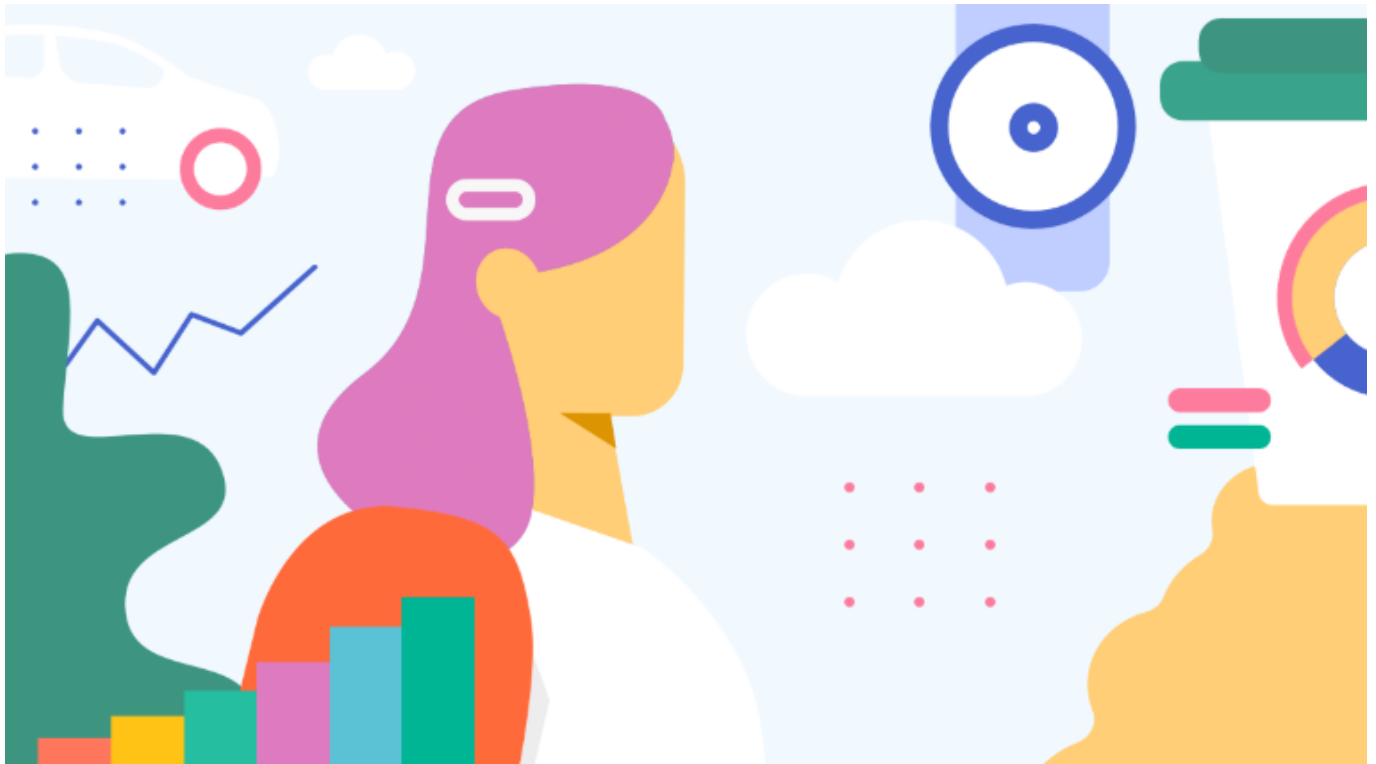




The Breathe Life Team
Breathe Life
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The Future of Data in Insurance



This post was written by [JN Hould](#), Co-founder and Chief Data Officer at Breathe Life.

In 1693, Edmond Halley published the first of what today's actuaries would recognize as a [mortality table](#), applying statistical methods to the mortality data from a Polish town. It wasn't until 1772, almost 80 years later, that Richard Price published the next table. While data has always been the foundation of the industry, data collection and usage have moved slowly.

With the digital revolution, this is no longer the case. 90 percent of the data in the world has been generated in the last two years alone. Data is created and updated in real-time. Advances in data storage, data processing, and computing and algorithms have enabled new opportunities that didn't exist just a few years ago. The insurance industry, an industry that heavily relies on data, must learn to

process and pivot directions quickly based upon this data to gain a competitive advantage. The advent of InsurTech has opened new opportunities for insurance companies, most of which are based upon the centuries-old importance of data.

A response to the marketplace and disrupting technologies, the term InsurTech describes the intersection of insurance and technology. It has evolved as companies seek to exploit new technologies that cater to digitally-savvy customers. While InsurTech companies can focus on the front-end, back-end, or both, they all have the goal of helping insurers compete and add value to the industry. Others compete directly against incumbents, seeking to capture market share by offering superior digital tools.

In an on-demand world, consumers now expect 24/7 access to their providers and a seamless and omnichannel experience. They want to apply and get quotes online, file claims online or through an app, get instant access to advisors via their preferred medium and track their policies in the digital world. InsurTech platforms now collect an unprecedented amount of data. Analyzing this data presents opportunities for greater cost efficiencies, a streamlined claims process, and risk and fraud prevention.

The data underlying the InsurTech revolution will touch every aspect of insurance. The marketing department can immediately judge a campaign's success, and quickly pivot and make changes based on customer response. Policies and new products will not be created in a vacuum; rather product development will collaborate with marketing, underwriting, and agents. InsurTech is shifting the insurance company model from a siloed organization to ecosystems which are fully integrated.

According to the Milken Institute, an estimated \$9 billion of capital has been invested in InsurTech as of 2018. Insurance companies are rushing to gain a competitive advantage by partnering with those who have the technical know-how. They are driven by the increasing need to understand and leverage data, which some experts view as the key to survival for an industry increasingly under pressure from slow growth, the interest-rate environment, and new competition.

Data's Importance to Insurance

Actuaries and Underwriters

It once took months for actuaries to compute the asset and liability position of assurance policies manually, and to this day, actuaries must know how to calculate reserves based on aggregate data patterns. With the power of software and technology, it now takes a fraction of the time it once did. This has brought change to two key roles in the industry.

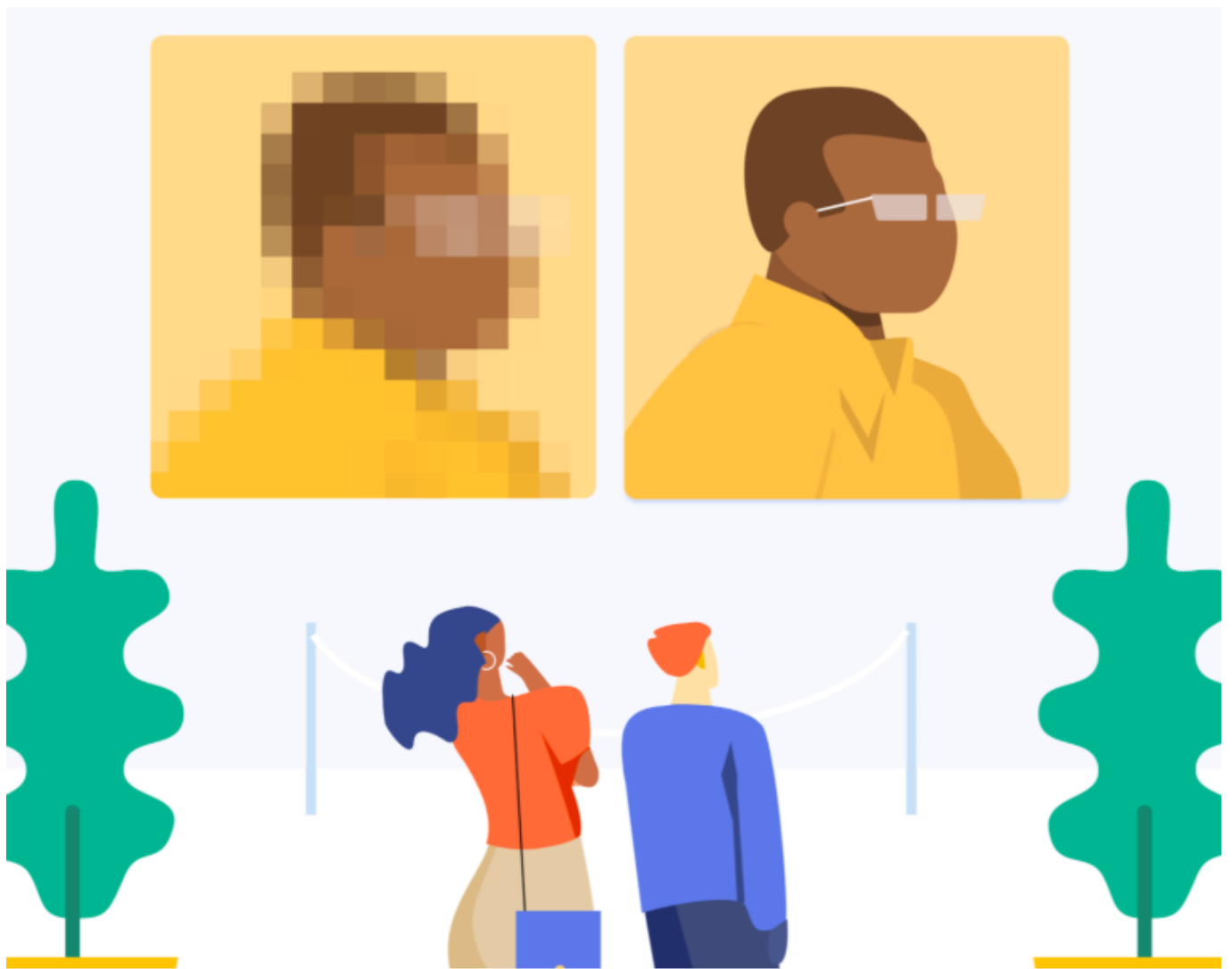
Actuaries still create rating tables for each of the common rating factors; gender, age, income, and geographical location, and set base premiums. However, now they can analyze claims and policy data in real-time, identify characteristics of successful agents in geographical areas, and help with product management and design. Companies are finding roles for actuaries throughout the organization, such as in fraud prevention and product development departments, or R&D departments in data scientist roles.

Underwriters once relied upon the models actuaries created, using them when evaluating policy applications. Actuaries established the categories and base premiums, while underwriters grouped individuals into those categories based upon risk characteristics. The data informed the decision of which applications to accept or deny, and whether or not to apply any exclusions.

Now, rather than just using actuarial data, underwriters will be talking to actuaries and telling them what they need to make underwriting decisions. Technology advances have unlocked new sources of data that can guide underwriting. Robust data collection through InsurTech platforms gives actuaries the ability to pull, analyze, and create more customized ratings tables based upon underwriter needs.

No longer will actuaries and underwriters work independently of one another in siloed organizations. Actuaries will not merely create models and provide information to underwriters, which they can then apply to policy decisions. Instead, actuaries will need to better understand commonalities in what underwriters are observing in their applications.

These changes to data collection and implementation will impact insurers in two significant areas; accurately pricing policies and preventing fraud.



Accurately pricing policies

Today's consumer can compare and contrast policy features and prices in just a few minutes online. This greater price and value transparency put pressure on providers to continually refine their pricing models and product offerings. As well, accurately priced premiums protect an insurer's profit margin.

Big data, combined with predictive analysis tools, gives insurers the ability to adapt policies to market demand quickly. They can design usage-based insurance, such as auto insurers charging by the mile, or generate coverage on an item or event-specific basis. On-demand policy creation meets the expectations of millennials and allows agents to sell more. This helps capture the business of an underserved and underinsured generation.

When data is drawn and aggregated from external sources, rather than just the applications received by one company, actuaries can better estimate risk and customer behavior. Thus, they can narrow in on premiums which maximize profit and meet demand while responding to competitive pressure.

According to Boston Consulting Group, those insurers who fail to adapt to new pricing models and technology disruptors in pricing will

“lose competitive edge to rivals that better understand what is driving their clients’ needs and willingness to pay.”

InsurTech company Montoux provides pricing tools to actuaries that transforms pricing with strategic insight and analysis. Their tools free up actuaries time to work on more growth-producing activities.

Preventing fraud

Fraud prevention must have the flexibility to shift often as criminal behavior frequently adapts to circumnavigate anti-fraud measures. Big Data has proven its effectiveness at preventing fraud, with insurers who have adopted it reporting 1.4x average lower investigation costs. It’s well-suited to risk management activities meant to identify fraud, such as profiling. By matching the variables within each claim to past fraudulent claims, the system quickly flags issues for further investigation.

Before raw data can be analyzed in this way, it must be converted to structured data that can be actively mined. Insurers can then analyze data for weighted elements that indicate fraud, often before even issuing a policy or paying out a claim. Algorithms built into InsurTech products assess data integrity so that actuaries know that their data is complete and reliable.

In a siloed organization, where the auto insurance division does not speak with the home insurance division, it is hard to gain a full picture of the customer. When data is pooled, it presents a more accurate picture. This enables insurers to compare better who the customer *says* they are to who they *really* are. Analytics software aggregates multiple data streams and then maps layers to identify weaknesses, gaps, or inconsistencies.

Data has always been the bedrock of the insurance industry, but now it will ensure its future.

How is InsurTech Revolutionizing Data Collection?

Online applications and underwriting

Underwriting a life insurance application used to take up to 75 days, which is a frustratingly long time for a consumer to wait for a decision. The speed of decision-making and agility in insurance has significantly lagged digital leaders, but InsurTech is helping them catch up.

An InsurTech platform enables real-time underwriting. With software that can pull together facts provided by the Medical Information Bureau, an applicant's Prescription Drug Report, and a Motor Vehicle Report, and compare them to consumer-provided answers most policies will not require manual underwriting.

Pen and paper applications left room for error, whether it was missed fields or incomplete information. This, in turn, slowed down the underwriting process. The underwriter would then have to return to the agent for the missing answers. E-apps may fool consumers into thinking that they are completely a digital application, but many are just digitized PDFs without any data validation or analysis behind them. InsurTech is not just collecting more data; it is also doing a better job verifying its integrity.

Online applications check for accuracy as the consumer completes the application, and prevent them from hitting "next" if a field has been left blank. They are making data collection quick and painless, rather than a process requiring multiple forms and a possible medical exam. Moreover, they're popular with consumers, with almost one in three adults attempting to purchase or purchasing life insurance online in 2018.

Unlocking historical unstructured data

Unstructured data in the form of old PDF medical forms and old claims sit in filing cabinets or on old hard drives waiting to be unlocked. The data has been collected, but was unusable unless a company wanted to invest a significant amount of time and effort. Now, InsurTech makes this data accessible.

One insurer partnered with an InsurTech company to harvest data and unlock over 170 million data points on limits, deductibles, and exposures from historical manual claims and applications. Artificial intelligence technology now enables carriers to extract data from old documents and gain insights. New insights into the past are expected to shed light on the underlying causes of claims, losses versus claims and premiums paid, and help in setting industry benchmarks.

Mining historical unstructured data presents opportunities for businesses to create new risk monitoring solutions and reduce total risk.

Merging data sources

In addition to collecting data, InsurTech merges data from multiple sources. When we discussed preventing fraud, we touched upon pooling data between the auto and home insurance divisions. This type of merged data can also pull data from external sources, such as the housing market, to enhance underwriting precision.

Wearable Technology

The Internet of Things has had a profound impact on the industry. With sensors installed in everything from smartwatches to a consumer's car, companies now have access to both more and better data about their policyholders. Using this information, they can customize product offerings and coverage to only address what customers will use.



Consumers have embraced wearable technology, such as smartwatches. They have proven willing to supply that data to their insurance company. Health insurance companies, in particular, utilize Fitbits or Apple Watches to track the wearer's behavior. They use the data collected by wearable tech to assess the

policyholder's lifestyle and activity levels, and in exchange, offer discounts on premiums to reward healthy activity.

No longer does an insurer have to rely upon consumer-provided data regarding their fitness and overall health levels. Wearable tech not only verifies a consumer's answers on a life insurance application about their physical activity, it also gives insurers a broader and more accurate data pool from which to build predictive models.

How is InsurTech Revolutionizing Data Interpretation?

It is one thing to have the data, quite another to know what to do with it. InsurTech helps insurance companies gather more data than ever before, but it is also revolutionizing the interpretation of data through algorithms and artificial intelligence.

Algorithms, AI, and InsurTech

Algorithms automate decisions leveraging data collected through applications, claims, and other sources such as wearable tech. In its simplest terms, an algorithm is a set of instructions telling the software to either solve a problem, process data, or engage in automated reasoning which has the power to automate decisions.

According to Breathe Life's Chief Data Officer, Jean-Nicholas Hould,

“Algorithms contain the breathtaking power to perform in minutes functions that used to take hours, if not days. When an InsurTech platform harnesses that power, it opens infinite possibilities.”

Algorithms help insurers break down Big Data into an analysis that can be used to better inform everything from underwriting to marketing decisions. The complexity and volume of unstructured data in insurance can be overwhelming, particularly for smaller companies. Algorithms turn Big Data into actionable data which can be used in small to midsize to large organizations.

When partnering with an InsurTech platform, such as Breathe Life, smaller insurance companies gain even more of a competitive edge. Platforms aggregate

the data from all of their partners, giving every partner access to a much larger set of data from which to create pricing models and identify consumer behavior.

AI has a particular application in the claims process. Because AI is more adaptive to humans, information systems can manage claims faster and with fewer errors. Self-learning platforms can, in most cases, handle claims and payouts and the policyholder will never speak to a human. Machine learning can pre-assess claims, flagging potential fraud, and automate damage evaluation in some cases.

Without analysis, data is just a set of numbers and fields. The analytical capabilities of algorithms used by InsurTech platforms allow companies to leverage the data they've collected, manipulate it, and draw conclusions. Processing historical and real-time data through a complex algorithm constructs a sophisticated view of the marketplace and a more accurate view of risk.

AI's computational abilities cut down drastically on the cycle times for purchasing a new insurance product. Using AI, carriers will further refine their ability to instantly issue new policies. McKinsey predicts that this will lead to a "new wave of mass-market instant issue products," based upon superior risk-identification.

Helpful in comparative analysis, AI's adaptive properties mean that it will help insurers keep pace with changing criminal behavior. Systems can be built which flag cases for review if factors exceed an AI-established threshold. As AI's capabilities continually increase, so will its application throughout the industry.

Security, Privacy, and Ethics in InsurTech

The insurance industry is one of the most heavily-regulated industries in the world, and for good reason. Insurers collect private and deeply personal information about people's lives and homes. With InsurTech, companies have even more granular data about consumer's lives.



They know which roads an auto insurance customer takes to get to work or how often a life insurance policyholder exercises. Online applications collect information that could be damaging to the person if released publicly. InsurTech has brought great opportunity to the industry, but with it has come a host of ethical issues.

Security, privacy, and confidentiality

To what extent do auto insurers need to know every road a policyholder drives down? Some would call it an invasion of privacy to track a customer's behavior that closely. Instead, could the insurer's tracking system aggregate the data and transmit to the company in the form of the percent of time spent driving on roads categorized as "unsafe."

As InsurTech grows in its reach into the everyday lives of consumers, companies should grapple with how to balance the benefits of the data it provides with their customer's right to privacy. As well, when companies gather this amount of information on consumer's lives they become responsible for safeguarding its confidentiality.

InsurTech needs to proactively be at the forefront of consumers rights to privacy. As regulations are lagging behind the fast-paced technology advances in data science, it is vital that InsurTech take a strong stance advocating for consumers privacy rights and develops themselves an ethical frameworks to guide their decision-making. Moreover, as the cyber ecosystem is becoming riskier than ever, InsurTech needs more than ever to be ahead of the game when it comes to security practices, going above and beyond standard controls. Security should not be an afterthought of technological innovation, but rather should be embedded in its genetics.

Bias and data

Underwriters can make policy and premium decisions based upon lifestyle choices such as smoking or family medical history. They must comply with industry regulations and internal ethics trainings. However, with AI and algorithms now making many policy decisions those checks to prevent bias will be ineffective.

Tools like correlation clustering, used by algorithms to gain risk-related insights, are of particular concern. Correlation clustering takes data objects and looks at their relationship to one another. It does not look at the objects themselves. The algorithm then manufactures information out of this cluster analysis that it learns to associate with certain identities. Unlike humans, algorithms do not explain their reasoning, which could lead to discriminatory decisions.

It happens automatically and is a component of the adaptability of machine learning. It is not overseen or visible to human beings. This means that it can generate a discriminatory outcome for some consumers. Often because of mathematical complexity, algorithms contain a lack of transparency in their decision process. Black-box models keep decision-makers and regulators from understanding what they are calculating and how they are drawing conclusions from the data.

As well, the algorithm is only as unbiased as the data it is analyzing. In the past, research has found widespread bias in datasets fed to algorithms. If an algorithm or AI's learning process is shaped by bias data it, too, will develop this bias. Data learns from silent biases. Even if race or gender variables are removed, other

variables could be correlated to them. The algorithm could produce the same bias patterns as if excluded variables had been included.

If certain classes are under-represented in the data used to train the algorithm, the trained model could under-perform when handling someone of that class in the future. This could lead to unfair treatment. Every data project should incorporate an algorithmic impact assessment looking for race and gender bias, at a minimum.

Accessibility of insurance

The concept behind pooling risk was to make insurance accessible to almost everyone. Low-risk individuals offset higher-risk individuals and grouping them together lowered premiums to an affordable level for a higher-risk person. But with highly-customized products there is a concern that risk pools will shrink, driving up the cost for individuals who are higher-risk.

Companies will need to establish monitoring processes to assess the fairness of their data mining.

Conclusion

The abundance of data available to insurers may not be new, but with the development of high-performance computing tools insurers now have an unprecedented ability to access and use it throughout their organizations. More data can be generated, stored, processed, and applied to improve the insurance industry for all players.

As the industry moves forward, data does not just *have* a future in insurance, it *is* the future.

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