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Application of Block-Chain Technology in the Insurance Industry : The Case for India

Insurance helps in building a financially resilient society. The industry is looking for ways to increase the access to insurance through the use of new-age technology. A technology like blockchain is creating a new ecosystem which will provide a new way for conducting business in a more transparent, efficient and democratic manner. This paper examines the prospective use of blockchain technology in India and the construing barriers to the ecosystem.

Key words: Blockchain - Insurtech - Blockchain and insurance - Technology and insurance

Introduction

Insurance plays an important role in the development of the economy. At the same time insurance penetration and density are considered as one of the indicators of a developed economy. The role played by insurance in development of businesses is well established. It also helps in building a resilient society when it comes to dealing with natural and man-made disasters and calamities. Increasing severity and frequencies of natural calamities associated with climate change indicate the imperative need of insurance globally. Insurance sector is poised to undergo disruptive changes in the near future because of technological innovations. Technologies like blockchain, artificial intelligence and machine learning are creating a new ecosystem which will provide a new way for conducting business in a more transparent, efficient and democratic manner. Auditability, traceability, and immutability of blockchain technology is transforming the insurance processes by making it faster, cheaper, accessible, and safer (PWC, 2020). Research is being conducted to investigating the platform design, risk and regulatory issues for bitcoins or Ethereum (Bohme *et al.*, 2015; Gandal & Halaburda, 2016) and the

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blockchain (Yermack, 2017) to examine and document these developments. Some other studies talked about robo advisors (Fein, 2015) and mobile payment and wallet services (Miolsnes & Rong, 2003; Mallet *et al.,* 2004; Mallet, 2007). Dushnitsky *et al.* (2016) talked about the role of regulation in crowd-funding platforms. Cumming and Schweinbacher (2016) examined the various venture capitalist investments for fintech start-ups around the world.

Blockchain is a fully functional Distributed Ledger Technology (DLT) that collects, stores, distributes and facilitates exchanges of some value between private or public users (Grima, Spiteri & Romānova, 2020). It is a distributed, append-only log of time-stamped records that is cryptographically protected from tampering and revision. Blockchains provide decentralized approaches to the creation and management of value (Chen *et al.,*2018). The key features of blockchain are immutability, peer-to-peer transmission, availability of time-series data, real-time visibility, anonymity, smart contracts, and distributed system with no central control; hence, there is no single point of failure (Pu & Lam, 2020). The flow and visibility of data to all stakeholders make the distributed ledgers and blockchain technology potentially revolutionary particularly for the insurance sector (Crawford, 2020).

The platforms dedicated to creating blockchain-enabled ecosystem are being launched for all classes of insurance business (Grima, Spiteri & Romānova, 2020). It is envisaged that blockchain technology will become the default platform for the entire insurance sector in the near future (Crawford *et al.,* 2018). Implementation of blockchain has a long-term horizon as it depends on network effects as well as on defining the regulatory conditions (McKinsey, 2016). In regulatory space application, blockchain technology falls under the preview of FinTech or InsureTech. Globally regulators are showing a keen interest in the growth of blockchain technologies within the FinTech and more specifically, technological innovations under InsurerTech. Many regulators in Europe have used the 'sandbox' concept to test the strength, viability and rigour of new technologies and concepts (Brophy, 2019). Indian regulatory authorities have also taken a proactive stance to examine InsurTech. Hence, Inusrance Regulatory Development Authority of India (IRDAI) constituted a working group in the year 2018 to make recommendations relating to regulatory and supervisory framework in respect of InsurTech. The framework relates to risk assessment, risk improvement, product design and product pricing. It also allowed testing of the products under sand-box concept before launching them on a wider scale (Mathur, 2018). The Indian insurance sector is also looking forward to adopting blockchain technology in a big way. Thirteen Indian life insurers have come together to create a blockchain consortium to facilitate cross-

company data sharing. The shared infrastructure provided by the distributed ledger, smart contracts, and non-repudiation capabilities of blockchain is intended to enhance the insurance value chain. It will pave the way to greater automation in requesting, exchanging, and entering data. It is expected to reduce the reliance on intermediaries and aggregators for KYC, financial and medical underwriting, risk assessment, fraud detection and regulatory compliance (Morris, 2018). In this paper we examine the prospective use of blockchain technology in India and the barriers in the ecosystem.

Understanding The Basics of Blockchain Technology

Distributed ledger technology are the databases that are spread across multiple cities, countries, or institutions, and are typically public copies of each other. Records are stored in transactions located in blocks, one after the other in a continuous ledger, but they can only be added when the participants reach a quorum (Walport, 2016). Essentially, there are three types of blockchain-permissioned items wherein verification nodes are pre-selected by a central authority/consortium. Private blockchains are restricted to be used within the organization, and public blockchains which anyone can read and submit transactions to the blockchain (Peters & Panayi, 2015). Blockchain 1.0 was primarily aimed at understanding the digital currencies whereas Blockchain 2.0 is focused upon contracts, economic, markets and financial applications that transcend the blockchain beyond cash transactions (Swan, 2015; Scott, Loonam & Kumar, 2017). Blockchain technology can be effectively used in the peer-to-peer lending framework and smart-property transactions (Efanov & Roschin, 2018).

Why is Blockchain Beneficial?

Blockchain is poised to revolutionize insurance globally. It facilitates innovative business models, and promises cost advantages to insurance companies and their customers (Higginson *et al.,* 2017). It has the potential of breaking barriers of access and affordability. It can be instrumental in changing the way insurance business is carried out (Accenture, 2018). Today the majority of insurance policies are documented and processed on paper or in digital format systems. These processes are highly prone to human errors and need supervision, which increases both cost and turn-around time. It also operates in a complex environment and involves multiple stakeholders like consumers, brokers, insurers, reinsurers, banks and regulators. Blockchain provides a distributed ledger for all these stakeholders to work seamlessly in real time (Chen *et al.,* 2018). According to the 'Chainthat' report, blockchain can be instrumental in improving efficiency in four aspects of insurance industry, namely: (i) reducing fraud, (ii) claim

automation, (iii) data analysis and (iv) reinsurance. Information on credit history, policy information, health data, etc., can flow into the blockchain network from various stakeholders making it easy to operate real time. It can automatically collect records of agreements, transactions and other valuable information sets, then link together the information and act on the data using smart contracts (Delloit, 2016).

As per the PWC (2017) Report, blockchain technology offers several benefits, such as automated processes, reduced theft and frauds, real-time price adjustments, integration over a single platform, and customization of products. Today the insurance industry does not have a repository of all insurance policies. This lacuna makes it difficult to identify duplicity of policies and claims. As a result, insurance companies end up paying multiple claims for the same peril. Contracts and claims can be recorded and validated by use of blockchain. It will help in avoiding multiple/duplication of claims for the same event as it will become easy to track claim payment recorded in the network. This will help in plugging the holes in the claim settlement process and reduce losses to the insurance companies. In other words (Grima, Spiteri, & Romānova, 2020) one of the uses in this context has been the KYC platform developed by Mutuel Arkea Group and IBM, primarily aimed at improving customer data sharing between banking and insurance industries.

Smart Contracts in Insurance Industry

Smart contracts are based on blockchain technology and can be a potent tool in the hand of insurance industry for seamless and smooth insurance services. A smart contract is an agreement that is self-enforced as a code and managed by the blockchain. It is encoded within a computer program automatically executed, provided certain criteria are met (PWC, 2020). Smart contracts are self-executable programs that operate on Distributed Ledger Technique (DLT) and can automate previous manual processes and mechanisms (Allens, 2017). The advantages of smart contracts are that it is tamper-proof, reduces contract execution cost, improves quality and efficiency. Insurance industry can adopt smart contract application in automated claims processing, verification of transactions and payment. It will prevent/detect fraud and minimize human errors. An innovative example and use is adoption of smart contract-based flight insurance mechanism that will generate automatic refund to the insured passengers for flight delays (Bertini *et al.,* 2015). Another example of its use is the CAIPY which is the smart contract-based system facilitating car insurance that enables current processes and facilitates cost savings for the firm (Bader *et al.,* 2018). Smart contracts will help in claim settlement by employing recorded coverage information, thereby leading to automation of claims' payments

(KPMG International, 2017). Smart contracts enable only valid transactions and will enforce those contracts only when certain conditions are validated (Deloitte, 2016). Smart contracts would be able to provide better claim management by making it more transparent and responsive and will minimize friction and disputes.

The enhanced role of blockchain has received very little attention in health insurance sector (Simon, 2019). The healthcare system could be the prime beneficiary of the blockchain technology in the domain of drug verification, health data records, health insurance (Griggs *et al.,* 2018). Health insurance industry can immensely benefit from the blockchain technology as it would lead to mitigation and minimization of false claims. Further, using smart contracts claim requests can be validated in a more robust manner.

The Enablers of Blockchain Use in Insurance Industry: The Case for India

The ***data protection and privacy*** issues will have defined impact in the event of blockchain use in the insurance industry in India. In this context, it should be noted that the Government of India introduced Personal Data Protection Bill, 2018, that outlined the rights and obligations of data subject to fiduciaries. The economic groupings like APEC and EU are also working in the same direction. The EU has its GDPR which is one of the robust laws available protecting the rights and interests of the consumers of fintech industry. The use of ***digital financial services*** (DFS) for G2P payments have resulted in significant efficiency and fiscal gains to the government as GOI had saved more than US$ 12.7 billion through digital transfers with minimum leakages. So, the government has also been advocating the use of digital financial services keeping in mind the data privacy/security issues. Similarly, availability of ***data platforms*** helps in creating a robust digital financial infrastructure. Apart from this advantage and access, it also has an added feature in this category. The automated access to the government data platforms has eased the tasks of banks, and loan approvals have become easier (loans are approved in an hour instead of taking 20-25 days).

For the use of blockchain technology digital, IDs can be very useful as it helps in resolving authentication issues and lowering the information costs. ***Digital ID*** is very important for digital financial services and better effectiveness of fintech models, like open banking. Authentication issues can be addressed with the help of digital IDs. It also lowers the cost. Digital IDs also help in green growth as they reduce the carbon footprints. In India, use of AADHAR has led to instant opening of the accounts and reduced the cost and time of KYC information gathering/verification from Rs. 1500 to

just Rs. 20. Besides that, India has a Digi-locker to have secure documents which can be shared with the services providers, and India Stack does the job of aggregation. The use of inter-operability has also given much relief to the financial services providers. UPI has further eased this task by using QR codes for facilitation of payment. Adequate ***safety measures*** have also been taken, such as banking ombudsman scheme that has been efficiently operationalized. For industry code of standards, we have Banking Code and Standards Board of India. Similarly, the RBI has also come up with ***Ombudsman scheme for digital transactions (OSDT)*** that offers free solutions to settle grievances. FinTech have started to work in India mostly using the avenue of India Stack, available technology, venture capital funding. These include mobile wallets, alternative lending and insurance. Alternative lending has been launched in India with some of the FinTechs that are involved in P2P, consumer and SME loans. There are many examples like Mintifi, Capitalfolat, Faircent, Lendingkart, Moneytap and Power2SME, etc. Their strength comes from using big data analytics in analysing the data and offering quick decisions.

Some use cases of Insurtech are defined below.

Use Cases of InsurTech in India

Company Name	Key Technology Used	Products Offered
Acko	Deep data analytics	Telematics/Usage Based Car Insurance
Artivatic	SaaS platform, NLP, ML, Deep Learning	Health Insurance Services
Mantra Labs	AI	Insurance Technology
Pentation Analytics	Cloud Platform	Insurance Analytics Suite
Toffee Insurance	API	Microinsurance Products

Source: Authors

Barriers to Adoption of Blockchain Technology

Khan *et al.* (2021) is of the view that blockchain and smart contracts offer ample opportunities for insurance and other industries, yet their application remains limited because of several handicaps stemming from legal issues, absence of standards and protocols, privacy problems and error intolerance. The blockchain use case in insurance industry is limited to removal of intermediaries, producing temper - resistant records for transactions and reduction in the operational costs in the insurance value chain.

Blockchain in insurance industry can be used for underwriting and pricing, sales and distribution and claims processing management. These are some of the major use cases of blockchain in insurance industry. Blockchain will accelerate the digitization and bring about transformational change in the insurance industry.

The study by Popovic *et al.* (2021) argued that the adoption of blockchain would make sense only when there is a *suitable and high impact on business use case.* Little knowledge and limited understanding of blockchain technology make it more difficult to use it and would possibly be the reason/s for the reported failed projects and non-performing investments. Companies are shying away from using blockchain technology as they are still reluctant *to transact via public permissionless blockchain.* The use of Zero-Knowledge Proof (ZKP) as an encryption technique has allowed one party in the transaction to prove to another party that they have the value X without conveying any information apart from the fact that they know the value of X. Further, the issue of change in the management persists as there has been a ***lack of support*** for deployment of blockchain technology in the organization as it involves change in the mindset. One of the issues involved in using crypto assets, which are based on blockchain technology, has been the ***lack of accounting guidelines,*** solvency, and capital issues and how to resolve them. Absence of standardized guidelines and procedures makes the reporting and analysis of blockchain transactions opaque and questionable. Blockchain development has been smart and fast paced but, ***legislation and regulation*** have not been able to keep up with its the speed and momentum. Besides, there are issues concerning the legality of the smart contracts (Giancaspro, 2017; Werbach & Cornell, 2017; Norton Rose Fulbright, 2016). It is not very clear whether the smart contracts would be formally recognized as formal contracts. Jurisdiction issues around crypto-currencies have also raised concerns for the use and validation of crypto-assets and whether smart contracts ***are legally enforceable*** or not. Further, data privacy issues are the primary concerns of the policymakers, and the General Data Protection Regulation (GDPR) Act finds itself not in alignment with the immutable feature of blockchain technology. Further it contradicts the centralized database/storage mechanism. Smart contracts encompass protocols that triggers automated operationalization of the contractual obligations to be enforced by parties to the contracts (PWC, 2017). The Smart Contracts Alliance (2016) has defined the consensus protocol as the form of an algorithm that constitutes a set of rules for participation in the blockchain, how it should process the message, how the participants accepting the blockchain should process messages and how those participants should accept the processing done by the other participants.

An issue that organizations/companies have given the least consideration is the ***economics of blockchain*** that is at the core of the adoption of blockchain technology. The study by Khan *et al.* (2021) have discussed this aspect in the detail and their study emphasized that there is no disagreement that blockchain in disruptive in character. However, blockchain must be tested under real-world, real-time adversarial conditions. The insurance companies have pilot-tested the proof-of-concepts but most of them have failed to move on to the production stage. The lack of expertise in blockchain technology is an issue that affects the early adoption of the blockchain technology.

Conclusions and Recommendations

Blockchain technology is expected to and can revolutionize the insurance industry. Use of blockchain will reduce information asymmetry and make it transparent for both the insurer and the insured. It will make smart contract possible and that will benefit the Indian insurance industry in reducing cost and making insurance affordable and quick. Smart contracting is going to be at the forefront of several collaborative efforts undertaken within the industry or in conjunction with major external technology entities (Tarr, 2018). Automatic claim settlements would become possibly the best validation of the test conditions (Deloitte, 2016) and Indians can greatly benefit as India's demography as well as technological backup favour its quick adoption. Further, the use of digital ledger would make Indian insurers more supportive in terms of providing quicker and better customer-service convenience as it gives the customers a complete overview of their insurance policies, notifies them when their premiums are due and displays an impeccable record of the entire policy history. Blockchain can be instrumental in combining and consolidating health records for better diagnosis. However, health privacy and data security are the major issues in health insurance. Accessing and sharing of health records have privacy and ethical constrains at stake. This can be solved by blockchain as patients can grant access to their information to others by providing private keys to unlock the data to select entities like physicians and insurers (Delloit, 2016; Accenture, 2018). Blockchain-enabled platforms will have the ability to enable community, companies, and developers to build insurance prediction markets and formulate insurance products. It can also build a self-insurance platform for any insurance company with a smart contract and a risk-based tokenization system (Huawei, 2018). General health and life insurance are highly regulated industries in India. The industry would benefit the maximum from the use of blockchain as it will bring increased transparency into organizational transactions and administrative activities. Pulling data quickly from diverse sources will improve regulatory reporting efforts such as the

Medical Loss Ratio (MLR). The accessibility of blockchain's distributed ledger can make reporting to regulators faster, cheaper, and easier (Delloit 2016). However, numerous challenges remain for the Indian insurance industry as security of blockchain, data secrecy, its pseudo-anonymous nature, energy intensive technology and scalability may affect the prospects of blockchain adoption and applications in the insurance industry in India.

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