

The Trust Link: Movement towards a More Connected and Efficient Insurance Market with Blockchain and Distributed Ledger Technology

By Patrick Schmid, PhD

Abstract:

The blockchain, a distributed database and ledger that maintains a growing list of digital records, has potential to redefine insurance operations and help the insurance industry overcome many of its current challenges. The decentralized consensus process associated with blockchain technology, what some call the "Trust Machine", removes the need for intermediary verification and could dramatically lower costs. Untrusting competitors within the industry can securely share data with one another on a permissioned blockchain, abating duplicative efforts, minimizing reconciliation issues and reducing costs. The ability to use smart contracts – programmable code that can be written into a blockchain and self-execute – extends potential applications and makes automating large chunks of insurance-related processes more practical. Recent research suggests blockchain implementation could lead to 5-13 percentage point reduction in combined operating ratios, creating a \$200 billion opportunity. When production-grade blockchain use cases proliferate across the industry, the first entrants will be best positioned to understand the associated efficiency gains and reap the competitive rewards. Therefore, industry participants are best served engaging early in blockchain efforts, including consortia, rather than waiting on the sidelines. The goal should be to determine use cases, prioritize them, engage in requirement setting, test the viability of blockchain applications and efficiently adopt use cases with a positive projected return on investment.

Introduction

The risk management and insurance industry is changing. The industry is faced with an increasingly fast moving, innovative, and data-driven environment, which may result in large-scale changes to traditional industry products, processes, distribution, and employment. New risks are emerging. New forms of data and analytics are changing the way the industry operates and analyzes risk. New tools are being utilized to create innovative efficiencies. The industry is embracing a variety of new technologies, including blockchain, all at once.

Meanwhile, today's economic climate presents many challenges for insurance-related organizations. In an extended period of weak income growth, rising prices, greater access to information, ever-evolving technology and increasing globalization, consumers demand more from suppliers, including insurers. Yet, in this increasingly competitive environment, profits have been constrained by low interest rates, weak investment returns and regulatory scrutiny. Insurance-related organizations have increasingly begun focusing on cost minimization in order to drive profitability. Much of this focus is on leveraging technology to lower the costs of recordkeeping, easing data retrieval, simplifying processes, combating fraud and finding an efficient path within a stringent regulatory environment.

As organizations implement technology to drive down costs, it is no surprise that industry employment is expected to change. Traditional areas of industry employment are not expected to grow substantially and several areas are expected to decline. In U.S. P&C insurance, for example, carrier underwriting employment and claims adjusters employment are expected to contract by 10% each over the next decade according to the Bureau of Labor Statistics. The BLS primary rationale for the forecasted fall in employment is technology-related automation. Other areas of employment more aligned with the technical changes, such as statisticians or jobs related to predictive modeling, are expected to grow.

As all of these factors play out and technological change flourishes within the risk management and insurance industry, blockchain will undoubtedly play a key role. Most new technologies, including internet of things or machine learning, provide a means to capture and analyze data. Blockchain technology provides something different: a secure and permissioned way for entities to store and share data without the need for an intermediary. Up until recently, competitors within the insurance industry have had a fear of sharing data because the benefits did not outweigh the security risks/costs. That changes with the birth of blockchain technology.

Across the broad financial services industry, many are looking at blockchain technology and associated smart contracts as a potential opportunity to streamline the flow and verification of data, lower operating costs, improve processes and cut out the need for intermediation. Blockchain and distributed ledger technology may provide the industry with:

- Trust and auditability
- Increased automation

- Privacy with permissioned sharing
- Lower administrative costs
- Elimination of fraud

The potential use of this technology is one of the reasons the World Economic Forums stated that blockchain will soon become “the beating heart of the global financial system” and predicted that within ten years “10 percent of all gross domestic product will be stored on blockchains”.¹ Other groups have made similar predictions specifying insurance benefits. A McKinsey & Company report found that the insurance industry accounts for the most blockchain uses (22 percent of the total), distantly followed by the payments industry (13 percent).² A Deloitte report stated that “adopting a common blockchain across the sector could create a step-change in value in the insurance industry: claims handling could become more efficient and streamlined, resulting in an improved customer experience. Such an approach could also help to reduce further, if not entirely prevent, fraud if identity management was also enforced on the blockchain – meaning that criminals could no longer crash for cash.”³ Capgemini research indicates that personal auto insurers could save \$21 billion a year through lower costs, which can be realized through application of blockchain-enabled smart contracts.⁴

Blockchain Overview

The blockchain is significant in that it combines a distributed database and decentralized ledger, completely removing the need for verification by a central authority. For example, through its underlying blockchain technology, bitcoin solved the double-spending problem, which stymied digital currencies before it. It also reinvented the concept of monetary networks by providing a true peer-to-peer payment system and eliminating the need for intermediary banks, including central banks.

What was truly unique about bitcoin was it provided a decentralization of trust. Traditionally, trust has been established by a centralized party, institution or intermediary. These parties, whether they are companies or governments, have been very important to establishing or giving root to our contemporary society. Yet, recently people or consumers who utilize these traditional systems have also been less trusting of these centralized institutions. Many trusted organizations have often misused consumer data and information. It turns out these systems can be untrustworthy at times. Cryptocurrency, particularly bitcoin, was important because it demonstrated that something critical in our society – the creation and transmission of money – could emerge without an intermediary

¹ Peter Vanham, “Blockchain Will Become ‘Beating Heart’ of the Global Financial System,” World Economic Forum, August 12, 2016, <https://www.weforum.org/press/2016/08/blockchain-will-becomebeating-heart-of-the-global-financial-system/> (accessed January 23, 2017).

² “Blockchain Technology in the Insurance Sector,” McKinsey & Company.

³ “Blockchain Applications in Insurance,” Deloitte, 2016, <https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/innovation/ch-en-innovation-deloitte-blockchain-app-in-insurance.pdf> (accessed January 23, 2017).

⁴ “Consumers Set to Save Up to Sixteen Billion Dollars on Banking and Insurance Fees Thanks to Blockchain-Based Smart Contracts Says Capgemini Report,” Capgemini, October 11, 2016, <https://www.capgemini.com/news/consumers-set-to-save-up-to-sixteen-billion-dollars-on-banking-andinsurance-fees-thanks-to/> (accessed January 23, 2017).

involved in verifying transactions and establishing trust. Even the government is uninvolved. The idea of peer-to-peer transactional exchange is indeed a revolutionary concept.

However, blockchain applications are much larger in scope than bitcoin and the associated transaction protocol. More recent public blockchains, like the blockchain associated with the Ethereum Virtual Machine (EVM), have further extended the blockchain innovation by establishing the use of smart contracts – computer protocols that facilitate, verify, and enforce the performance of a contract and that can be self-executing and self-enforcing. Ethereum allows codable contracts to be built and inserted into its blockchain so that contracts are enforced and verified without middlemen. Original blockchains, like bitcoin's or ethereum's function as shared databases that are both public, in that transactions can be viewed by users, and anonymous, because the associated cryptography hides the identities of parties to the transactions.

It is important to distinguish between the concept of blockchain and cryptocurrency. Bitcoin and ethereum are examples of cryptocurrencies with their own public blockchains. Public blockchains are defined as blockchains where anyone on the system can read or write to the platform. There are nearly 2000 cryptocurrencies, each with their own blockchain or distributed ledger. These public blockchains have great revolutionary prospects, but their current potential offerings are bounded. Each of these public blockchains are fairly slow, since all transactions/smart contracts are broadcasted to all parties in the system, and have difficulty scaling. It may be the case that technological advancement continues and these hurdles are overcome, but currently they are not ideal for business usage.

Towards Other Blockchains

In a lot of ways, blockchain was the next logical step in technological innovation. It fused databases/ledgers with networks through encryption and economic incentives to provide advancements in e-commerce (i.e. transactions via Bitcoin) and computing (i.e. smart contracts via ethereum).⁵ Although blockchain was born within cryptocurrency and the associated public blockchains, there are alternatives. Despite the rise in media attention regarding public blockchains, most businesses are focusing on private, permissioned or consortia blockchains rather than public blockchains. For example, a consortia blockchain creates the potential for a shared database that, if adopted, could transform and automate countless traditional processes.

A consortia blockchain could also help with trust. Businesses need to trust one another in order to interact and trade information. In fact, all parties within an industry, including government and regulators, trade information with one another as it is. Therefore, trust is desperately needed and it is also paid for. Businesses and governments are either storing data themselves, paying for intermediaries to store data for them, or both. Each of

⁵ Patrick Schmid, "What Blockchain Will Mean for Insurance," Medium, March, 29, 2018 <https://medium.com/@schmidpat/what-blockchain-will-mean-for-insurance-5f69ebd2a664> (accessed June 25th, 2018)

these possibilities comes with a cost. If the organization stores data themselves, there is a cost to that data storage and there are transaction costs associated with sharing that data on demand. If the organization pays intermediaries, there is a storage cost and transactional cost with sharing and retrieving data. If they are doing both, there are reconciliation costs involved.

But, what if every untrusting competitor within an industry trusted a secure blockchain or distributed ledger system to deliver necessary information to parties it deemed appropriate on a permissioned basis? Costs could fall for all parties substantially. Universal problems that affect an industry could be worked on in a collaborative manner through permissioned data sharing. All of the sudden duplicative efforts associated with transactions and various intermediaries would be eliminated. Reconciliation issues would disappear. Permissioned regulatory reporting could be done in real-time with no resource drain.

For this reason, many within the insurance industry are turning their attention toward blockchain consortia because blockchain can lower operating costs, increase automation, streamline usage and verification of data, improve processes, and eliminate the need for intermediaries. A realization is afoot that the blockchain works best within a robust network, so consortia are a logical starting point for adoption.

To Insurance

Blockchain could have widespread ramifications across the insurance value chain, increasing market reach and customer personalization while also cutting costs. The industry could change in these ways:

- Insurance products, pricing, and distribution may be wildly altered as blockchain proliferation and its associated smart contracts spawn new products, such as parametric insurance and insurance implanted in transactional purchases, and realize efficiencies in the insurance process, thereby lowering prices and allowing for broader reach into emerging markets.
- Underwriting and risk management may see data-sharing capabilities and risk registries emerge. The immutability associated with blockchain provides provenance and auditability features. Peer-to-peer insurance models may also become more practical.
- Policyholder acquisition and servicing could become more efficient because new customer data will be increasingly confirmed at the origin. In addition, insurance life cycle documents will be easily updated with blockchain technology, avoiding repeat entry and verification and easing concerns with know-your-customer/anti-money laundering regulations.
- Claims management itself could be simplified through smart contracts, while an industry-wide shared ledger could help with multilayer settlements and fraud inspection.
- Finance, payments, and accounting in insurance could also change. A distributed ledger like blockchain could allow for lower-cost international payments, more efficiency in subrogation via smart contracts, and new forms of raising capital.

- Insurance regulation and compliance could be transformed, as regulators would be able to monitor all insurance variables in real time and potentially create an industry-wide proof of insurance ledger.

Table 1 summarizes several potential use cases in each bucket of the value chain.

Potential Blockchain Use Cases Reside All Along The Insurance Value Chain					
Products, Pricing and Distribution	Underwriting and Risk Management	Policyholder Acquisition and Servicing	Claims Management	Finance, Payments and Accounts	Regulation and Compliance
Parametric Insurance	Provenance	Policyholder Acquisition	Fraud Register	Netting and Payments Across Countries	Real-time Regulatory Monitoring
Insurance Included in Transactional Purchases	Data Sharing and Risk Registries	Placement Documentation	Automation of Claims Process	Subrogation	Agent/Broker Licensing
Mobile Insurance for Developing Countries	Peer-to-Peer Insurance	KYC/AML	Multi-layer Claims Settlement	New Forms of Raising Capital (Crowd Sourcing)	Motor Vehicle Proof of Insurance
Oraclize Existing Data	Digital Twins	Self-sovereign IDs Linked to Insurance	First Notice of Loss Data Sharing	Surety Bonds	Certificates of Insurance
Telematics or IoT-based Products	Creation of a Repository of Truth for Underwriters	Cancellation and Non-payment	Marine Claims Management	Multiple Payees	Auto Titles

If implemented, these blockchain use cases can benefit both insureds and insurers. From an insured’s perspective, industry use of blockchain may enhance the customer experience, improve affordability, provide a means for greater product innovation and allow for faster entry into emerging markets. From an insurer’s perspective, use of blockchain may lower costs, ease data retrieval, simplify processes, combat fraud and lower regulatory burdens. On net, a B2B blockchain can help the industry work collaboratively on universal problems like uninsured motorists and fraud.

With the major benefits identified, the challenge now becomes actually realizing them by building blockchain-related applications. This could be a tall order for insurance organizations, given the number of evident use cases for blockchain technology in insurance. One way to get started is to highlight certain impacts to carriers, brokers and reinsurers.

Some Potential Impacts for Carriers

Blockchain technology can help carriers by creating new efficiencies. Cost containment can be realized through automation and disintermediation, particularly in the claims process. The current insurance experience is complex, often relying on paper processing. Great room for improvement exists according to feedback from customers, who want seamless, personalized solutions with minimal delay. However, today's processes involve ingrained system complexities that hinder the ability for smooth transitions and deviation from the norm. For example, insurers interact with many intermediaries and third-party data providers, which can lead to delays and increased costs. In addition, the current claims process is largely manual: adjusters manually inspect claims submissions, verify policies, review coverage, evaluate damages and liability, and negotiate loss amounts and settlements.

Blockchains can help reduce costs through automation as blockchain-enabled smart contracts can be embedded throughout the claims experience. Broader use of smart contracts could establish rules to enforce policy terms, notify participants of a first notice of loss, and even pay claims without requiring loss adjusters to manually administer or review every claim. Instead, allowing adjusters to focus on complex claims.

The claims submission process could be dramatically simplified and become more customer focused if smart-contract-generated submissions were incorporated into it. Engagement with intermediaries through the claims process could also improve because the flow of information would be automated and streamlined where appropriate.

Some Potential Impacts for Brokers

Blockchain applications will also affect agents and brokers, lifting administrative burdens and allowing for greater efficiencies. In commercial insurance, for example, exchanges of information and transactions often occur in a centralized manner. Much of the activity is documented on paper in great detail. This is a labor-intensive process as participants maintain electronic and often physical files that describe all the risks.

To develop a quote, brokers may call multiple underwriters or search various insurer websites. En route to being registered, finalized contracts often undergo digital transformation, processing, and recordkeeping. Copies of the contract are then sent to the brokers and insurers. The processing and recordkeeping then begin again. Brokers and insurers may need to use these records in later stages of the insurance policy life cycle. In fact, the records are generally adjusted and updated throughout the life of the contract, potentially leading to reconciliation issues.

Documentation difficulties, such as data updates that might not be duplicated in other versions of the same contract, may lead to processing delays, which in turn increase the overall cost of insurance. Moreover, such difficulties can constrain growth opportunities by requiring that increasingly more labor resources are dedicated to administrative tasks. A consortium blockchain or permissioned blockchain can help by providing permissioned access to contract documentation. Keys can be shared with the related insurers and brokers, allowing permissioned and secure access to the documentation and updates that are

reflected across the board. In this way, a blockchain can help ensure consistency among various parties and dramatically cut administrative costs.

Some Potential Impacts for Reinsurers

Blockchain technology offers hope within the reinsurance market as well. It provides potential to improve information exchange, reduce operating costs, provide true auditability, and streamline processes. Estimates around blockchain show that the technology could provide reinsurers with cost savings in excess of \$5 billion.⁶

Efficiencies in claims placement, processing and settlement times and from minimized manual collaboration will likely provide much of this savings. Through a blockchain, the entire process of placement, premium cession, loss cession and payment is represented on a single ledger that can be shared among all permissioned parties simultaneously, reducing claims leakage and providing efficiency.

The processing and settlement of claims can occur in real time, through a single source of truth, thereby limiting manual interaction among parties. And because all information is accessible on the chain, the reinsurer would not need to ask the cedent for detailed premium or loss data through a bordereau. These changes could be highly beneficial to reinsurers and their customers.

Strategic Implications and Conclusions

It's no surprise that insurance carriers, brokers and reinsurers are inspecting a variety of digital technologies, including blockchain. Much of insurance involves transferring data. With distributed ledger technology, untrusting competitors within the industry can securely share data with one another on a permissioned basis, abating duplicative efforts, minimizing reconciliation issues and reducing costs. In addition, insurance-related organizations can leverage the shared database to avoid costly intermediaries and enact smart contracts in order to automate various procedures.

Blockchain technology is unique in that it is network-based. Although blockchain and distributed ledger technology could be leveraged within an organization to bring various departments together, it is unlikely that operating a company-specific blockchain will be as productive as operating a blockchain that involves a larger network of competitors. In order to get the most out of distributed ledger technology, the industry must join together, working collaboratively and collectively to design holistic blockchain solutions. The insurance industry is already developing these networks. For example, The Institutes RiskBlock Alliance has brought thirty large brokers, insurers and reinsurers together to build a blockchain consortium. RiskBlock's use case efforts are focused on proof of insurance verification, first notice of loss data sharing, net settlement of subrogation claims and claims automation via parametric insurance. The Insurwave initiative is another industry example. This initiative has brought interested parties together in the marine insurance space to build out a platform for use by various commercial vessels. Finally, B3i

⁶ "Blockchain: The 5 Billion Opportunity for Reinsurers, Price Waterhouse Cooper, 2016
<https://www.pwc.com/gx/en/industries/financial-services/publications/blockchain-the-5-billion-opportunity-for-reinsurers.html> (Accessed June 20th, 2018)

is a European reinsurance consortium, which has focused on building a prototype for cat XoL contracts. Each of these examples has either an informal network or a formal network (consortium) at its heart.

Due to the potential operational improvements, industry participants are best served engaging early in blockchain efforts, including consortia, rather than waiting on the sidelines. Once the organization ties in with the network, there are six key phases to bringing blockchain uses to life, each of which involves effective network communication and education.

- **Ideation:** Participating organizations ideate and brainstorm on potential blockchain applications or use cases. Each blockchain use case is defined and potential return on investment for each use case is offered.
- **Prioritization:** The network prioritizes use cases. Factors such as budget, resources and ROI are considered in order to establish a network consensus.
- **Requirement Setting:** Once the first use case is selected, participants form a working group to discuss existing processes related to the use case, define the user journey and specify use case requirements.
- **Development:** Requirements are passed on to developers to build the blockchain application.
- **Testing:** Network participants engage various parties within their organization to collectively test the security and functionality of the platform and use case.
- **Adoption:** Firm-specific strategies are created ensure proper implementation and change management, which may include coaching and training associated with adopting the new application into existing processes.

Each of these phases involves an openness from network participants to explore the new technology, learn from one another and work together. In order to do this in a competitive environment, the underlying network provider (or consortium) must be a trusted entity that is capable of standing up appropriate governance structures and providing impartial facilitation to the use case requirement setting process. The network provider must also demonstrate an agnostic approach to both developer and platform selection, as “the best in class” developers and platforms are constantly changing within the blockchain space. If the network is set up correctly, the use cases are defined appropriately and the technology is used to its potential, the result will likely be a much more efficient insurance ecosystem.

When production-grade blockchain and distributed ledger technology use cases proliferate across the industry, the first entrants will be best positioned to understand the associated efficiency gains and reap the competitive rewards. Recent research from Boston Consulting Group suggests how important this could be organizations operating within the P&C insurance sector.⁷ In personal lines, for example, the report suggests an all blockchain-insurer could have a combined operating ratio 10-13 percentage points lower than a traditional insurer. This same research suggests similar declines in combined operating

⁷ The First All-Blockchain Insurer, Boston Consulting Group, June 8th 2018
<https://www.bcg.com/en-us/publications/2018/first-all-blockchain-insurer.aspx> (Accessed June 20th, 2018)

ratios for blockchain utilization in commercial insurance (10-13 points) and significant improvements in reinsurance as well (4-5 points). All told, blockchain implementation could lead to a \$200 billion in technical margin for the P&C insurance sector alone. Other sectors of insurance, like life insurance, may expect to similar benefits. The future for blockchain usage in insurance is certainly bright.