

AI and Insurance

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A Bit of Background

The insurance sector is one of the most old-fashioned and resistant-to-change space, and this is why AI will have a greater impact on that with respect to more receptive industries. The collection of data of new types (i.e., unstructured data such as reports, images, contracts, etc.) and the use of new algorithms are disrupting the sector in several ways.

Traditionally, an insurance company followed this type of process:

- Identifying pool of customers whom might be risk-assessed;
- Targeting those customers and assessing the risk for each class;
- Selling differently priced policies spreading the risks over the pool of customers;
- Try to retain those customers as long as possible offering lower price for longer contracts.

This is a really simplistic representation of the insurance business in the last fifty years, and I am aware that insurance experts might disagree with me in many different ways. There are a couple of further features to be pointed out: first of all, insurance has historically been ***sold not bought***, which means that brokers and agents were essential to tracking new customers and to even retain old ones. In addition, it is an industry which is by definition rich of data because they collected anything they could, but is also one of the less advanced because either many of those data are unstructured or semi-structured, or the model used are quite old and simple.

Most of those data were easy to obtain because they were required to correctly price the coverage, while additional complimentary data were provided only by good customers who had incentives in providing as much data as possible to get a cheaper policy. Of course, this works the other way for bad customers, and this is a perspective on the phenomenon of “*adverse selection*” (i.e., bad customers are going to ask an insurance because they feel they will need it).

The adverse selection issue is though only one of the intrinsic challenges of the sector: ***strong regulation***, high level of ***fraud*** attempts, and ***complexity*** are other features any incumbents should take care of. It is interesting to notice though that some of those are also specific barriers to entry for startups: they might attract indeed people who normally can get affordable insurance with a bigger competitor (adverse selection) and they usually have the capabilities for breaking down the risk complexity but not to support the funding need for risk coverages (so they need to work with incumbents rather than trying to replace them).

In spite of those problems, in the last decade, we noticed a new trend emerging. Insurances, in the effort

of trying to reduce *moral hazard* problems, they started offering *premium discounts to their final customers* in order to get extra information. This occurred either through a questionnaire (asking **directly** the customer for further data in exchange for a lower price) or **indirectly** through devices (healthy devices, black boxes, etc.). The real issue though has been the engagement side of this proposal, because of the opposite nature of information, rewards, and human nature. The rewards offered were indeed either temporary or provided only once and people got lazy very quickly, while the information stream needed to be constant.

The following step has been the introduction of apps to let customers monitor by themselves their own data and behaviour, sometimes even given away for free the device itself. Leaving the customer with full power on his data had though an inverse effect, because people did not have the motivation in tracking down their improvements, and they got upset at the same time because they felt they were not getting the most out of that opportunity.

Regardless of the specific innovative way in which insurers engaged customers, the process used in the insurance business did not change much in the past century. **Expert systems** and **knowledge engineering** dominated the sector setting the rules to be followed in internal workflows, but this is slowly changing with intelligent automation systems. We are actually migrating from rule-based decision systems to statistical learning and eventually machine learning.

So How Can AI Help The Industry

AI is helping (or disrupting, depending on how you see the matter) the sector in different ways. First of all, it can help **increasing the customer engagement and retention** problem which has been just mentioned. The abundance of data can be used indeed to refine the customers' segmentation and provide personalized offers based on personal features. It also helps in **reducing the costs** through smart automatization or RPA (robotic process automation).

Second, AI is making people **more aware of the risks as well as habits**, and it is driving them toward better behaviors.

Furthermore, the better pricing and risk assessment that AI is introducing analyzing more granular data will make some people **uninsurable** (i.e., too risky to be fairly priced and covered) as well as to turn back some previously uninsurable people into insurable customers again. The governments or central regulatory agencies should then start thinking about a "*pricing/risk threshold*" in which they intervene subsidizing the cost of relevant insurances (e.g., basic health coverage) in order to "*guarantee the uninsurables*".

Finally, it might be useful to think in terms of what an insurable risk is in order to see how AI can help with that.

According to Jin Park (Assistant Professor at IWU), an insurable risk is identifiable through the following five conditions:

- Large number of similar exposure units (mutuality);
- Accidental and unintentional loss (not predictable and independent from the insured customers);
- Determinable and measurable loss;
- Calculable chance of (not catastrophic/systemic) loss;
- Economically feasible premium.

AI is going to affect all those features: with a better and more detailed customer profiling, we won't need indeed to have such a large base of insured units. It will turn some frequent events into accidental (e.g., affecting drivers' behaviour it will reduce the basic accidents into rare events) and it will improve our ability to forecast and compute both the probability and magnitude potential losses even in those cases too hard to be managed before. All the previous improvements will make many more premium under budgets, and therefore the conclusion is that AI will "lower" the threshold of what we consider nowadays an insurable risk, and it will make then more risks insurable.

Who Are The Sector Innovators

There are plenty of startups out there working at the intersection of AI and insurance, and it essential to look at least at some of them to understand the future direction of the industry, as well as the kind of improvements AI is having in the insurtech space. An interesting thing to notice is that most of the innovation is happening in the UK rather than other countries, in all the segments proposed below.

Claim processing: [Shift Technology](#) skims the valid claims from the ones that deserve further validations; [Tractable](#) instead is trying to automatize experts task for insurances; [ControlExpert](#) has a specific focus on car claims; [Cognotekt](#) optimizes internal business processes, as well as [Snapsheet](#) does; [Motionscloud](#) offers instead mobile claim management solutions; and finally [RightIndem](#) aims to help insurers to deliver on-premise smoothing the claiming flow.

Virtual Agents & Chatbots: [Spixii](#) is an automated insurance agent who helps you buying any insurance coverage you might want; [Cognicor](#) is a virtual assistant that offers customer care services;

[Conversica](#) identifies which leads intend to purchase, while [Your.MD](#) is a personal health assistant that analyses symptoms and produces pieces of advice. [MedWhat](#) instead uses EMR (medical records) to assist the patient as it was a virtual doctor, and [Babylon](#) gives medical advice taking care of tight budget constraints. [Insurify](#) is another personal insurance agent who works as a comparator for car insurances.

What today is called simply chatbot is going to be renamed in a few years **robo-insurer**. There are already few examples of companies toward that goal: [Risk Genius](#) is indeed an intelligent comparator which identifies gaps in coverage for the customer and [PolicyGenius](#) looks for the best solution that fits customer's needs and characteristics, while [Drive Spotter](#) implements real-time video analytics to keep drivers safe(r). More generally, robo-insurers will be a quite wide class of agents who will end up providing different services, all of them with the final goal of helping the clients to undertake risk-mitigating actions and only cover the real (residual) risks.

Customers engagement: [Oscar](#) is probably the most successful insurtech company out there, with the final goal of making insurance simple and accessible to everyone through a great UX. Similar to Oscar is somehow [Stride Health](#), while [Brolly](#) is a tool that helps customers in understanding their own needs and facilitates in one place all the insurance coverages in place, in a similar fashion to [Knip](#). [Adtelligence](#) instead creates personalized offers and relevant products based on customer's characteristics. [Captricity](#) uses machine learning to convert handwritten files into structured data, and this can be used to better understand the final customer. Finally, [ValChoice](#) ranks the service of insurers to the benefit of the client.

Telematics: connected cars and telematics is a pretty big area itself, but it would be worthy to point out the work that [Greenroad](#), [Vnomics](#), and [Telogis](#) are doing in capturing driving behaviors and habits as well as computing fuel efficiency. [Cambridge Mobile Telematics](#) works similarly, although it uses smartphone data and mobile devices habits. [Navdy](#) is trying to revolutionizing the UI/UX within vehicles, displaying information in such a way that the driver does not get distracted. [Lytx](#) uses vision technology to provide real-time feedbacks to the driver.

Underwriting: AI can be (and actually is) used to spot out hidden correlations to granularly segment customers and risks in a more efficient way. Even though it might in theory possible to identify some algos that could perform better than others (see the work [Wipro did](#) for fraud detection), data always come first, at least for the next close future. Many companies operate in the space, as for instance [Carpe Data](#) that provides predictive algorithms and data products for property and casualty and life insurances through the analysis of public data (e.g., social media data). [Atidot](#) created a machine learning risk management platform, while [Tyche](#) uses unstructured data to optimize the underwriting and claims process. [Big Cloud Analytics](#) collects data from wearables and formulates health scores for a better risk assessment, while [Cape Analytics](#) uses computer vision techniques on geospatial data to improve the level of detail on current houses conditions. [Dreamquark](#) creates a more accurate representation of the medical datasets to be used for underwriting purposes by insurances, similarly to [FitSense](#) that offers also apps products. [Melody Health Insurance](#) provides also low-cost insurances, while [Uvamo](#) uses AI to assess

the risk of policy applications. A more accurate underwriting can even translate into covering events that are today quite risky (e.g., as [MeteoProtect](#) and [Praedicat](#), and are doing for weather risk management).

Finally, on a side, it is worthy to point out to pure technological enablers as [Instanda](#), which offers a management tool to the insurance providers to manage effectively and timely new products launched; [Insly](#), a cloud-based platform for insurance brokers; and finally, [SimpleInsurance](#) is instead an e-commerce provider for product insurances.

P2P insurance: [Lemonade](#), [Friendsurance](#), and [Guevara](#) are peer-to-peer insurance startups focusing respectively on property and casualty insurance the first two, and car insurance the latter one.

Insurchain & Smart Contracts: these are companies in the insurance sector that are driven by *blockchain technology*. [Elliptic](#) offers real-time AML for bitcoin specifically, while [Everledger](#) is a permanent immutable ledger for diamond certification. [Luther Systems](#) is instead a stealth-mode company working on the standardization of smart contracts. [Dynamis](#) provides a P2P supplementary unemployment insurance product, while [Saldo.mx](#) provides micro-insurance policies on the blockchain. [SafeShare](#) covers multiple parties with insurance cover at short notice and for varying periods, and finally, [Teambrella](#) is another P2P insurance platform run on the blockchain.

Insurance on-demand: this class of startups put in customers' hand the entire insurance buying process. [Trov](#) is probably the best example of this new class of players and it allows to ensure things by simply taking a picture of them. [Cuvva](#) is quite similar but with a focus on car insurance, [Sure](#) and [Airsurety](#) on travel policies, and [Back me up](#) is another example of on-demand insurance. But this class does not include only the proper on-demand business model, but also insurance startups which provide products that vary by location, time, use, or customer. In other words, pay-per-mile business model ([Metromile](#)), micro-insurance policies ([Neosurance](#)), or eventually Insurance-as-a-service models ([Digital Risks](#)).

Concluding Thoughts

[Yan identifies four elements](#) which constitute the insurance profit structure: premium earned and the investment income from one hand, and underwriting cost and claim expenses from the other. AI is and will be able to improve the cost structure, increasing at the same time the competitiveness and enlarging the customer base accessible to insurers, while optimizing internal processes and enhancing the transparency and robustness of the compliance flow.

The greatest challenge I still see in insurance is the ***cultural mindset*** which might prevent insurance to adopt early AI solutions, although this won't probably have a long life given the incredible pressure to innovate the insurance providers are undergoing through.

This article first appeared in my book “Applied Artificial Intelligence: Where AI Can Be Used In Business” edited by Springer.

About the Data Science Foundation

The Data Science Foundation is a professional body representing the interests of the Data Science Industry. Its membership consists of suppliers who offer a range of big data analytical and technical services and companies and individuals with an interest in the commercial advantages that can be gained from big data. The organisation aims to raise the profile of this developing industry, to educate people about the benefits of knowledge based decision making and to encourage firms to start using big data techniques.

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