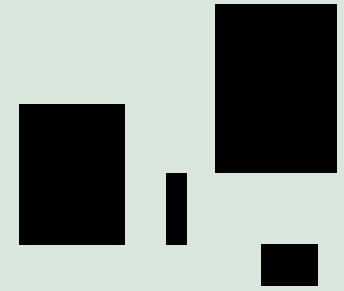


So maybe you figured out what blockchain is — but what can you do with it?

Focus on solutions, not technicalities

By Magda Ramada Sarasola



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A lot of hype surrounds blockchain, distributed ledgers and cryptocurrencies, but how will it benefit insurers?

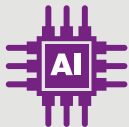


Blockchain's impact on the wider InsurTech movement is likely long term compared with such technologies as artificial intelligence (AI) and the Internet of Things (IoT) (Figure 1). Nonetheless, the growing number of blockchain industry and InsurTech start-up ecosystem initiatives cannot be ignored.

What blockchain shares with more immediately anticipated technology developments, and what makes it relevant to insurers, is its link to three key global trends affecting the nature and business of risk (see “How blockchain works – in simple terms” on the next page).

- 1. New social interaction paradigm:** New types of activism and social interaction (e.g., sharing economies, peer-to-peer [P2P] transactions and crowdfunding), the growth of individualism (e.g., personalization over mutualization and data self-sovereignty), and quicker adaptive behaviors to economic stimuli and to the perceptions of others are challenging established business methods and call for a different interaction with customers.

By now most insurers are aware of blockchain technology and how it might impact the industry. Indeed, some insurers are already taking tentative first steps to apply it or engage in shared pilot projects. But if you're still working out how it fits in with your technology development plans, you're not alone, and there's still time.

Figure 1. InsurTech technologies and when they'll have an impact

| | Description | Examples of applications | Timeline |
|---|---|--|--------------------|
|  | <ul style="list-style-type: none"> Development of computer systems to perform tasks and decision making that have historically required human intelligence, e.g., machine learning Improved forecasting ability | <ul style="list-style-type: none"> Automated risk to capital matching Fraud detection Chat robots for customer interaction | >2 years |
|  | <ul style="list-style-type: none"> The interconnection of a plethora of everyday devices, enabling them to send and receive data that can be analyzed | <ul style="list-style-type: none"> New data available to price risks and products, to understand customers, to map and incentivize behavior | ↑ ↓ >5 years |
|  | <ul style="list-style-type: none"> An immutable digital ledger in which transactions are recorded through distributed consensus Can be extended to host computer protocols capable of executing automated “smart contracts” | <ul style="list-style-type: none"> Secure, trusted and incorruptible information collection Smart contracts used to increase efficiency and lower costs through process automation Enabling the scale of trustless P2P networks to transact value | |

Source: Willis Towers Watson analysis

How blockchain works — in simple terms

Blockchain is a data protocol that allows non-trusted partners, with potential conflicts of interest, to collaborate and agree on the validity of transactions without anyone overseeing that process. This is a transparent process based on predefined, consistent, impartial and systematic “consensus mechanisms” generating a distributed, digital, chronological ledger, which is immutable, shared in near real time and fully auditable. Initially, blockchain was just a protocol that supported recording transactions in which the cryptocurrency bitcoin was being transferred between two individuals. It was needed to make sure that bitcoin provenance could be validated and double spending avoided in the absence of a central authority overseeing the bitcoin market. Today blockchain technology has

evolved to become a protocol that allows us to record any type of transactions transferring value.

Two other advances have significantly increased the ability of blockchain to become a truly disrupting technology. First, there is the ability of blockchain to be used as a ledger that registers transactions and the provenance of physical assets, as opposed to assets like cryptocurrencies that are born and transacted only online, leaving a digital footprint. Second, blockchain not only registers transactions but also houses programmable code – smart contracts – so that those contracts and their evolution/transition into different states are immutable and fully transparent, while any changes to the code are subject to consensus rules and the agreement of the contracting parts.

2. **Transformation of risk:** The social trends described in trend one and new technologies have generated new sources of risk, increased the interconnectedness of different risks and increased the speed at which risks transfer from local to global spheres (and vice versa). Still, they have also enabled greater risk transparency; improved our ability to assess, forecast and measure risks; and allowed for near-real-time risk monitoring and risk mitigation services.
3. **Tech acceleration:** From FinTech to InsurTech, RegTech to WealthTech, the clamor and investment momentum to monetize new technology assets and ideas are applying pressures to the value chain in all kinds of areas, including insurance.

Disruptive potential

As with any aspect of InsurTech, insurers' key concern is very practical: blockchain's impact on existing business models and practices. In particular, they are concerned over what specific operational, analytic and, ultimately, business-defining opportunities and threats it might bring.

In our view, promising applications over the next 10 years are likely to allow insurers to reduce administration and claim processing costs; reach underserved business segments; and offer on-demand, self-issuing policies driven by a number of key blockchain characteristics (*Figure 2*).

Figure 2. Likely effects of blockchain over time

| Short term | Medium term | Long term |
|---|---|---|
| Operational improvements <ul style="list-style-type: none"> ▪ Automation: Improved speed and cost-efficiency through self-executing smart contracts | Better data and measurement of risk <ul style="list-style-type: none"> ▪ Provenance and identity: Safeguarding data/asset provenance, and enabling data portability and auditability through its chronological and immutability attributes | True disruption to the value chain <ul style="list-style-type: none"> ▪ P2P business models: Increased disintermediation through distributed and autonomous organizations of participants and networks |
| <ul style="list-style-type: none"> ▪ Distributed databases: Increased efficiency, transparency and fraud protection within and among insurers, reinsurers and regulators through shared blockchain-based relational databases | <ul style="list-style-type: none"> ▪ Risk transparency: Improved ability to calculate and price risk through new, verifiable and secure sources of data | <ul style="list-style-type: none"> ▪ Automated risk matching platforms between customer and carrier,* with more risk handled via smart contracts rather than traditional policies |
| | <ul style="list-style-type: none"> ▪ IoT + blockchain + AI | <ul style="list-style-type: none"> ▪ Innovative new products for emerging risks |

*For less complex risks, this may happen sooner.

Source: Willis Towers Watson analysis

Smart contracts

Smart contracts implement the terms of an agreement or contract through self-executing, programmed computer code. They have three core elements: a frequency to test conditions, a set of conditions and an action that gets triggered by those conditions. When embedded on a blockchain, smart contracts become immutable, self-executing pieces of code sitting on a transparent and auditable shared ledger. The code will self-execute by responding only to certain triggers (oracles) to transition from one contractual state to the next. Once coded, smart contracts are not controlled by a central authority – in the case of insurance, not even by the underwriter. Among other attributes, these products imply there is unbreakable escrow.

Blockchain's impact on the wider InsurTech movement is likely long term compared with technologies such as AI and the IoT.

Short to medium term (two to five years)

Automation

Blockchains can improve speed, transparency and cost efficiency through self-executing smart contracts (see “Smart contracts”). This is particularly relevant in the short term for parametric insurance products where payouts are triggered by an event such as a catastrophe. Rule-based claim processing that relies on external data – ranging from publicly available weather data to data streaming in real time from the IoT – can support new product designs that automatically trigger and approve claims, reduce fraud and improve customer experiences for such claims as flight delays on travel insurance, catastrophe swaps and bonds, and crop or weather-based insurance coverages.

Distributed relational databases

Blockchains are able to reduce human error and the costs and delays associated with the verification processes, and with the synchronization and reconciliation of multiple databases among the various players in a market or value chain – they increase efficiency, transparency and fraud protection. In the battle against fraud, for example, distributed ledgers using blockchains can be more effective than existing technologies due to their shared and distributed nature and the mechanisms to self-regulate in a network of multiple parties with conflicts of interest. In addition, the use of state-of-the-art encryption to protect data and guarantee confidentiality, combined with smart contracts that define data access to different parties in a very granular way, could help overcome issues related to data privacy and ownership.

Provenance and identity solutions

Some of the blockchain's attributes – initially developed to track the origin and spending of cryptocurrency and avoid double spending – have become a great way of establishing provenance for (insurable) assets. This has already been demonstrated by Everledger in developing a mechanism that bridges the gap between a physical asset – diamonds – and its digital traceability.

Equally, blockchains could track “risk provenance” on an individual basis by leveraging data from the IoT and wearable devices. Currently, expensive know-your-customer processes are duplicated across institutions, and their insights are not portable for individuals. This could change with blockchain time stamped and recorded portable identities. So-called identity wallets could hold information about an individual's health, DNA, molecular decay, attitudes toward risk, driving ability and other personal information, and could further impact the design of models with near-real-time adaptive pricing, expanding the idea behind telematics and usage-based insurance into other areas. Key to this idea is the concept of data self-sovereignty and the fact that for the first time individuals are trusted as custodians of their own data, since those data now sit in an immutable, incorruptible ledger. These identity solutions, once well developed, could radically change the type of data insurers can access, store and use, as opposed to insurers only interrogating the data. The fact that individuals will govern their own data might also change the type of data they are willing to share and the economic incentives they will need to do so.

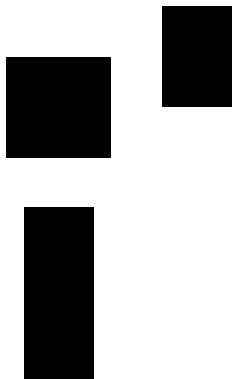
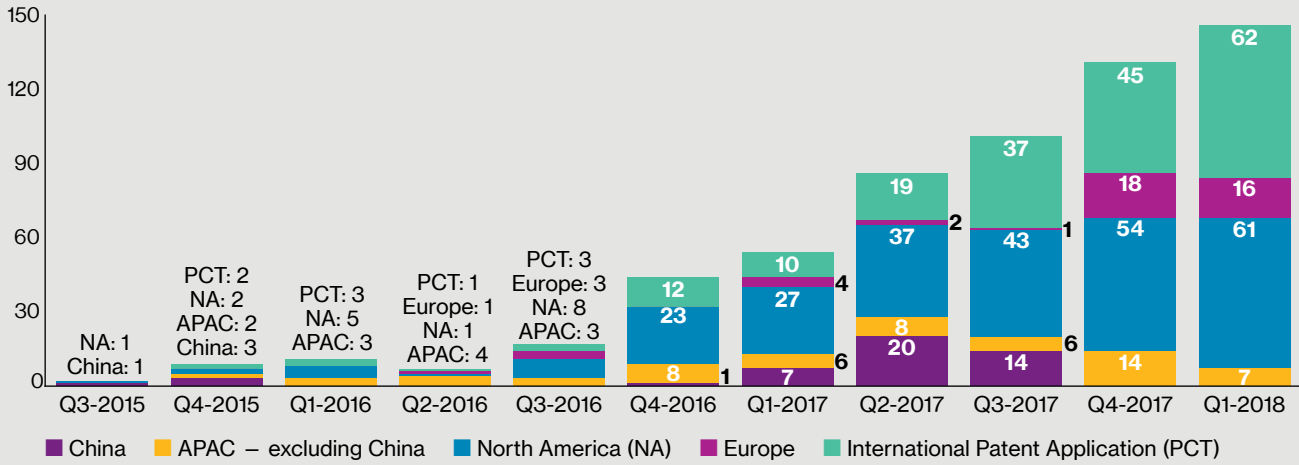


Figure 3. Number of quarterly blockchain/distributed ledger technology (DLT) patent applications by region (July 2015 – March 2018)



Source: Willis Towers Watson calculations based on PATENTSCOPE data, World Intellectual Property Organization, <http://www.wipo.int/patentscope/en/>

Medium to long term (five to 10 years)

P2P business models

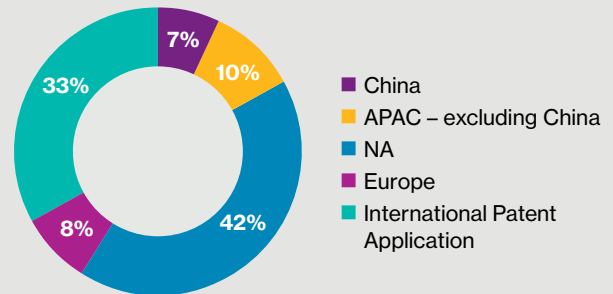
While blockchain will not reinvent the way insurance is done, it can enable the transparency and scalability of new business models like P2P insurance, since it provides a framework for self-regulating organizations among non-trusted partners. Start-ups currently providing P2P insurance, like Lemonade in the U.S., Friendsurance in Germany or WeSura in Colombia, struggled to scale their models due to moral hazard and fraud issues, and the burden of managing and controlling P2P networks. Some of the above are now starting to look at blockchain as a solution to that problem. Other P2P insurance start-ups, like Teambrella, InsurePal and Aigang, realized from the beginning that blockchain could be the technological enabler of a true P2P insurance platform.

Risk transparency

Near-real-time adaptive pricing, on-demand insurance and hybrid insurance products for the sharing economy are being explored by multiple start-ups leveraging big data, AI and the IoT. Blockchain would add a feature to these types of models, making sure that these new sources of data used for better risk assessment, pricing and mitigation are stored in a distributed ledger, which is owned by neither insurers nor insureds and cannot be corrupted or manipulated. Further, blockchain-enabled prediction markets like Augur could become an additional source of actuarial data.

Indicative of the momentum building behind blockchain since 2014, 627 patents were filed (372 in 2017 alone) containing either blockchain or distributed ledger technology in their abstracts.

Figure 4. Percentage of blockchain/DTL patents by region (July 2015 – March 2018)

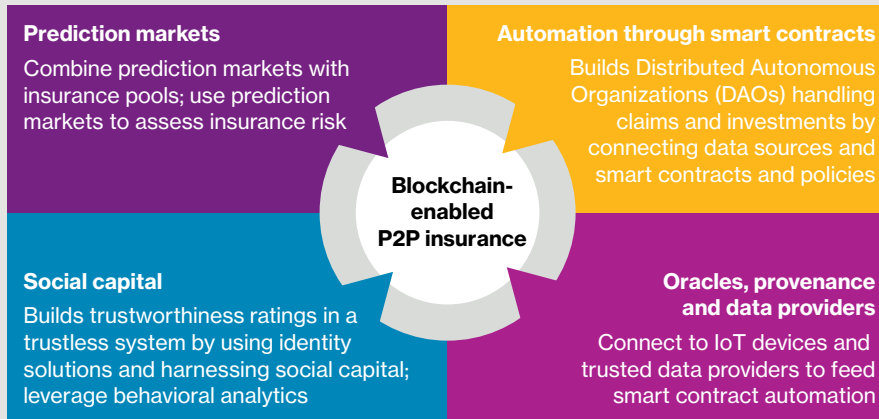


Source: Willis Towers Watson calculations based on PATENTSCOPE data, World Intellectual Property Organization, <http://www.wipo.int/patentscope/en/>

Theory to reality – use cases

Indicative of the momentum building behind blockchain (Figures 3 and 4) since 2014, 627 patents were filed (372 in 2017 alone) containing either blockchain or distributed ledger technology in their abstracts. Only 38 of all blockchain-related applications contain the word “insurance” in their descriptions. A third of blockchain patents are international applications that have been filed under the Patent Cooperation Treaty, and most of these international patent applications were filed starting in 2017.

Figure 5. **Blockchain-enabled P2P risk transfer protocols**



Source: Willis Towers Watson

Near-real-time adaptive pricing, on-demand insurance and hybrid insurance products for the sharing economy are being explored by multiple start-ups leveraging big data, AI and the IoT.

A number of broader FinTech collaborative initiatives are also flourishing. R3, founded in 2015, is the biggest of these with over 80 systemically important financial institutions. B3i, a consortium of major reinsurers, has been working on an excess-of-loss proof of concept and presented a prototype reinsurance post-placement platform at the 2017 Monte Carlo Rendez-Vous. Other consortia or industry groups looking into how to apply blockchain to insurance specific use cases include The Institutes RiskBlock™ Alliance, Hashed Health and the Financial Blockchain Shenzhen Consortium.

Most use cases being explored by incumbents have sought automation and back-end efficiency, either through the development of smart contract-enabled products for parametric insurance – cat swaps, crop or weather-index-based insurance, travel insurance and even life microinsurance products – or by using the technology to explore industry-wide solutions that use shared and near-real-time synchronized databases. These distributed relational databases are being explored to automate processes, like subrogation, and reduce costs and processing times by reducing friction and human errors.

However, while some start-ups have also ventured into the parametric insurance space like InsurETH and Fizzy on travel insurance or Etherisc with its Jamii Crop Insurance, others like Dynamis, ChainThat, Aigang or InsurePal are working on blockchain-enabled P2P risk transfer protocols that aim at disrupting the core of the insurance industry's business model. Details of these protocols vary – type of risk, data or method used to provide trustworthiness scores and to generate risk pools, ways in which risk is carried (or not) and surplus is redistributed – but in essence they all share a

similar type of framework, as depicted in *Figure 5*. In these frameworks, instead of a broker or carrier role, there is a tech platform that serves a “community administration” role – in a very Uber-like fashion – and where risk placement relies on multiple other blockchain-based solutions that tokenize social capital, behavior and, ultimately, risk.

Risks and obstacles to address

Despite all of this activity, the future of blockchain and the speed at which it progresses within the insurance industry will depend on a number of unanswered questions and issues.

First, there are matters of scale and scope. The development of the Internet provides some interesting parallels. When companies first tried to understand the Internet, intranets were built because it was impossible to conceive how everything would be connected. Similarly, the only way blockchain can be truly transformational is if it is employed at a scale, and with a depth and scope, where everyone is on board.

For that to happen though, such concepts as data self-sovereignty and the tokenization of assets – when sensitive data are replaced by nonsensitive equivalents – will require defined industry standards and safeguards. In particular, since a large part of the risk in smart contracts on distributed ledgers will reside with the information provider (oracle), there will be a need to define “safe oracles.” There is also the significant issue of the insurability of blockchains and the associated crypto ecosystem. Some elements – such as business interruption, and currency and third-party risks – will be familiar, while others around, for example, encryption, security and the value of cryptocurrency will not.

Potential next steps

In short, no one has all the answers when it comes to how blockchain will ultimately influence the insurance business – even those at the forefront of its development.

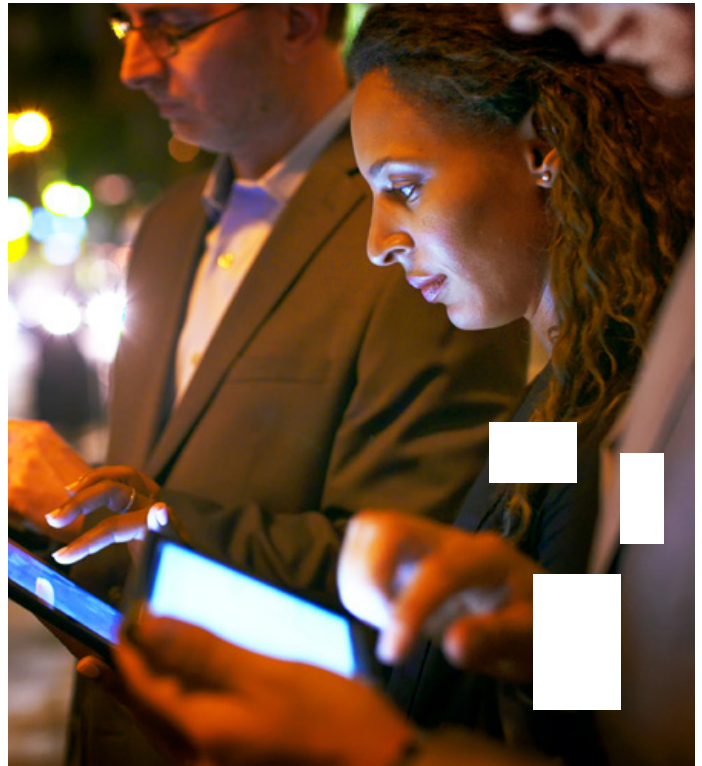
If there is one overriding piece of advice we would offer to insurers trying to define their place in a technology strategy, it would be to skim over the technicalities and concentrate on what the technology is going to solve.

In particular, the tendency in all industries, including insurance, is to focus on what is known. Applying new technologies in this way often results in a very poor prototype because current technology, say shared databases versus a blockchain, is far more developed and, consequently, superior.

Using a blockchain as a shared database only makes sense if you need data sharing or automation to reflect transactions that have multiple parties that either do not know or do not trust each other, or have a conflict of interest and they don't want a central or third party overseeing their interactions.

Certainly, there is low-hanging fruit. Parametric and simple products can go on the blockchain. It's a logical first approach to the technology, and it will help you to understand it. But to realize blockchain's longer-term benefits, insurers should focus on reaching underserved markets or developing new products. It's also worth considering where technology can complement changing the way things are currently done, which business models may become obsolete if blockchain solutions become widespread, and what are the regulatory implications and risks of blockchain-enabled insurance models.

Blockchain, in combination with AI and the IoT, could enable a future in which risks are calculated, pooled and placed automatically through smart contracts on a truly decentralized, P2P platform. The ability to access fully coded, decentralized information and place pooled risk vehicles in an also decentralized capital market moves the risk to the capital value chain.



Insurers defining a technology strategy should skim over the technicalities and concentrate on what the technology is going to solve.

Current technologies make such a future possible but not plausible. There are many variables that still must be understood and worked out. For instance, underwriting without underwriters will surely be on regulators' radar. This nascent technology makes forecasting its evolution nearly impossible. For simple risks, blockchain may become a reality sooner than we think, but for more complex risks, many challenges need to be overcome. The blockchain trail is sinuous and tricky, and insurers should work expediently to become proficient.

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