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Impact of Blockchain on the Crypto financial industries

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Abstract: Blockchain technology has recently garnered significant attention regarding functionalities, remarkable potentials, potentially novel and innovative corporate models, and technological implementations on the advantages of emerging crypto markets. This study primarily aims to assess the effects of blockchain technology and emerging crypto markets. Two primary techniques (deductive and inductive) were utilised to analyse the study data from the Cambridge Centre for Alternative Finance, Congressional Research Service, North American Industry Classification System (NAICS) and CoinMarketCap. Econometrics considerations have enlightened this paper. The findings provided several noteworthy insights to gauge how blockchain technology time influenced emerging crypto market behaviours. Notably, the price of one Bitcoin at $7,945 (as of March 9, 2020) exceeded $32000 on 21 January 2021.Thus, it was concluded that the blockchain impact might gradually reconstruct market structures, product capacities, and client experiences towards sustainability in emerging crypto markets and the global economic system.

Keywords: Crypto-assets; Crypto-currencies, Blockchain; Crypto-economy

1.INTRODUCTION

Based on the research term, crypto-assets economy denoted private asset types that primarily relied on cryptography and blockcha in as part of the observed or inherent value. For example, crypto-assets could be characterised as digital exchanges without an issuer (Bitcoin) or other digital tokens, such as security and asset-backed (representing property ownership interests) or utility tokens for access to goods or services on a specific digital platform. The development of blockchain and other distributed ledger technologies (DLTs) on financial market usage could encourage value exchanges without a reliable central authority or mediator (government and banks) for efficiency-oriented benefits (Organisation for Economic Co-operation and Development [OECD], 2020).Blockchain is still at the preliminary stages of technological development with challenges inefficient adoption and implementation. Consequently, the study progress established both gains and losses before the development of sustainable and profitable business models and complete network effects.

Blockchain denoted technology to potentially convert most sectors and economies. Predictably, blockchain could generate $3 trillion per year in business value by 2034. In this vein, the World Economic Forum expected10% of the international GDP to be retained in blockchain by 2025 and identified blockchain as one of the seven technologies that would revolution is different life aspects (NITI Aayog,2020). Blockchain innovation potentially converted the economic system infrastructure (apart from the emphasis on financial services) and holistic global value chains (crypto-currency exchanges). For example, crypto-asset issuances could facilitate more affordable and inclusive and less burdensome means of financing small and medium-sized companies through capital-enhancement and competitive strategy standardisations (European Commission,2020). Blockchain (distributed ledger technology) is currently disrupting the financial services sector as part of a larger external and innovative wave with digital financial technologies.

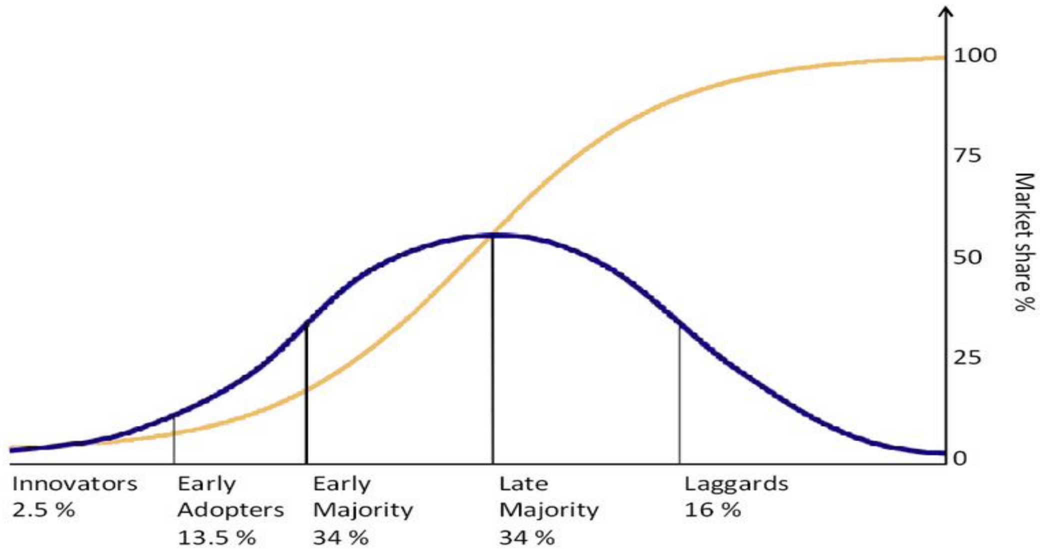
Following higher banking risks and digital financing and lower bank penetrations, developing markets were deemed appropriate for blockchain-oriented economic alternatives. The ensuing advantages could include a technological catalyst towards economic inclusion and growth. Based on Helpnetsecurity.com (2020). Asia witnessed the highest financial advantages of blockchain technology. Regarding individual nations, blockchain could have the highest net benefit with China at $440 billion and the USA at $407 billion. Five other nations (Germany, Japan, the UK, India, and France) were also assumed to have net benefits exceeding $50 billion. The number of issued and traded crypto-assets currently exceeded 1800 with a total market capitalisation of over$200 billion. The fundamentals of long-term crypto-infrastructure were implicitly developed by specific groups, such as individual block producers, block producer pools, Blockchain as a Service provider, wallets, and exchanges (The International Telecommunication Union [ITU],2019).

Crypto-currency platforms were often employed in blockchain technology to authenticate ledger shifts. For example, blockchain technology utilized cryptographic protocols to prevent invalid public ledger changes or exploitations. The overall crypto currency market capitalization has rapidly improved by 1000 times in under six years since 2014 and was just under one trillion euros by the end of 2019 with a similar total circulation currency in the third quarter of 2019 (1.2 trillion euros) (Gerba & Rubio, 2019). Presently, over 5,000 crypto-assets were identified with diverse aspects and universally distinct account units across nations with systems that facilitated immediate cross-border ownership transfers. The assets were exchangeable date, economic-oriented for specific goods and services in certain economies or other crypto assets (Shirai,2020). To studies offered little insight into the financial relevance of crypto assets. Economic-based research on the crypto asset and blockchain technology effects were also scarce. As such, this study proposed a framework for crypto-economy analysis activities and the blockchain technology and crypto-asset effects. Specifically, the following sections are arranged as follows: Section Two presents the blockchain technology theoretical background, Section Three discusses the study data and methodology, Section Four illustrates the results, and the final section summarises the study.

2.THEORETICAL BACKGROUND

Blockchain denoted a developing Fourth Industrial Revolution-oriented technology (equivalent to the Internet in the Third counterpart). Following the technology adoption curve technology (blockchain technology) proponents (innovators),novel sources were immediately incorporated due to the appeal towards disruptive innovation, novel experiments, and subsequent functionalities (see Figure 1). Hence, the adoption or diffusion rate reflected the relative innovative speed implemented by social system members with the number of individuals adopting innovativeness in a specified duration, such as on an annual basis (Rogers, 2003). Notably, Moore's Technology Adoption Curve was adapted from Roger's Adoption Categories. Moore substituted Roger's Adoption Stages with novel counterparts: Technology Enthusiasts at the beginning of the curve (invasion stage), Visionaries, Pragmatists, Conservatives, and Skeptics (at the tail-end of the curve) (Moore. 1991).

Figure 1: Rogers' Technology Adoption Curve



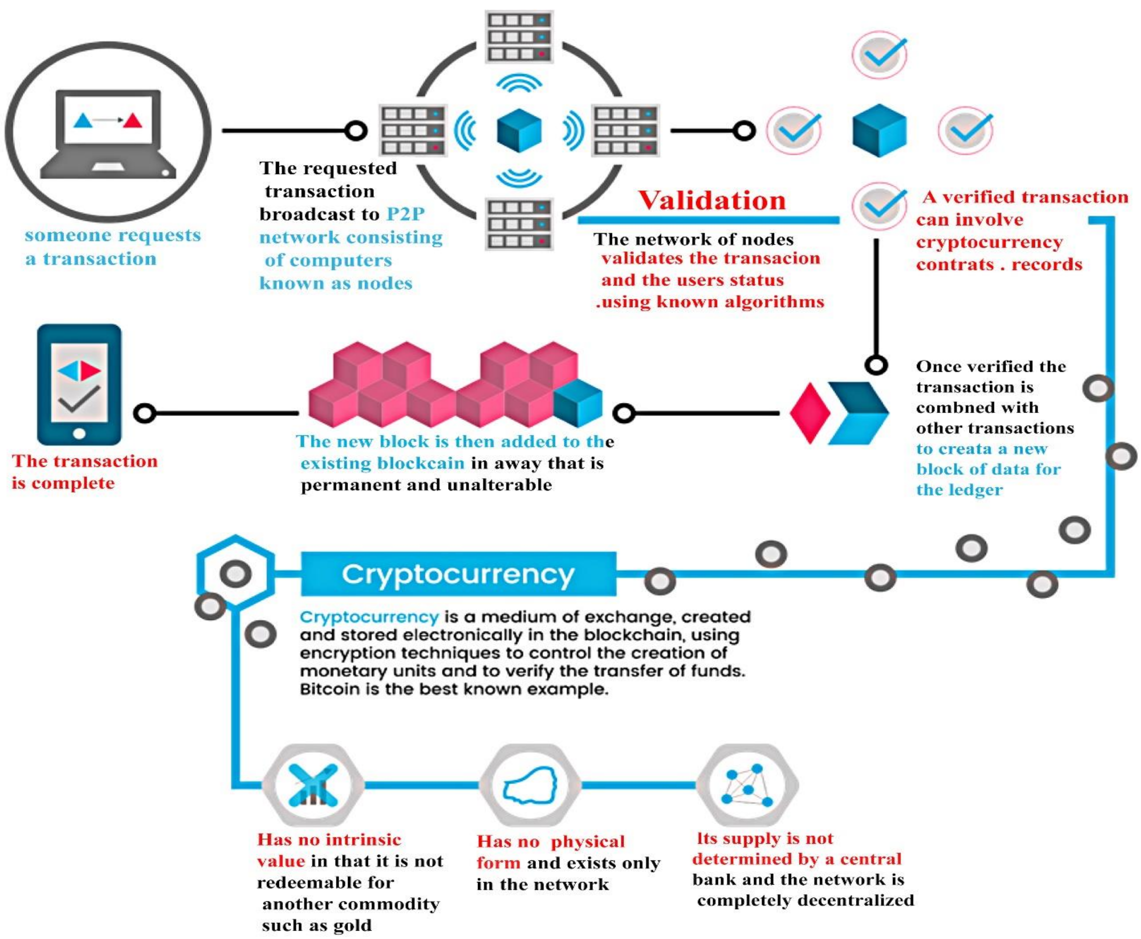
Source: Ondigitalmarketing.com

In Rogers (2003) novel innovation or concept adopters (blockchain technology) could be classified as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%) under the mathematically-oriented Bell curve. In this regard, blockchain technology highlighted the utilization of advanced encryption techniques based on a research publication, "How to Time-Stamp a digital document," by two scholars (Haber & Stornetta,1991). Blockchain technology was initially coined in the white paper of Bitcoin by Satoshi Nakamoto in 2009 (Nakamato,2009). Specifically, 'blockchain' indicated data storage techniques with transactions recorded in time-stamped "blocks". Each block was linked to past blocks and transaction chain developments (Ramachandran & Rehermann,2017).

A clear boundary between the applications and crypto-currencies was deemed necessary for specific blockchain technological implementation. Blockchain indicated a DLT type that acted as the crypto-market backbone and facilitated multiple currently-circulating crypto-currencies (Houben & Snyers,2018). Additionally, DLT denoted a new and dynamic data-recording and sharing method across multiple data stores (ledgers) with the exact data records collectively sustained and controlled by a distributed network of computer servers or nodes

(World Bank Group,2017).Furthermore, initial coin offerings (ICOs) defined fund-raising mechanisms by selling coins or tokens, using blockchain technology, and promoting product launching or a new virtual currency. In this vein, ICOs incorporated crowd-funding and blockchain (Allen, Gu, & Jagtiani,2021). Regardless, the most essential and potential blockchains followed Satoshi's Bitcoin model (Nakamato,2009) (see Figure 2).

Figure2: Blockchain Technology Fundamentals



Source: https://blockgeeks.com/

The Bitcoin blockchain scenario could be reflected in the following example:

If Lora intended to convey 100 Bitcoins to John, Lora would have to first digitally sign the transaction with a private key. Lora would also need to address the transaction to John's public key (John's address on the Bitcoin network). The transaction (collated into a "transaction block")would be authenticated by the Bitcoin network nodes. In this regard, Lora's public key would be used for signature verification. Based on Lora's signature validity, the network would process the transaction, insert the block to the chain, and transfer 100 Bitcoins from Lora to John. In this regard, the blockchain was associated with decentralisation, persistency, anonymity, and audit ability. Decentralisation indicated that although each transaction required verification, the authentication process did not occur through a central trusted agency resembling a central bank (Ertz & Boily, 2019). Crypto-coin owners possessed the right to own and employ the blockchain technology and payment system as the technology belonged to all network participants(decentralization principle). As such, a single network user could not be responsible for technological maintenance, regulation, and development. Crypto-currencies (coins) also provided ownership rights to omit the virtual values circulating within the network following the blockchain technology.

Blockchain is a developing technology that provided the re-structuring of financial models and facilitated market and product establishments that were previously unavailable or unprofitable across emerging markets (Miller, et al. ,2019).Crypto-finance and token or coin-trading thus became the first significant blockchain technology application. With approximately $300 billion in crypto asset market capitalisation and over 3,000 launched ICOs and 200 crypto-exchanges, public officials and leading market participants needed to engage in decision-making (Casey, Crane, Gensler, Johnson, & Narula, 2018).Through blockchain technology, Western European firms would save nearly $450 billion in logistical costs by controlling and distributing data in a secure and timely manner (Tunali, 2020). A PwC revealed that blockchain technology possibly boosted the global GDP by $1.76 trillion over the next decade (Helpnetsecurity.com,2020). The key finding of the report measured the extent to which the technology was currently being implemented and assessed the blockchain impact on the global economy. Primarily known for digital currency use, the technology involved various applications that extended beyond the financial and economic scope, including supply chain management, trade, health, and government services.

3.METHODOLOGY

This study analysis corresponded to extensive literary studies with essential opportunity areas, such as the collection and aggregation of and access to necessary data in monitoring the blockchain technology, analyzing digital patterns, and providing the required studies towards efficient responses to crypto assets. The qualitative analysis is based on quantitative extrapolation.The research method involved a review of scientific publications and research papers on crypto assets, blockchain synthesis, and subsequent data analysis. In the study context, most of the journal articles were published between 2018 and 2021 (relatively recent and updated).Two primary techniques (deductive and inductive) were duly employed. In the deductive approach, the study emphasized general to specific movements and conceptual and theoretical structures against empirical observations. Contrarily, an inductive counterpart emphasised specific to general movements that were often implemented within interpretivism and reflected inductive logic through existing theories to identify novel conclusions. With enlightened by the considerations of econometrics. As blockchain technology remained relatively new and largely unknown, the survey method (generally targeting many people) was not applied. Alternately, review journal articles and data from the Cambridge Centre for Alternative Finance, Congressional Research Service, and CoinMarketCap were selected for data analysis.

4. ECONOMETRICS CONSIDERATIONS

The first blockchain and a peer to peer digital currency is called the Bitcoin, that permits online payment from one party to another deprived the need for third party. It was offered to answer the shortcomings of money and banks. A Bitcoin employs blockchain in order to record the transaction (Nakamoto 2008). We have identified the Bitcoin price equation to account for the three factors (Ciaian, Rajcaniova, & Kancs,2016).

$$p_t^B = \beta_0 + \beta_{1pt} + \beta_{2yt} + \beta_{3vt} + \beta_{4bt} + \beta_{5at} + \beta_{6mt} + \varepsilon_t \qquad (1)$$

Where t is subscription time, p_t^B is the Bitcoin price (i.e. Bitcoin dollar), *pt* reflects the general economic value for the products and services (i.e. currency of the exchange), *yt* is Bitcoin's size economy, *vt* the velocity of Bitcoin; and determines the frequency of the purchase of one Bitcoin unit, and ε_t is an error term.The first four variables *pt*, *yt*, *vt* and *bt* for demand and supply drivers (driver 1). According to the money theory of quantity, we estimate that the coefficients β_1 and β_2 are positive in relation to β_3 and β_4. In addition, given the fact that Bitcoin supply was essentially preset, the total stock of Bitcoins circulating, *bt*, are semi-exogenous and have an impact on the price of Bitcoins that is limited and /or statistically significant (Ciaian, Rajcaniova, & Kancs,2017).

$$x_i^* = \left(\frac{\rho}{r}\right)^{\frac{1}{1-\rho}} h(n)\tilde{A}\lambda_i ,$$

The Bitcoin attractiveness variable (driver 2). Coefficient β_5 might be positive or negative in connection with this variable. Investors and users are attracted, for example, by negative and good news. Finally, *mt* variable defines macroeconomic and financial indicators (driver 3). Depending on the macroeconomic variable, the sign of the coefficient β_6 is expected either positive or negative. The econometric model (1) comprises variables-bitcoin price, its explicative variables, and mutually interdependent. The evaluation in presence of interdependent time series interdependent nonlinear interdependence factors is sensitive to endogenous characteristics (Ciaian, et al.,2016).The typical technique in literature research to measure the causation between endogenous time series should be followed to sidestep the question of endogenous and to find multivariate Vector Auto Regressive (VAR) modelling. Regressions of interdependent and nonstationary time series, according to Engle & Granger (1987), may provide erroneous results. Test the characteristics of the time series to avoid false regression. Thus, in the first stage, we determine the stationarity of a time series using two unit root exams: the Phillips–Perron (PP) test and the augmented Dickey–Fuller test (ADF). If there are no token blockchain (Gomez & Tembine,2019), consider a simple set-up in which risk-aware users are able to operate and enjoy exchange surpluses on blockchain platforms without owning tokens; nevertheless, utilize as a medium of trade a basic currency (i.e. dollars, euro, yuan). Take into account the following risk-conscious best answer problem:

$$x_i^* = \left(\frac{\rho}{r}\right)^{\frac{1}{1-\rho}} h(n)\tilde{A}\lambda_i,$$

Where B is a themotion of Brownian and w_i is the goods flaw achieved on the blockchain by decision-maker through the transaction of the in its native cryptographic currency. The i, x_i represents the dollar amount utilized by decision makers i, n represents the entire number of policymakers who opt to connection the network of the blockchain(i.e., $x_i > 0$). h represents one-to-one positive mapping. a represents an assault binary random variable, $a = 1$ represents the assault state, size $k, \hat{\lambda}$ represents the request arrival rate, and $\hat{\mu}$ represents the service rate. Note that, because of the variance term, this issue (1) isn't a normal stochastic game differential problem. This is an issue with the variance-conscious mean-field game. Proposal 2 (Tokens not): In token-less blockchain technology, the equilibrium of strategy of i is:

$$k_{nto} := \mathbb{P}\left[\lambda_i \geq \frac{\xi}{h(k_{nto}\bar{n})\tilde{A}} \frac{\rho}{r(1-\rho)} \left(\frac{r}{\rho}\right)^{\frac{1}{1-\rho}}\right]$$

$$= 1 - F_{\lambda i}\left[\frac{\xi}{h(k_{nto}\bar{n})\tilde{A}} \frac{\rho}{r1-\rho} \left(\frac{r}{\rho}\right)^{\frac{1}{1-\rho}}\right], \quad (3)$$

Where $\tilde{A} = A(1-v)^{\frac{1}{(1-\rho)}}$, v: is the blockchain protocol probability being successful in an attack is high (by malicious group or node of hostile nodes). The participant's number in the token-free blockchain technology explains the next fixed-point calculation:$n_{nto} := k_{nto}\bar{n}$. Resolve the next fixed-point equation:

$$Sup_{xi}\mathbb{E}\left\{w_i(T) - \frac{\eta_i}{2w_i(0)} var[w_i(T)]\right\}, subject\ to$$

$$d_{w_i} = [\{x_i^{\rho}(h(n)A\lambda_i)^{1-\rho}\}\mathbb{I}_{\{a=0\}} - \xi - x_i r]dt,$$

$$dA = A(d_A dt + \sigma_A dB),$$

$$A(0) > 0 \quad (2)$$

Where F-λi repersents the accumulative function of the random variable productivity.In order to test this hypothesis, we must use a dynamic programming concept for mean-field-kind games. Because the reformulation lacks a running reward and the drift lacks the state variable wi, the equilibrium strategies are gained by one-shot direct optimization for each decision maker. According to Gomez & Tembine (2019), the optimal decision-maker i investment in the token-free blockchain has the subsequent stimulating properties: (i) increases as the overall number of the active participants in the token-free blockchain increases; (ii) increases as the token-free blockchain's productivity $A\lambda_i$ increases; and (iii) malicious nodes reduce the success of the probability *v* of an attack of the blockchain.

There are also M miners competing to update a blockchain in subperiods $n = 0, \ldots, \overline{N}$ for all transactions from subperiod 0. (Chiu & Koeppl,2018). Miners undertake precisely one costly computational operation with a random success rate in each subperiod by advancing processing power, *q*, determined in actual cryptocurrency balances. We assume that miners provide a linear value to real balances. According to the Bitcoin protocol, if miner i's processing power in a subperiod is *q(i)*, at that time the chance that miner i will gain the mining game is provided by:

A miner that wins the competition can update the blockchain (i.e. add the nth block to the blockchain) and get a real *R* award. This payment is believed to be given to miners once the period has been reduced by time (β). It should be noted that mining games are distinct during subperiods. As a result, miner *i* solves the following problems in any subperiod:

$$\max_{q(i)} \rho_i R - q(i) \tag{5}$$

so that

$$\frac{\sum_{m=1}^{M} q(m) - q^*(i)}{(\sum_{i \neq j} q(m) + q^*(i))^2} \beta R = 1 \tag{6}$$

Where $m \neq i$ for all miners. By striking symmetry, $q(m) = Q$ for every *m*, we obtain as the mining game's Nash equilibrium (Chiu & Koeppl,2018).

$$\rho(i) = \frac{q(i)}{\sum_{m=1}^{M} q(m)} \tag{4}$$

$$Q = \frac{M-1}{M^2} \beta R \tag{7}$$

Subsequently, the overall computing the mining cost in any subperiod is:

$$MQ = \frac{M-1}{M} \beta R \tag{8}$$

Therefore, the projected profit of anequilibriumminer throughout the transaction time is:

$$\Pi_m = (\bar{N}+1)\left[\frac{Q}{\sum_{m=1}^{M} Q}\beta R - Q\right] = \frac{\bar{N}+1}{M^2}\beta R \qquad (9)$$

In order to represent the reality that mining is fairly competitive and lead to new entrants, we can let $M\rightarrow\infty$ arrive to the subsequent lemma. Lemma 1, as $M\rightarrow\infty$, the predicted rate of miners is zero, and the aggregate processing power of miners distributes all mining rewards:

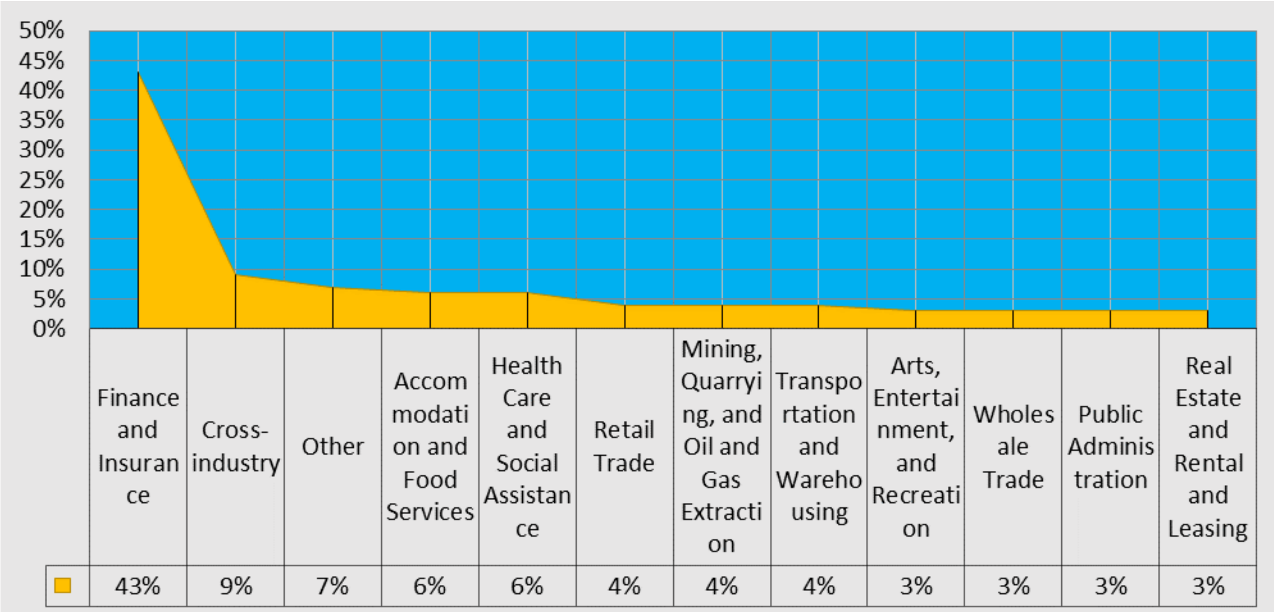
$$MQ = \beta R \qquad (10)$$

It is believed that the overall number of miners is between 5000 and 100,000 Moreover, there are 14 mining pools that contribute for at minimum 1% of the entire hashrate individually according to blockchain.info. Finally, miners can leverage their existing mining capacity to exploit several cryptocurrencies (Chiu & Koeppl,2018).

5. RESULT AND DISCUSSION

Blockchain reflected the tremendous potential for developing markets as the markets seemed prepared for more rapid blockchain adoption. A framework was deemed necessary to evaluate how technological applications could be deployed with potential cases. Although organizations and institutions from almost every global sector and industry had recently examined potential blockchain technology, no other sector resembled the Finance and Insurance industry regarding live enterprise blockchain network deployment. Approximately half of all the aforementioned networks were initiated by financial institutions (see Figure 3: Industries have been categorised according to the North American Industry Classification System (NAICS). The complete NAICS code list is available at: https://www.naics.com/search/). Specifically, the Accommodation and Food Services and the Healthcare and Social Assistance industries held a distant second place with 6% of every network.

Figure3: Nearly half of real-time blockchain networks are launched by the financial and insurance industries



Source: Prepared by the author with information from Cambridge Centre for Alternative Finance,2019

Most findings corresponded to past study conclusions (Hileman & Rauchs, 2017) in demonstrating that the Banking and Finance and Insurance sectors reflected 42% of all explored use cases. Interestingly, a discrepancy arose concerning the public sector,wherein13% of the explored use cases in 2017 were attributable to the public sector. Only 3% of the live blockchain networks were government-oriented in 2019 (Cambridge Centre for Alternative Finance,2019). In this vein, some projects might have been discontinued or remained under construction. Following the rapid crypto-currency growth, blockchain became an underpinning technology that garnered much attention. Primarily regarded for digital currency use, the technology encompassed multiple applications beyond the financial scope (supply chain management, trade, health, and government services). Regardless, blockchain remains a nascent technology with limited-scale adoption and strategic short-term values towards standardizing processes, minimizing inefficiency, and facilitating cost optimisation. Consequently, notable savings could be attained with resource preservation by minimizing intermediaries and administrative attempts(record-keeping and transaction reconciliations) to shift value flow by regaining lost revenues and establishing new ones for blockchain-service providers. As such, blockchain defined a distributed ledger technology form that acted as a crypto-market catalyst. Blockchain also denoted the technology behind diverse and currently-circulating crypto-currencies. The advent of distributed-ledger technology or blockchain (a decentralised, secure, and permanent financial transaction record) encouraged the presence of thousands of crypto-currencies. As of March 10, 2020, one industry group purportedly tracked 5,170 crypto-currencies (Congressional Research Service, 2020). In other words, technology promoted multiple private digital money forms.

Data analysis of specific characteristics and crypto-currency utilisation aided crypto-currency function assessments as an alternative payment source and to gauge money-functioning prospects. Regardless, such analyses presented certain limitations. The decentralised nature of crypto-currencies caused complexities in identifying authoritative industrial data sources. The culminating appreciation of crypto-currency values in 2017 potentially influenced the recent public interest in the aforementioned currencies. At the start of 2017, a Bitcoin exchange price was approximately$993.43. The price gradually surged and peaked at around $19,650 in December 2017 (see Figure 4), hence denoting a nearly 1,880% increase from the January 2017 prices. Nevertheless, the price drastically reduced by 65% ($6,905) in under two months. Consequently, the Bitcoin price remained fluctuating (Congressional Research Service, 2020). Other major crypto-currencies (Ether and Litecoin) indicated similar price trends.

Figure 4: Crypto-currency Values

Source: Congressional Research Service, 2020

One Bitcoin price (as of March 9, 2020) was $7,945 witharound18.3 million Bitcoins in circulation, thus summing all current Bitcoin values to around$144 billion (Congressional Research Service, 2020). Although the statistics were essential to and facilitated crypto-currency analyses as investments, little was disclosed on the prevalence of crypto-currency as money. The recent fluctuations in crypto-currency prices suggested poor account unit workability and value storage. At the beginning of 2020, global stock markets seemed to reflect a certain stability level and positive trends that were interrupted by the presence of Covid-19 as the “black swan” that disrupted the world stock markets and compromised the international economy. In this vein, the “black swans” of economic markets were reflected to be rare and highly-disruptive occurrences.

Regarding crypto-currency markets that indicated relatively novel and potential financial assets, COVID-19 was an unanticipated downturn. In barely a decade, Bitcoin has undergone highly volatile durations without susceptibility towards any major systematic crisis. For example, Morales & Andreosso-O’Callaghan (2020) debated that the “black swan” theory indicated three primary “black swan” characteristics: i) a black swan was regarded as an outlier (unprecedented or unexpected occurrence; ii) a black swan held substantial influence on relevant occurrences and matters; iii) individuals justified the black swan incident through oversimplified elaborations.

Bitcoin approximately increased by 87% in 2019 and continued ascending until mid-February 2020 (the crypto-currency collapsed tonearly15% at the month-end). The downturn was caused by the international stock meltdown following COVID-19 or coronavirus (Blockgeeks.com,2020). For example, Table1presentsthe top10 crypto-currencies highlighted in this section. Specifically, market capitalization was reviewed to assess the size,24-hour trading volume, and circulating supply as the liquidity indicator of the top five crypto-currencies as of 21 January 2021.

The Bitcoin price on 21 January 2021 was at $32,627.21 with a market capitalisation of over $605 billion and a 24-hour trading volume exceeding $70 billion, hence dominating the remaining samples concerning size and liquidity. On another note, Ripple indicated the lowest market capitalisation and liquidity with a market capitalization of almost 13 billion and a 24-hour trading volume of over $4 billion. Following CoinMarketCap.com (2021), the global crypto-market capitalization reached $938.65 billion on 21 January 2021. As a world-renowned and high-performing crypto-currency, Bitcoin enabled convenient and safe financial transactions involving global currencies. Regardless, the tremendous energy requirement and price fluctuation was possibly the most significant digital currency drawback. Although global trust was yet to be established, the Bitcoin impact on the international economy proved too palpable to be ignored.

Table1:Top Five Crypto-currencies by Market Capitalisation (as of 21 January 2021)

No.	Name	Symbol	Market capitalisation	Unit price	Circulating supply	Volume (24h)
1	Bitcoin	BTC	$605,231,184,837	$32,627.21	18,606,368 BTC	$70,722,131,006
2	Ethereum	ETH	$142,460,976,581	$1,251.10	114,342,539 ETH	$45,941,409,397
3	Tether	USDT	$24,830,410,135	$0.9987	24,828,846,122 USDT	$118,911,294,172
4	Polkadot	DOT	$14,828,707,365	$16.52	902,494,137 DOT	$5,074,041,648
5	Ripple	XRP	$12,804,231,431	$0.2837	45,404,028,640 XRP	$4,113,427,578

Source: Prepared by the author with information from CoinMarketCap.com, 2021

The deflation drawbacks were generally due to nominal interest rates that were not negative. The zero borders denoted that currencies normally offered a zero-return rate. Although interest rate caps could be cancelled in the crypto-currency context, the apparent partial solution of deflation encouraged crypto-currency rates to increase with the economy. Nevertheless, the crypto-currency amount would not be able to fluctuate seasonally and only partially responded to COVID-19-oriented financial downturns. The partial digital currency use in the economy would also be more authentic. The central bank could then be less rigid on the business cycle and cap the inflation rate of the currency with lower accuracy.

6.CONCLUDING REMARKS

Notable incremental benefits could be realised in some areas through blockchain technology utilization in public services. Both benefit groups that were relevant to blockchain denoted enhanced security (improvement of data integrity and consistency and immutability among organisations) and efficiency gains (minimal processing time and costs). Given the steady growth in crypto-currencies, blockchain became an underlying technology that garnered much focus. Primarily known for digital currency use, the technology highlighted diverse applications beyond financial and economic aspects, such as supply chain management, trade, health, and government services. Crypto-currency analyses as investments did not reveal much on crypto-currency prevalence as money. Although crypto-currency amounts did not fluctuate seasonally and only partially responded to COVID-19-oriented financial disruptions, the total capitalization of the crypto-currency market drastically improved. Although blockchain technology remained at a nascent developmental stage, blockchain seemed to exit the hype-cycle of inflated assumptions and accessed a more pragmatic exploration phase. As such, educating both private and public sector stakeholders on technological advantages remained challenging. This study proposed that the blockchain impact could gradually re-engineer the market structure, product capacities ,and client experiences to depict a sustainable influence on the international financial system. Notably, blockchain was not a universal alternative to all circumstances and issues. The technology functioned optimally in contexts where multiple parties were engaged in transactions requiring trust and integrity. Furthermore, the technology was still developing despite multiple issues, such as technical, interoperability-oriented, and legal complexities. Organisations also faced intricacies following ambiguities over the blockchain impact. The dichotomy of transformation against perpetuation formed ambiguities on whether to fully substitute traditional processes for a blockchain-based business model or proceed as usual. Given the blockchain potential, firms, civil organisations, software developers, scholars, governments, and inter-governmental organisations should collaborate in analysing practical and legal technological implications for collective alternatives to current barriers. As blockchain technology was rapidly evolving on a global scale, developing markets should enhance competitive advantages to become major international players. Decisions on whether blockchain could minimise costs and improve market expansion determined whether and when to restructure business models to remain at the forefront. For the actualisation of blockchain technologies (in both applications and investments), the blockchain needed to be incorporated into public policies and legal frameworks. Current clarity in regulations would permit organizations (both incumbents and startups) to fully examine crypto-asset investments, token applications, or other blockchain technologies. Ultimately, potential blockchain adventures proved complex to visualise whether a complete financial overhaul following distributed ledgers could occur soon. Conclusively, a hybrid method where distributed ledgers complemented the current systems had more potential.

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