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Block Chain Technology and Financial Inclusion- A Systematic Review of Literature

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Abstract

The brainchild of Satoshi Nakamoto, Blockchain Technology, a concept on the rise which allows data to be shared but not copied is a phenomenal innovation made. Originally innovated for use in the digital currency, now a days it presents for applications in various industries and technologies. This Systematic Review aims to present a relation between the Blockchain Technology and how it could be used to lead to better Financial Inclusion. A Systematic Literature Review was conducted to identify the main objectives of the research and understand the various methodologies involved in researches on the topic. Major themes were also identified which included: A secure way of Financing, Legal Issues, Microfinance and Financial Inclusion. A total of 64 articles were shortlisted from a pool of 926 researches which were arrived at through major keyword searches. Furthermore Limitations to the study are also stated thereby providing a scope for further research with respect to major themes and suggestions for more empirical researches on the same.

Keywords: *Blockchain Technology, Distributed Ledger Technology, Financial Inclusion, , Cryptocurrencies, Systematic Review of Literature, Methodological Review*

1 Introduction:

Use of Digital modes of Commerce is on an outburst in the recent past. Since the mid 1990's self-service channels such as the online banking systems is on an up-rise as a banking service delivery channel. These include the use of portals online by customers aimed at simple aspects like online money transfer, bill payments to complex functions like making investments.Financial institutions have absorbed a crucial position on the Internet as trusted third parties for processing these electronic transactions. The model is based on a trust of receiving a payment from the other side in return of certain tasks carried out by us or vice versa. This trust model provides good solution to the system of internet for finance related transactions online, however it comes with its own weaknesses. The possibility of having a non-reversible transactional promise is not really feasible and hence this creates a degree of uncertainty for the users of online banking. Use of physical currency can help eliminate the cases of frauds, additional intermediary costs and payment uncertainties. However till few years back there was no mechanism available to make payments over an online communication without going through a trusted party (financial intermediary)[1-3].This leads us to an electronic payment system based only on cryptographic proof and without any reliance on trusted third parties. This system called the "Distributed Ledger Technology" (DLT), uses standalone computers referred to as "nodes" which are used to record and share systematically all the transactions carried out in their particular E-ledgers. Blockchainis a form of DLT which is part of 'finance centred technology' innovations commonly known as 'Fintech'. Now a days, all finance sectors use 'Fintech' based developments to bring about a revolution in the financial system thereby helping improve Financial Inclusion. Financial Inclusion means the ability of the unbanked or the under banked section of the society to have access to basic, affordable and usable financial services. The financial services industry is yet to expand its reach to approximately 2 billion individuals who at present still loom across in the darkness of poor financial support[4]. One of the most important policy goals of the government is to make financial services available to the common masses. This is done so as to help individuals to access financial services and tackle their

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financial hardship and make money thereby improving the overall economic outcomes of the country. The impact is brought in by "Block Chain", a distributed ledger technology system that supports cryptocurrencies, and has been the major change bringer in the basic structure of financial services. Cryptocurrencies allows scope for multiple applications which includes value transfer, reduced settlementreal-time tracking of transactions, smart contracts, information protection and sharing of ledger databases. All such applications paves way for many new opportunities. Statistically talking, investments in Cryptocurrencies have been over $1.4 billion for the year spanning 2013-2015. More than 2,500 patents were filed in just 3 years in respect of distributed ledger technology. The Distributed Ledger Technology already had an user base in more than 24 countries by 2016. Our motive is to research more into the topic and find more insights into the distributed ledger technology, how it will impact the banking scenario in the next few years and how it impacts financial inclusion[5-8].

2 Systematic Literature Review Methodology

As compared to the traditional literature review, Systematic Review helps bring in improvement in the overall quality. It also improves outcomes by putting in place a transparent and reproducible process which is free from bias. In the current study, we follow the systematic review process and make use of standard guidelines to search for relevant papers[9-15]. The information and data for the research was collected through secondary sources i.e. published articles, journals, newspapers, reports and websites. We use this particular methodology for exploring the already available literature which relate to Blockchain technology and financial inclusion. The result derived from the systematic review would facilitate us to figure out Blockchain and financial inclusion related researches. In the following sub sections, we have provided the detailed methodology of identifying the relevant literature from the research papers included in this review.

2.1. Scope of the review

This review is based on the study of blockchain technology as a form of distributed ledger, its benefits in modern financial system and the role it could play in carrying out financial inclusion. In terms of forms of research data, this review includes various journals, research paper, news articles and editorials. Thus, the scope of the review includes majorly 2 sets of criteria, the content and the form. The scope is mainly the coverage of future benefits of blockchain in simplifying financial payments and accelerating financial inclusion.

2.2 Identification Of Relevant Literature

The procedure of identification of relevant literature review was conducted by the way of online database research and scholarly articles. We initially conducted the search by use of keywords like 'blockchain technology', 'financial inclusion', unbanked, distributed ledger technology, FinTech in 6 databases, EBSCOhost search, Sci-napse, google scholar, Scopus, Sage Journals. These journals were chosen on the basis of their relevance to business and financial research and the high quality academic content provided by them. The first database search (EBSCOhost) generated 398 results (see table 1). A complete initial study achieved a total of 926 articles papers, articles, and reports. The search results database was maintained by one of the authors of this paper. The obtained theory contained the title of the article, its authors, publication year, type of document and database. From the first set of searches that were conducted about 450 duplicates, irrelevant articles were eliminated, which resulted in the initial sample of about, 400+ articles.Further, the abstracts were read to substantiate their relevance to the study in question and the topic. An added screening from different websites and databases was conducted to have consistent literature, failure to do so, would hinder the study's relevance to a certain extent. A total of 412 articles were discarded for failure to comply with the initial outlook of the study, which consisted of non-academic articles, and/or were off topic. Finally, a sample was achieved of 72 articles which were then examined by the authors for

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including in the final study, based on the specific criterias which were initially finalized. A few articles were further rejected upon thorough assessment. A final tally of 64 articles, papers and reports were compiled which concretely supported the initial idea of the study.Later another search was conducted which resulted in no new articles, or findings by the authors. Hence a final tally for 36 articles was achieved for further review of the aforementioned topic.The Keywords used include Blockchain Technology, Bitcoin, financial inclusion, unbanked, financial exclusion, FinTech, distributed ledger technology, Banking, financial services[16-19].

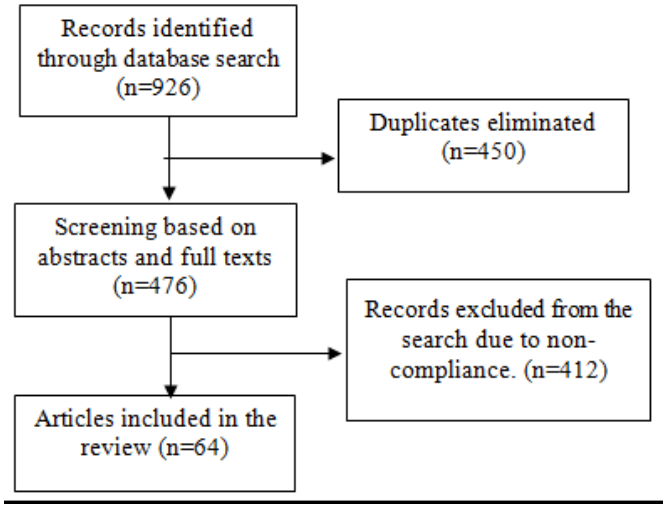

Figure 1. Flow chart based on the second phase of finding relevant content for literature review on 'Blockchain technology and financial inclusion'

2.3. Results of Systematic Literature Review

After narrowing down our search from the 926 search results, the 64 articles used in this systematic review were published somewhere in-between a 7 year period from 2010 to 2017, with a gradual but undulating increase over this eight-year period. This can be explained by the fact that many cryptocurrencies like Bitcoin, Ripple are a relatively newer concept and has emerged over the past 10 years. However the overall research in the area of concern remains minimal[20].

3 3. Methodological review

This methodological review intents to provide a concise summary of the methods/techniques used in research on Role of Blockchain Technology in Financial Inclusion, without systematically enumerating the research strategies and procedures of the reviewed literature work. In terms of approaches, passages illustrating the applied methods were mined from each paper/ article. Article methodologies were categorized by the three authors into non-empirical researches and very few mixedresearches, which consisted mainly of the conceptual papers, research reports, reflective essays and a few reports which contributed to the answering of the topic in question. Empirical research approaches were used in 73% of the reviewed articles (n = 47) which was followed by Non- Empirical based researches which accounted for (n =27%of the total reviewed articles. This methodological breakup can be clarified by the range of themes and research questions considered in the evaluated articles, as well as the ranging levels of analysis. The presence of non-empirical and moreover non-quantitative researches in the considered literature on Role of Blockchain Technology in Financial Inclusion can be explained by the uniqueness of the area of focus. The concentration of non-empirical articles compared to qualitative and mixed articles reflects upon

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how new areas of research go through various stages of maturation. Research in budding areas is primarily dedicated on definitional subjects. Hence, as is the case with growing areas of research, the research on the topic of Role of Blockchain Technology in Financial Inclusion being in its primacy consists of conceptual articles, reports, theoretical dialogues, hypothetical models, and qualitative researches further transforming into quantitative research for which this topic is very contemporary[21-23].

4 Thematic Review

All three authors have identified the themes for this review literature. The abstract, keywords of this 64 articles were examined by authors. From these examinations we found that, financial inclusion and unbanked people is the major theme in which is found in 28 articles.

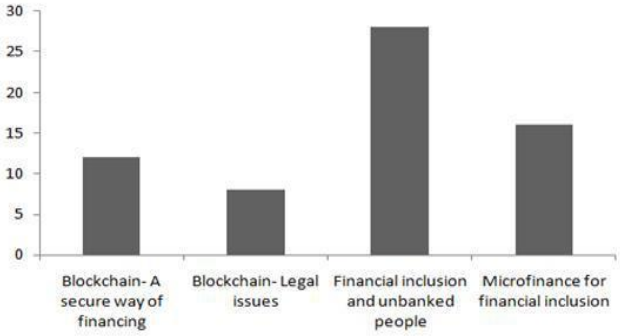

Figure 2. Main themes of research paper on blockchain technology and financial inclusion

The 16 papers have the theme of microfinance while 12 papers were on how blockchain is a secure way of financing. The rest 8 papers talk about legal issues related to blockchain. These themes covers majority aspects related to how blockchain can identified as a possible platform for financial inclusion. The explanation of each theme is to give brief idea of the current practices of blockchain technology and concerns raised through the literature.

4.1. Financial inclusion and unbanked people

Topics related to financial inclusion were the top area of investigation in the reviewed literature on employee usage of BCT and financial inclusion, with 28 articles out of 64. Most of these articles were specifically related to the financial inclusion. Financial inclusion indicates to the delivery of cheap and utilizable financial access for unbanked and under banked people.“Unbanked,” refers to the people who have no or very little financial access and they live in a cash-based environment, which fails them to be included in the economic development of the country A financial transaction that is extremely regarded by the unbanked and under banked is money transfer, whether within an economy (i.e., intra economy spending) or across national borders .India has a enormous number financially excluded residents which offers immense opportunities to Indian Commercial Banks for customer base expansion by banking the unbanked The obstacle ahead is to introduce financial inclusion in the economy, where every resident is a part of formal financial infrastructure and weigh in to the growth of the economy. India has premiered an array of ranging and remarkable reforms in the finance industry especially in the banking system The apex institution of finance in the country of India that is the RBI persistent on pushing the Financial Inclusion (FI) drive all engines booming and has developed numerous policies by consenting all banks to provide wider array of products and have easier “Know Your Customers” (KYC) norms. Empirical research advocates that financial inclusion initiatives – such as enabling access to financial supplies or providing

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microcredit – are alone not enough to lower socioeconomic disparities.Yet large opportunities remain to increase financial inclusion, especially among women and the poor. Providing access to financial services for low-income populations through banking agents' networks enables social innovation through new technologies and the reduction of transaction and investment costs associated with bank branches . Financial inclusion has been at the face of development policy. There is a strong interrelationship between economic growth and financial growth through financial inclusion. Financial inclusion involves the concerns related to the operating costs that are inherent in wider expansion. The emergence of unbanked and financial inclusion as the peak of research in this review is unarguably due to the combination of keywords used for screening the literature, namely 'unbanked' and 'underbanked'. Searching for these keywords resulted a fairly massive number of articles capturing the essence of financial inclusion. In general, the reviewed research in this theme was highly focused on financial inclusion and unbanked related to the topic of this review of literature.

4.2. Microfinance for financial inclusion

Another theme that emerged out more often than not was, Microfinance. To help out millions of people from poverty, microfinance is great innovation. It is about expanding the horizons of financial services The provision of such financial services requires implementation of delivery channels and ways of facilitating it. The need for microfinance services that allow the under banked to both to advantage of prospects and better utility of their financial assets Microfinance can be one targeting tool among many for poverty relief. Small micro enterprises have been setup to provide proper financial support for the specific target population whenever required. This financial support is like providing saving accounts for low income groups, credit to the micro users and other financial services.Some technical experts believe that mobiles phones or internet which ICT based channels, can be used to reduce the security factors that are associated with supplying basic financial services in the rural areas.Some financial markers to measure the success of the micro institutions such as income, fixed assets, and household expenditures. Micro finance has proven to be an effective tool for poverty reduction. The low income clients, self-employed people lacks the access of banking and its related services. Micro financing will be great tool for providing them these basic services

4.3. Blockchain- A secure way of financing

From the reviewed 64 articles, 12 articles were related to how blockchain can be used as a secure way of financing. The blockchain is a decentralized system and operated in a private manner. It does not require any financial institution or any centralized authority for doing transactions. The blockchain keeps the online records that track who is the owner of that particular cryptocurrency from their creation through the process called mining.. Blockchain is a type of distributed ledger technology. Blockchain is expected to bring a revolution in the industry and in the economy because it is unchanging, transparent and will bring secure, fast and dependable solutions. It will help to avoid financial crisis that happened in 2008. Blockchain bringing various records including legal one into a new paradigm, whereby rights are governed by technology, which uses a software code, and not by trusted organization. Blockchains are digital ledger consists of linked batches of transactions also called as E-chain of hashes of digital signatures. Digital signatures gives the authenticity of a digital message or digital records. Due to digital signature, receiver believes a valid sender created message. Some blockchains use Merkle Tree if the chain is getting too long, where the base of the tree is the hash that is framed from the hashes of every previous transactions. The integrity of the chains maintained by saving the storage without breaking chain.. Cryptocurrency Bitcoin uses many weaker systems instead of centralized intermediate authority for the maintenance of ledger. This is to reduce influence of any third party. The nodes are called as miners who commands the Bitcoin's transaction processing. They form a large network that together authorizes financial transactions. The actions are checked by miners who ensures that money is not being mishandled and later authorize the transaction. Cryptocurrency like Bitcoin made payments anonymously and independent of governments and banks. Depending on the situation of payments, cryptocurrency has both benefits and drawbacks. The

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benefits of cryptocurrency is mainly due to its anonymity, ease of use, speed and costs. Blockchain could be used to manage the state records. The drawback of cryptocurrency is lack of protection to the investors or users. However, benefits of blockchain-based currencies outperform traditional payment system in terms of cost efficiency. Cryptocurrency has properties of money like medium of exchange, unit of account and also a store of value. As people accepts money because it has value, in the same way they will accept cryptocurrency. The blockchain becomes bulkier day by day as number and amount of transactions are increasing. Each node has to store all transactions to validate them on the blockchain because they have to check if the source of the current transaction is unspent or not. As there is restriction on block size, time required to generate a block is more. Cryptocurrency like bitcoin is able to process only 7 transactions in one second. This speed is not enough to process millions of transactions in the current scenario. (In the banking and financial services areas, blockchain can create safe and authentic records of transactions, which will simplify business processes. Apart from the economic benefits of blockchain technology, there ae some limitations also. The first challenge is the complicated technology of blockchain. The main problem is that the basics of this system itself are difficult to understand. Due to this it is difficult to implement in large scale. Second, blockchain network consumes a lot electricity. Energy consumption is unsustainable beyond certain limit.

4.4. Block chain- Legal issues

The 8 identified articles within this theme examined the possibilities of regulating blockchain currency. Many countries have not taken official decision yet on digital currencies regulation. According to the European Banking Authority, as one of the major cryptocurrency Bitcoin, which is not regulated yet, the customers are not protected and at a risk of losing their investment. In Canada, there is tax onbitcoin transactions but they did not decided yet regulating digital currency. Few governments are trying to setup the regulations on cryptocurrencies, to reduce the competition with their national currency and furthermore to guarantee a security strategy, intended to ensure customers against theft, money laundering and other sort of unlawful exercises for example gambling, drug trafficking etc. The virtual currency like bitcoin is so attractive because it is not under any regulation. Due to this, no other government agency can affect its value on exchanges made by this blockhain framework. However, the disadvantage is that, anyone can generate many Bitcoins by entering illegally into the system.To regulate the virtual currency business, financial services department of New York issued its final “BitLicense” framework in the yea 2015.Block chain-based currencies show some similar financial properties like commodity money. Some legal definitions supports this characterization The UK is trying to make the London as the area of decision for digital crypto-currency. This is mainly because UK has friendliest laws and regulations for crypto-currency businesses. In addition, London is as of now home for largest Bitcoin businesses in Europe. This could give the UK the chance to end up becoming world leader in building up the advantages of this innovative technology.Cryptocurrency like bitcoin does not meet the requirements of Art. VIII of the IMF. Due to this, there is no legal agreement, which proves legality of bitcoin in the international field. Cryptocurrency is yet to get the status of convertible currency. Regulators should now consider whether they actually require financial transactions based on blockchain to be directed as per the requirements of existing regulations. In addition, whether this would able to justify benefits of blockchain and give enough economic stability to investor. Best option for regulators is to develop an administration intended to encourage the improvement of an advanced blockchain, while keeping up with their regulatory objectives. The revolution of blockchain technology is now of technological one. It will introduce modern ways of recording, reporting and processing of transactions, which will make financial markets more efficient. The current methodology will remain largely the same as far as administration of blockchain system is concerned. Now governments need to cooperate to create a supportive governance for regulation to ensure that blockchain innovation can be utilised for the benefit of the market all in all.

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5 Limitation of the Research

In the review of Literature, we were able to spot a few limitations to the study. Firstly the topic being a less researched upon topic, the number of research papers found even after various combination of Keywords was very limited. The second limitation pertains to the selection of keywords. The Topic being specific, the keywords selected for research though inclusive and very wide based, there is a possibility of some relevant literature to have been overlooked. The third limitation of this literature review relates to the uncertainty related with bias being involved in the selection of articles to be included or excluded for the purpose of the Review. The fourth limitation would relate to the lack of time for the Review of Literature to be conducted, hence leaving scope of missing out on other major themes.and Germany having differing opinions can lead to a study on the technology's viability in the long run in a complex environment like India. Such a direction would give for a very strong research study on the home country. In a different domain, a very important area for future research is the study of the limitations and the possible negative implications of using such technology on the banking system. The pressure on fees and commissions of banks thereby leading to a situation of credit negative added to the reduction in gains on foreign exchange will affect the overall revenue.

6 Conclusion

This literature review seeks to provide information about the use of Blockchain Technology on Financial Inclusion. The question long in mind but less researched upon is a very forward looking yet challenging topic to undertake a research on. For the purpose of the Research we undertook Systematic Review Methodology to identify relevant research papers and articles with the use of select keywords. Although limited in scope the literature review seeks to give an insight on the topic "Blockchain Technology and Financial Inclusion" after reviewing 64 Articles. The Major themes identified included 4 aspects namely: A secure way of Financing, Legal Issues, Microfinance and Financial Inclusion. From the Methodological Review we came to know that there is a scope for more Empirical Research with focus towards more Quantitative and Experimental Researches. With a growing number of people investing in the Distributed Ledger Related products, there is a great scope for further research on the same, adding further its implications can also be studied in various other fields apart from the banking industry. Finally we can conclude by saying that with a digital market for banking products providing great facilities to the consumers, Blockchain Technology with its demerits can still work up to open up a great new array of opportunities to provide solutions for the concern of better Financial Inclusion.

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