's position on cryptocurrencies. The content of the paper appeared promising to traders in the virtual currency industry. In July 2017, the South African government collaborated with Bankymoon, a blockchain-based solutions provider, to draw a balanced-based regulation for bitcoins. Unlike most of the countries discussed in this section, South Africa remains tight-lipped on digital currency regulation in 2018 (Nelson, 2018).

### 2.3.14. Ghana

At a media briefing in Accra on 22<sup>nd</sup> January, 2018, the Governor of the Bank of Ghana, Dr. Ernest Addison, stated the position of the Ghanaian government on bitcoin: "Bitcoin is not yet a legal tender." Presently, there is a Bill before the Parliament of Ghana seeking to regulate use of digital currencies in the Ghanaian economy. Until the Bill is passed, cryptocurrencies, including bitcoins, are not recognised as a legal tender in Ghana (Nelson, 2018). It is believed the Bank of Ghana's pronouncement was a reaction to earlier recommendation by Groupe Ndoum, one of the investment institutions in Ghana, for Bank of Ghana to consider investing 1% of its reserves in bitcoin.

The Bank of Ghana Act of 2002, Act 612, Section 4, Sub-sections (1) (d) and (e); and the Banking Act of 2004, Act 673, Section 51, Sub-sections (a) (3) allow the Bank of Ghana to regulate transactions concluded on mobile phones and related electronic devices. The operation of bitcoin is likely to be considered under the Payment System Act of 2003, Act 662, which mandates the Bank of Ghana to ensure promotion and supervision of electronic and other payments; and transfer of funds, clearing, and settlement systems(PWC, 2016).

### 2.3.15. Nigeria

Nigeria remains Africa's largest economy with a gross domestic product (GDP) of US\$405.1 billion in 2016. In 2017, the Nigerian economy went through recession leading to a fall in value of her currency, Naira. To stem the tide of the crumbling economy, the Nigerian government restricted traders' access to the United States Dollar. This compelled businessmen and businesswomen to seek financial refuge in bitcoins.

In January 2017, the Central Bank of Nigeria (CBN) decided to apply strict rules and regulation to the use of the digital currency. However, this decision was later rescinded; Mr. Musa Itopa Jimoh, Deputy Governor of CBN noted the Central Bank of Nigeria does not have the locus to regulate or control bitcoins, blockchain, or the Internet since the country does not own any of them. In Nigeria, trading in bitcoin surged by 1,500% in 2017 (Nelson, 2018).

On 25<sup>th</sup> January, 2018, Mr. Edwin Emezie, Governor of the Central Bank of Nigeria, renewed the government's commitment to regulating digital currency trading. The Governor likened investment in digital currencies to gambling and that, the Nigerian government cannot support instances where individuals and group of investors alike, risk their savings to gamble. However, the unimpressive performance of the Nigerian economy in 2017 may pose a challenge to the successful implementation of any legislation seeking to regulate digital currency trading in the country (Nelson, 2018).

## **3. Research Methodology**

A study involving digital currency is virtually a new phenomenon; there is limited available expertise in this research area to provide reliable information about the phenomenon. Stated differently, it is quite challenging to access reliable primary data to complete, successfully, a study on cryptocurrency, especially in Ghana. Thus, the most reliable means of gathering relevant data for the current research was secondary sources. Therefore, data required for the conduct of this research were obtained mainly from secondary sources. These included text books, journals, newspaper publications, and digital currency markets.

The systematic exploratory technique, an example of the mixed methods approach to scientific inquiry, was adapted for this research. That is, the research was conducted with strong qualitative leanings though elements of both qualitative and quantitative methods were present.

## **4. Research Findings and Discussions**

Financial pundits (Hodge, 2018; La Monica, 2013; Price, 2016; Reutzler et al.; Rooney, 2013; Stalnaker, 2013; Tassev, 2018) have expressed divergent views on the prospects of bitcoins in the medium- and long-term. Some experts believe a bitcoin would soon trade at 1BTC: US\$12,000; others believe the future of the digital currency cannot be predicted with relative ease; it is quite challenging to predict with precision, what would become of the bitcoin in the medium- and long-term.

Interestingly, investors in China, since 2013, have expressed strong optimism about the prospects and potential growth of the crypto currency in the global financial market. The bitcoin market has experienced some price volatilities. This notwithstanding, the digital currency has made remarkable strides in value since 2009 till date. In 2013, the crypto currency was positively featured in Chinese government-backed newspapers and state-run CCTV television network. Bitcoin is accepted as payment for certain services in China. China that is least fancied as a free market economy has jumped into the lead with regards to adaption and implementation of the 21<sup>st</sup> century digital currency while the United

States, the “Apostle” of free market, is struggling to come to terms with the digital currency’s dynamics and economic prospects.

In September 2013, Bitcoin Investment Trust, an investment fund located in the United States of America was launched. This trust is dedicated solely to cryptocurrency. Barely two months after its launch it was able to accumulate US\$15 million. A belief commonly held among some financial analysts is the crypto currency has come to stay; its ability to survive the financial bubble burst in April 2013 implies it has the requisite “shocks” to withstand the test of financial challenges.

A research conducted by the Chicago Federal Reserve revealed the use of bitcoin in mainstream transactions is limited. However, the digital currency could be adapted and used by banks and governments because its technical and conceptual achievements are simply remarkable. The digital currency (bitcoin) is described as a store of value; it is an alternative to gold. Available statistics on the website of the Business Insider (2018) revealed the price of gold per ounce at the close of day on 8<sup>th</sup> March, 2018 was US\$1,328.93. Using the price of a bitcoin on 5<sup>th</sup> March, 2018 as the base value, one observed 1BTC was equivalent to 8.62 ounces of gold ( $US\$11,455.50 \div US\$1,328.93 = 8.6201$ ). It means one required about 8.62 ounces of gold to obtain 1 bitcoin.

In September 2013, the United States government shut down an online market called Silk Road for trading in drugs and other illicit items. During the shutdown, the Federal Bureau of Investigations (FBI) seized 170,000 bitcoins valued at US\$101 million. This virtual firm was believed to be encouraging anonymity through the use of bitcoins in its transactions. However, several other virtual firms emerged after the closure of Silk Road by the United States government. Transactions in bitcoins are carried out using coded wallets and special keys; no real names are required in bitcoin transactions. This guarantees substantial privacy to the detriment of security agencies’ ability to fight crime.

In spite of the significant gains associated with investment in bitcoins, it behooves investors to be cautious; the risk associated with investment in the crypto currency is high. Massive investment in bitcoins would be appropriate for moderately aggressive and aggressive investors; it may not be conducive for conservative investors.

## 5. Recommendations

Discussion in the preceding sections affirms the existence of challenges that could impact negatively on the successful adoption and implementation of the digital currency for rapid development of the financial sub-sector to enhance its contribution to growth in the services sector; and to accelerate real growth in national gross domestic product. On the basis of the foregoing, the following recommendations are proffered.

- Governments must introduce measures that would ensure anti-money laundering, and “know-your-customer” controls. Stated differently, the governments of various economies must put regulatory mechanisms in place to limit the extent of privacy associated with bitcoin and its related transactions.
- Government’s regulatory measures must include use of names in the transaction process. Reduction in the level of anonymity and privacy would minimise use of bitcoins in criminal activities.
- Indeed, the bitcoin system involves complex mathematical computations. As a result, intelligence agencies of governments must engage the services of individuals who are technologically savvy to understand, operate and control the bitcoin system, which is technologically more complex than most of the computer systems used in day-to-day operations in various organisations. This implies additional funding in security operations may be required to allow security agents keep a constant trail on criminals. The various bitcoin exchanges must adapt enhanced security measures to protect the investments of their investors against the nefarious activities of predatory hackers.
- Governments must ensure all bitcoin exchanges and agents operating within their jurisdictions register with their central banks; the latter must keep records of the former. Registration of operators would reduce the incidence of companies running away with bitcoins of investors. The registration must be extended to include individuals who engage in bitcoin transactions on a daily basis so as to minimise the adverse effect of the digital currency on each economy.
- The necessary cost-benefit analysis must be diligently carried out by government before introducing regulations and actively involving herself in the activities of bitcoins. If the cost of regulating the digital currency in terms of administrative and security costs would outweigh eventual revenue to be derived from the activities of investors, it may not be economically productive to pursue it, vice versa.
- Measures to be adapted and implemented by government should not “cripple” activities in the digital currency industry. Rather, it should streamline and guide the industry to enhance its overall contribution to national development and growth through high GDP. In other words, government’s interventions should deter criminals; it should not affect, negatively, the activities of genuine investors. Adaption and implementation of measures without due diligence could result in criminals with strong technological leanings dominating the bitcoin market. When this occurs, the fundamental objective of maintaining genuine investors and discouraging funding for terrorism and its related activities would be defeated.
- Bitcoin operators must secure their systems against Internet predators that employ crafty means to hack into computer systems, including the bitcoin system, to deny individuals of their valuable investments as recorded in the cases of Bitfinex in 2016 and Coincheck in 2018 respectively. As noted earlier, the Bitfinex and Coincheck experiences resulted in respective loss of over US\$10 million and US\$530 million by investors. The necessary proactive steps must be taken by government and the digital currency exchanges to avert their recurrence in the near and distant future.

- Entrepreneurs could tap into the growing economic benefits of bitcoins to stabilise and grow their businesses. Small- and medium-sized enterprises (SMEs) could take advantage of the fees holidays to purchase goods and services and effect payment on same, using the digital currency.
- While committing to due diligence, leaders of African and other developing economies must commit to adaption and implementation of the digital currency to provide security for national currencies, public funds, and investments. In addition to forward, futures, option and swap, economies and corporate bodies could invest in bitcoin as a derivative; they could buy bitcoins to hedge against short- and medium-term investments. Specifically, the governments could invest in bitcoins as a means of hedging against their nations' future earnings and debt settlements. Returns on investment in bitcoins could shore up significantly, the overall GDP of an economy in a given year. Repayment of debts at due dates could be affected with few bitcoins relative to more national currency notes, which could negatively impact on the strength of the latter in the foreign currency market. However, it is imperative to ascertain the credibility of chosen bitcoin exchange or exchanges before the nation's funds are committed to such an investment. Such an investment may be carried out using a wallet ID and not the name of the government; this may make it difficult for the investment or investments to be noticed; and to become a direct target for hackers. It is equally important for such investments to be held for not more than two (2) years to avert the possibility of losing those investments to system hackers. All things being equal, an investment is expected to double in value in a year or two. When this objective is realised, the bitcoins could be resold to realise real earnings in Dollars; and reinvest a relatively small amount in the digital currency market to guard against potential loss of new investments.
- Bitcoins purchased and held for investment purposes could be classified as a security; and categorised into the pool of eligible financial securities regulated by regulatory bodies in the various economies. A major challenge, however, may be how to regulate the activities of bitcoin traders in the "spot" or virtual markets where direct trade occurs without recourse to a specific jurisdiction. However, registration of groups and individuals engaged in the activities of the digital currency in each economy should facilitate the task of the regulatory bodies.
- Institutions of higher learning and professional bodies across the globe are encouraged to integrate the study of crypto currency into individual business related programmes such as Finance, Banking, Economics, Accounting; and a programme that combines Finance and Banking. It could be introduced as a core or an elective course. This would enhance individual and collective understanding of, and knowledge in the digital currency market; and its impact on individual economies and the global financial market.

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