

## **BLOCKCHAIN AND PAYMENT SYSTEM IN BANKING : A KEY TO SUSTAINABLE CHANGE IN FINANCIAL SERVICES**

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### **ABSTRACT**

*Due to the potential of disruptive influence it has on the business models, blockchain technology is a matter of debate amongst the researchers. Studies for exploring the effect of blockchain on the payment system, representing major cornerstone of the banking system and cradle of the technology have been done. The results of the studies along with 4 main areas of thought process, suggest that this technology allows an offering of the new services which render few of the present day services completely obsolete.*

*This has consequently impacted the financial system of organisations in payments structure. It also generates a huge potential for the new blockchain management technologies while making few of the present ones obsolete. Eventually, the new players that have the capability of leveraging the prospects of blockchain technology have a very strong impulse on this development. Findings contribute to studies by offering insight regarding the impact these innovative technologies have on the blockchain technology and the practical implications by giving a better explanation about the future of blockchain technology regarding payments.*

**Keywords:** *Blockchain Technology, BMs, Blockchain Management System, Global Payment System*

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### **Introduction**

The technological changes bring new challenges and offer new opportunities for organisations. Particularly, the innovative technologies are potential for modifying the equilibrium amongst the firms within an industry. Top firms consistently are not able to

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identify their effect on the BM or the business model might result in ruinous errors. For stay on the top of the industry while the technological discontinuities happen. Not enough instance an introduction of smartphones, online streaming and digital cameras. Companies like Nokia, Eastman Kodak, and Blockbuster had to quit the market due to their inability for adapting the BMs to the changed technological surroundings. Thus, it's imperative to assess the result of latest technologies for BMs in affected industry might have **(Christensen, Raynor and McDonald, 2015)**.

During the past few years, the sector of financial services went through the far reaching changes because of the current crisis in the financial market but only partially. These days, the move towards digitisation of the products and the process pushes the banks and the other financial organisations for rethinking the BMs, strategies and operations. Advent of the new technologies along with a reduction in the margin and rise of the new competitors are compelling the incumbent institutions for finding feasible solutions. This would help them in coping with this new surroundings. It's in this case that especially the technology called blockchain attracts the attention of actors of the financial institutions for the potentially revolutionary improvements of financials and the operations. Following, the blockchain technology vouches for the radical shift to the direct transactions amongst the end parties without the intermediary services having consensus mechanism for verifying the new transactions and decentralised maintenance of records for all the transactions.

Even though misuse of crypto currency has aroused a lot of scepticism in payment industry. The technology used for this forms the new digital currencies and has gradually imposed the evocative presence. In the past few years, the applications based on blockchain have multiplied manifolds and use the cases which cross over boundaries of payment system. Blockchain has a unique potential and adopting it in the payment industry is considered to be ground breaker.

Nevertheless, even when the preliminary predictions regarding the impact of blockchain for the particular parts of banking sector have been done, a specific delineation of consequences which could have for all the payments sector has been identified. For addressing the point and for contributing to studies regarding technological innovations and BMs, these studies answer all the questions related to this research. The main question is how does this technology impacts at present and the new business model in payment industry? The result is based on the Delphi studies amongst the experts of the payment industry which knows about the blockchain technologies **(Roßbach, 2016)**.

The results along with the 4 thought areas indicate that the blockchain technology

affects the blockading management technologies would affect BMs in payment industry by: allowing the new services while making a few of the service obsolete, through these change in the service, subsequent effect on financial structure in organisations in payment industry has been realised, it generates a huge potential for the new BMs within the market and some of the current ones become obsolete, eventually, this industry is affected by the new players which are capable of leveraging the potential of this technology. The contribution lies within an analysis of the effect of the new technologies of BMs with the help of blockchain technology (**Bott&Milkau, 2016**).

## Literature Review

Innovation in the infrastructure facilities like energy, transportation and water that accounts for a prominent amount of the emissions might have a huge impact for reducing the emissions. However, it demands a game changing approach for reimagining the way low carbon transition may happen at a low cost and in the most equitable way. The basic attributes of Blockchain technology could help in enabling deep technological integration, possibilities of the new business model and standardisation. The potential for technology integration with the other important technologies such as internet or artificial intelligence might have huge implications on the conventional infrastructure service(**Wirtz, 2016**).

Core competencies of the blockchain technology including auditability of data, transparency, value transfer, privacy, automation and efficiency in processing could be leveraged for driving systematic changes which are important for delivering a sustainable infrastructure. The attributes of the decentralised trust as well as immutable records help with the real ownership transfer. While just copying the data through internet was possible previously, the blockchain technology has helped in accelerating the shift to internet of valuable things. It enables tangible and intangible assets such as currency, data, infrastructure securities and other obligations such as contracts which need to be exchanged without any intermediaries through trustworthy ledger (**Guo& Liang, 2016**). While thinking of the blockchain, the carbon neutrality isn't something to be considered. The first application of blockchain is known to be the environmental polluter which consumes a huge amount of energy while emitting a huge quantity of carbon dioxide. It validates the transactions and sustains the network too. However, the concerns like these are true just for the specific applications of underlying technologies (**Knezevic, 2018**).

On the basis of the architecture of network and the choice of the protocols, blockchain may be deployed in energy efficient ways. For instance, the private block chains

with the help of algorithms such as proof of the authority while setting up properly don't consume more amount of energy as compared to the traditional solutions of the database (Collins,2016).

The blockchain technology might unlock the new sources for finance and mobilising the current pledges of the industry to reduction in carbon through establishment of the new financial platforms. One objective which is very clear here is lowering the cost for capital for the infrastructural projects apart from enhanced liquidity, expanded access as well as transparency in finances. Secondly, technology might bring visibility for alignment to the sustainability goals. This is done by enabling the stakeholders and the countries in tracking the information and data on infrastructure projects (Chung and Kim, 2016). The blockchain enabled platforms helps in standardising the data, assessing the performance of the assets and improving the compliance. These could further help in augmenting while they integrate with the remote sensors or when they are connected with deep analytics such as artificial intelligence. Thirdly, it might also help in improving awareness and in accessing by working as transactions enabled infrastructure of the new models of market. It may incentivise and boost the willingness of the consumers and the institutions and their ability to contribute to the long term goals of sustainability. It also brings changes within the industries for adapting to move to the demand by the consumers (Tschorsch, Scheuermann, 2016).

Blockchain was initially introduced in the form of an approach for payments transactions on the basis of cryptography. It aimed at providing an alternate mechanism for trust between the 2 transacting parties. The technology helped in collective ledger keeping. This by means of mathematical function helped the participants in reaching to an agreement for approval of the transactions. The information regarding the single transactions may be collected in blocks. The blocks are verified as well as reviewed by network and then added in the chronological order on computers of the participants in that network. The distributed ledger of the verified transactions of the specific units is provided to that network then (Yeoh, 2017). The conventional role which the financial institutions play as trustworthy 3<sup>rd</sup> party, mitigate any risk related to transaction. Bit coin is the first digital currency which is also the largest by far. It also represents the most popular applications of this technology. These days, blockchain has been proposed as the solution for broader spectrum of payments that range from real time payment between the 2 parties towards transfer of funds across different currencies such as remittances, micro payments and the digital assets. The effect of this technology could proceed further than some of the modified processes and some of the new commodities (Shang & Price, 2019). Researchers expect the consequences to reach further which would reach in the

whole BMs would be impacted. From this it could be incurred that the effect on BMs of blockchain technology are the best example for far reaching potential of the IT development. According to this, the blockchain technology has attracted the interest of the community of Information system regarding the cryptographic and trust aspects to implications and procedure and diverse issues of the virtual currency (**Geiregat, 2018**).

The payments sector represents the biggest business fields of the financial institutions. Payment in effect aren't just attractive source of revenue, they also work as an anchor for different services. Further, it is also a crucial element regarding customer data (**Franke, Schletz and Salomo, 2020**).

For banks, the information payment is the main knowledge source regarding the customers. Further, losing the stakes in the payments cause disastrous consequences on the banks. At present, the industry of payments finds itself within the state of upheaval. It is triggered by the regulations and the political initiatives. Amongst these it's worth mentioning development of single payments, establishment of the instant payment which is decided already (**Firdaus, et. al., 2019**).

Globally, an emergence of the smartphones has helped the new players like large telecommunication and technological enterprises, which enter the market. Further, a lot of companies from Fintech arena have emerged. Squeezed between need to invest according to IT, erosion of revenue from the conventional sources as well as increased competition, BMs of a lot of financial institutions are under a lot of pressure. Thus, any attempt at making current payments infrastructure obsolete or for pulling the payments away from banking institutions and other financial institutions contribute strongly to the deterioration of the BMs. Regarding this, the blockchain technologies represent threats significantly as it may switch the 3<sup>rd</sup> party functions of the financial organisations off in the payments. However a reduction in cost which might be realised by usage of the blockchain in payment induces them to look at the development (**Andoni, 2019**).

The promising potential if the blockchain technology attracts the attention towards the current payment system and operators, providers of the international transactions payments and the regulators. The enterprises from both these technologies and financial services domain are launching and considering the prototypes of the blockchain based options (**Casino, Dasaklis and Patsakis, 2019**). Particularly, the incumbent organisations make an attempt at defending the BMs. It's done with the application of different types of strategies from creating the in house platforms towards directly investing in the blockchain organisations collaborating with them and offering the accelerator services for exploring the blockchain applications. The large banks are

participating in the global collaborations. It's happening in almost all the major consultancies and audit firms offering their expertise and making an attempt at positioning themselves as a leading knowledge carrier (**Jia, et. al., 2016**).

Before getting into the details with major proofs from western banks, it is important to consider the role of geographical areas for the promotion of blockchain start-ups and developments of the companies.

While talking about the blockchain development and implementation, geographical differences arise since the level of investment differ from one region to another. In this regard, the US market is considered to be the pioneer of blockchain based start-ups. This is mostly due to the initial few developments of this technology came from those regions. However competitive edge regarding the environment and the investment that American landscaping the initial few years have been reduced recently by the entry of the Chinese Fintech organisations (**Yogesh, 2021**). Even because of the precise regulations which developed the desired ecosystem for allowing blockchain based start-ups for growing without any legal restrictions. Studies focus mainly on western areas, in an attempt to state the state of art of the blockchain strategy implementation in the banking system of America and Europe (**Burnson, 2017**).

Being a revolutionary technological blockchain has a prominent impact on the governance, law and the society. Some of the applications like voting on the basis of the blockchain technology does have certain implications. Blockchain impacts the design of the organisation as it creates the possibility for different stances for Bit coin ICOs and the other applications of the blockchain (**Ehrenberg and King, 2020**).

A positive aspect of this is that a blockchain isn't a single network. It comprises of multiple networks along with different mechanism of consensus as well as other specifications. There are certain levels for tokenisation which may help with the adoption of some of the blockchain networks. However some of the networks could also be banned in risk averse or conservative nations. Tokenisation offers 4 main benefits to all the sellers and the investors. These are cheap and fast transactions, better liquidity, increased accessibility and improved transparency. Tokenisation isn't important for all the applications based on blockchain technology. However it's the key for maximum number of disruptions in a financial domain. It serves as the base for ICOs (**Lee, Noh, Khim, 2020**). The importance of blockchain for supply chain is acting as the inter organisation system. It begins with the tracking of the product's journey from raw material to the finished goods. Low consumption of energy consensus protocol, tokenisation and the smart contracts has additional new dimensions to potential of the blockchain technology (**Tan, Xuan, Cottrill, 2018**). Studies have been done for providing a deep dive into

benefits as well as the applications of the blockchain technology while reviewing the current literature for the subject. Social performance, economic performance as well as the environmental performance form the constructs of sustainability. It's often the challenge for the business hubs to follow the practice of sustainability while offering an improved financial and environmental performance (**Montecchi, Plangger, Etter, 2019**).

It often becomes quite challenging for the businesses for following the practices of sustainability while offering an improved financial and environmental performance. Social performance demands a democrat's structure where rights as well as requirements of all the stakeholders are safeguarded. There're long term advantages for boosting the objectives of sustainable development that are even referred to under triple bottom-line approach (**George et. al., 2019**).

While improving the competitive benefits, an organisation engages into activities which positively impact the society and the environment. This particular aspect should be assess regarding the activities of supply chain. In this regard, it should be seen that collaboration has an important role to play for optimising flow of information, goods as well as financial payments. It often happens that the participants of supply chain have conflicting priorities as well as interests (**Behnke and Janssen, 2020**). There are also technological barriers of the incompatible system which are used by parties for tracking the shipments. The firms address such challenges through integration of sustainability into overall strategies. It would help the firms in positively impacting the society, environment and the economy (**Agrawal and, 2019**). The latest peer review on sustainability reflects that blockchain isn't simply one single network. It comprises of multiple networks which have different consensus mechanism as well as other specifications. There are multiple level tokenisation which may help with adoption of some of the networks of blockchain. However, some of the networks could also be banned in the risk averse or conservative nations. Tokenisation offers 4 main advantages for all the sellers and the investors including cheap and fast transactions, improved transparency and enhanced accessibility (**Raheem, Shishaev and Dikovitsky, 2019**). Tokenisation isn't important for the blockchain applications. However, it's important to see that disruptions in financial sector which also serves as the base for the technology. The importance of blockchain for supply chain is acting as the inter-organisational structure. It begins with tracking of the journey of the commodities from raw material to finished goods. Low energy consuming consensus protocol, tokenisation as well as smart contract add new dimensions into the efficiency of the blockchain technology into supply chain management (**Violino et. al., 2019**).

Embracing the new technological advancements enable prominent reductions in the greenhouse gases emission. It would be interesting to mitigate the impact of change in climate. However, it's not obvious what kind of breakthroughs would look like. It's quite likely that a lot of technologies, working in the concert would be required for handling the complexities of the challenge at hand (**Violino et. al., 2020**).

Innovation as well as investment in the storage of energy, material, renewable generation of energy, agricultural science, transport service and digital technology are a few areas crucial for transition of low level of carbon. Various digital innovations emerge in global economy offering the potential of transforming the systems which function by making trade, manufacturing, agriculture and infrastructure more intelligent, efficient and connected (**Duan et. al., 2020**). The biggest benefit of promoting the digital innovations is that it causes further innovation, unlocking of the unprecedented possibilities, etc. It's true specifically in the infrastructure services with the potential to innovate within the domain which is big. The report explores the way innovations and specifically disseminated ledger technology like blockchain technology along with the other technologies such as artificial intelligence and internet of things may help in boosting the cost efficient transition of the key infrastructural services. While considering blockchain technology, carbon neutrality does not come to our mind first (**Figorilli et. al., 2018**).

Talking about bit coin again, the first application of blockchain technology is considered to be an environmental polluter. It consumes a huge amount of energy while emitting vast amount of carbon di oxide for validating the transactions and sustaining the network. However, these kind of concerns are true only when the particular applications of underlying technologies happen (**Shi et.al. 2019**).

According to reports, the blockchain technologies as well as the underlying attributes have the capability of delivering sustainable infrastructure. It unblocks the opportunities along with the value chain of infrastructure. In principle, the blockchain technology which are used interchangeably could be used for the purpose of recordkeeping and transferring of value without needing a trustworthy central entity for maintaining the database or for validating the transactions. Instead, such activities are accomplished with decentralisation of the network wherein data is saved (**Treiblmaier, Rejeb and Strebinger, 2020**). The functions happen with the validation mechanism which helps all the participants within the network to have immutable one single source for truth. The as such smart contracts that are enabled through block Chan technologies permit an auto execution of the transactions while one and more preconditions could be fulfilled. Therefore, providing the potential for efficiency gain could be realised. The



digital and physical assets could be represented as the token of value on shared disseminated registry, helping tokens to be traded directly amongst the participants of the network. In short, such core efficiencies allow use of the crypto currencies and token digital records. This is in context to infrastructural lifecycle including finance as well as procurement by way of operations and tenders (**Bumblauskas et. al., 2020**).

### Objectives of the Study:

1. To find the reasons for radical shift in banking due to blockchain with special reference to payment or global payment system and its role in sustainable change in Financial Services
2. To ascertain the significance of the reasons for radical shift in banking due to blockchain with special reference to payment or global payment system and its role in sustainable change in Financial Services

### Research Methodology:

The present study is descriptive in nature in which the reasons for radical shift in banking due to blockchain with special reference to payment / global payment system & how it will be an enabler for sustainable change in financial services have been studied. The sample size of the study is 160. The data were collected with the help of a structured questionnaire on a five-point scale and analysed with the help of the mean values and t test.

**Table1: Demographic profile of the respondents**

Organisation		Gender		Accept Blockchain		Blockchain made transaction easier	
				Yes	No	Yes	No
Bank		Male	28	20	8	21	7
		Female	30	15	15	17	13
Stock Market		Male	22	8	14	12	10
		Female	27	8	19	18	9
Other Services		Male	24	14	10	15	9
		Female	29	16	13	20	9
<b>Total</b>			<b>160</b>	<b>81</b>	<b>79</b>	<b>103</b>	<b>57</b>

Table 1 presents demographic profile of the respondents on radical shift in banking due to blockchain with special reference to payment / global payment system and how it will be

an enabler for sustainable change in financial services. There are 56% males and 54% females in the study. Among the respondents, 33% are working in banking, 39% in stock market and 28% in other sectors. The 51% of the respondents accepted blockchain and 49% of the respondents did not. The percentage of respondents who thinks that blockchain made transaction easier is 64% and 36% thinks it has not.

**Table 2: Mean Value of the radical shift in banking due to blockchain with special reference to payment / global payment system and how it will be an enabler for sustainable change in financial services**

Sr. No.	Statements	Mean Score
1.	Blockchain offers additional security to the financial transactions	4.25
2.	Blockchain eradicates the middlemen for financial transactions	4.12
3.	Blockchain technology has helped in making the payments faster	4.21
4.	Blockchain has made it easy and safe to borrow money from financial institutions	4.19
5.	Blockchain helps banks to accept digital currency which is quite beneficial for the banks	4.23
6.	Since transactions are generated digitally, banks don't need to bother about any prominent errors	3.96
7.	Blockchain helps the financial institutions in knowing their customers better	4.02
8.	Blockchain increases transparency between the participants of the market	4.07
9.	Blockchain permits use of certain tools like self-execution contracts and smart contracts which automate the manual processes	3.91
10.	Blockchain helps in replacing the heavy paper work of the process of lading in trading finance industry	4.28

Table 2 shows the opinions of the respondents. It is observed that Blockchain helps in replacing the heavy paper work of the process of lading in trading finance industry with the mean value of 4.28. It is followed by Blockchain offers additional security to the financial transactions (4.25), Blockchain helps banks to accept digital currency which is quite beneficial for the banks (4.23) Blockchain technology has helped in making the

payments faster (4.21). Further, Blockchain has made it easy and safe to borrow money from financial institutions (4.19), Blockchain eradicates the middlemen for financial transactions (4.12), Blockchain increases transparency between the participants of the market (4.07), Blockchain helps the financial institutions in knowing their customers better (4.02) and Since transactions are generated digitally, banks don't need to bother about any prominent errors (3.96) were also considered important. Reasons like Blockchain permits use of certain tools like self-execution contracts and smart contracts which automate the manual processes (3.91) were also viewed as important.

**Table 3 Radical shift in banking due to blockchain with special reference to payment / global payment system and how it will be an enabler for sustainable change in financial services**

Sr. No.	Statements	Mean Score	t-Value	Sig
1.	Blockchain offers additional security to the financial transactions	4.25	9.285	0.000
2.	Blockchain eradicates the middlemen for financial transactions	4.12	7.219	0.000
3.	Blockchain technology has helped in making the payments faster	4.21	8.062	0.000
4.	Blockchain has made it easy and safe to borrow money from financial institutions	4.19	6.692	0.000
5.	Blockchain helps banks to accept digital currency which is quite beneficial for the banks	4.23	7.430	0.000
6.	Since transactions are generated digitally, banks don't need to bother about any prominent errors	3.96	5.280	0.000
7.	Blockchain helps the financial institutions in knowing their customers better	4.02	6.201	0.000
8.	Blockchain increases transparency between the participants of the market	4.07	7.518	0.000
9.	Blockchain permits use of certain tools like self-execution contracts and smart contracts which automate the manual processes	3.91	4.915	0.000
10.	Blockchain helps in replacing the heavy paper work of the process of lading in trading finance industry	4.28	9.410	0.000

Table 3 shows the results of t-test. It is found from the table that the significance value

for all the statements is below 0.05, hence all the statements regarding the Blockchain & radical shift in banking with special reference to payment / global payment system and how it will be an enabler for sustainable change in financial services are significant.

## Conclusion

The blockchain technology is potential enough for improving how transactions are happening across the world. It also has the potential of ensuring global access of the financial structure. In short, as per World Economic Forum, there're some key findings regarding the blockchain technology. The distributed ledgers technology is efficient enough of driving efficiency and simplicity. It establishes the new financial service infrastructure and process. The distributed ledger technologies forms the base for next generation of financial service infrastructure along with the other existent as well as emerging technologies.

The blockchain application also promotes formation of the multi-centre scenario which improves the efficiencies of the banking structure. However it is important to take into considerations some of the obstacles as technical regulatory as well as other issues related to this technology would be resolved at the end.

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