Actuarial Innovation and Technology

The Insurance Market in the Era of Digital Transitions: Relationships Between Insurers, Big Tech, and Insurtechs

January | 2025

SOA Research INSTITUTE

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AUTHORS Arthur Charpentier
L'Université du Québec à Montréal

Raphaël Suire
Nantes University, IAE—Graduate school of Management, France

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Executive Summary

The digital revolution has profoundly transformed market dynamics, particularly within the insurance sector. This transformation encompasses the infrastructure and technologies that facilitate information exchange, the emergence of new business practices, a deluge of data, and the rise of innovative players capitalizing on these changes to deliver unique value propositions to customers. Traditional insurance companies face significant challenges and opportunities as they navigate competition from established Big Tech firms and agile insurtech startups. This study examines the disruptive nature of digital advancements, compelling historical players to confront the innovator's dilemma (Christensen, 1997): whether to adapt and develop established practices or invest in new strategies to leverage digital opportunities. In doing so, they also come up against smaller, more agile start-ups. We highlight the necessity for insurance actors to rethink their roles in light of new market entrants and the evolving landscape shaped by Big Tech's data monetization strategies. To analyze these dynamics, we propose an original framework in the form of a triangle of possibilities, which positions various market players and elucidates their strategic movements, innovations, and possible partnerships. This framework also aids in identifying competitive advantages and development trajectories, ultimately offering scenarios for the evolution of traditional insurance players in a digital and data-driven era.

Introduction

Digital has significantly changed the way markets operate. Behind digital, we must first understand the infrastructure and technical objects that allow signals and information to be transported. Secondly, the 'digital transition' that comes with this deployment is most often accompanied by new behaviors, not only in terms of usage and consumption, but also in terms of organization and business practices. And finally, there are new players who are taking advantage of this dual opportunity to offer a differentiating value proposition. Since the end of the 1990s, strong positions, even monopolies, have been built not only around offering competitive infrastructure access (hardware and/or software), but also by offering connections between individuals and reducing the transaction costs of organizing exchanges, in particular through platform strategies (Kretschmer et al, 2022). At the same time, these companies have developed powerful business models based on the unprecedented monetization of individual and usage data.

The insurance market and, more broadly, the insurance world are not immune to an imperative for transformation resulting from these movements. These are challenges but also opportunities that are available to historical players facing Big Tech. To simplify, we will think of the historical Google/Alphabet, Facebook/Meta, Amazon, Apple, and Microsoft, but also more recent players such as Airbnb, Netflix, Tesla, Uber, NVidia, etc. Many of these companies were born with the internet and more recent agile players are deeply rooted as new start-ups, often called insurtech companies.

Digital technology comes with a set of disruptions that can shake up the insurance market (Christensen, 1997[1]), forcing historical players to confront the classic innovator's dilemma. Should we consider that the disruptions are of low magnitude and that they do not require challenging established practices (organizational structure, market, business model) or should we commit resources to reorient ourselves and take full advantage of the opportunities offered by digital technology? But in this case, in which direction and/or with whom?

This is, therefore, a question of noting a radical digital shift that is forcing insurance players to rethink themselves as new players enter the market (insurtech) and play the role of new intermediaries between the insurer and the insured[2]. It is also a question of better understanding the role played by and the attitude of Big Tech, which finds with the insurance market a new opportunity to enhance and monetize the stock of behavioral and usage data that they have[3]. Finally, it is a question of understanding the technological and changing context in which the insurance market is now evolving. This triple observation leads to redefining the positions acquired by the historical players in insurance and leads to suggesting new business models and a change in the innovation model towards greater openness involving organizational change.

[1]Christensen, C. M. (1997). The innovator's dilemma: when new technologies cause great firms to fail. Harvard Business Review Press.
[2]Frost, J., Gambacorta, L., Huang, Y., Shin, HS, & Zbinden, P. (2019). BigTech and the changing structure of financial intermediation. Economic Policy, 34 (100), 761-799. https://www.bis.org/publ/work779.pdf
[3]FS24/1 – Potential competition impacts from the data asymmetry between Big Tech firms and firms in financial services https://www.fca.org.uk/publication/feedback/fs24-1.pdf

To gain a better understanding of the changes that are taking place and the strategic consequences for the insurance industry, we propose an original analytical framework in the form of a triangle of possibilities. It allows us to position the different players in the new insurance markets and better identify the movements and strategy of companies, both from the point of view of the innovations they propose and the partnerships and mergers that can be observed or that may arise. The resources and skills internal to each of the players (historical players, insurtech and Big Tech) form organizational routines that make it possible to define an a priori competitive advantage, a growth trajectory, obstacles, and opportunities for each of the players (Penrose 1959[4]; Barney, 1990). In doing so, the triangle also makes it possible to establish some scenarios for the evolution of historical players in a data-intensive era, enabled by the digital transition.

[4]Penrose E. 1959. The Theory of the Growth of the Firm. Oxford University Press: New York.

Section 1: Technological Evolution and Digital Transition: Some Facts

Since the early 2000s, digital players have largely developed around a dominant organizational model: the platform (Rochet & Tirole, 2003[5]). More recently, high-frequency digital data analysis has made considerable progress. These technologies have been at the heart of the success of digital business models. Targeted advertising, targeted content, and targeted interfaces are, among others, some of the digital strategies widely deployed by large platforms (Shapiro & Varian, 1998[6]). The battle to attract users' attention at the lowest cost is still at the heart of the competition among big techs (Bohnsack and Liesner, 2019[7]). And, it is now known that this can be done by deploying aggressive strategies that can have ambivalent effects on the well-being of users (Allcott et al, 2020; Erhel et al, 2024).

The platform model has established itself as one of the dominant intermediation mechanisms among Big Tech players. In a few words, it is primarily about organizing exchanges by significantly reducing transaction costs, even if it means making historically established players uncompetitive or even useless in the eyes of users/consumers. Thus, these platforms have little outside of a software infrastructure and are based on a powerful model of decreasing marginal costs as they develop, which can make them profitable very quickly (Rifkin, 2015[8]). In addition, and simultaneously, they produce indirect network externalities that have two symmetrical effects. They are powerful barriers to entry for competitors and they lock in users/consumers (through a so-called network effect), making any exit from the network or platform costly (Rochet & Tirole, 2003). In these market dynamics where a few winners take all ("*Winner Takes All*" or "*the most"*), there are few winners left once the dynamics of network externalities are engaged.

Thus, the platform is an organization that (re)intermediates with increased economic efficiency. It produces powerful network externalities that lead it to a monopoly or oligopoly position in its market. It locks in consumers because it makes an exit strategy expensive. It is based on an efficient cost structure that produces increasing returns to scale. This is mainly due to what it owns and what it does, namely mainly software that relies on the exploitation of a digital infrastructure. While the initial fixed development cost may be substantial, the marginal cost of operating and acquiring a new user tends very quickly towards zero. This makes them highly profitable once a business model has been identified and stabilized.

Let's take the example of the Airbnb platform to illustrate. The hotel market is organized around a group of players: hosts (Hilton, Accor, Marriott, etc.), customers and regulations that can vary depending on the country (hotel classification, health standards, etc.). When Airbnb appeared in 2008, it was an internet player, a pure digital player. It owned nothing except software and a user interface accessible on both fixed and mobile devices. It allows a particular host to be connected with a customer. It is fully in the collaborative economy movement (Botsman & Rogers, 2010[9]) and sharing economy (Sundararajan, 2016) by intermediate individuals who would not otherwise be found (C to C market). We quickly understand that if the cost of developing the software is significant for the first interaction, then the adjustment and maintenance costs can become quite low. Data storage costs may increase, but technological developments in data center storage and cooling capacities can allow prices to be controlled. The mechanics of network externalities fully play their role as a growing barrier to entry as transactions

[5]Rochet, JC, & Tirole, J. (2003). Platform competition in two-sided markets. Journal of the European Economic Association, 1 (4), 990-1029. https://doi.org/10.1162/154247603322493212
[6]Shapiro, C., & Varian, H.R. (1998). Versioning: the smart way to. Harvard business review, 107 (6), 107. https://hbr.org/1998/11/versioning-the-smart-way-to-sell-information
[7]Bohnsack, R., & Liesner, M.M. (2019). What the hack? A growth hacking taxonomy and practical applications for firms. Business horizons, 62 (6), 799-818. https://doi.org/10.1016/j.bushor.2019.09.001
[8]Rifkin, J. (2015). Market share. RSA Journal, 161 (5562), 32-35. https://www.jstor.org/stable/26204411
[9]Botsman, R., & Rogers, R. (2010). What's mine is yours. The rise of collaborative consumption, Tantor.

increase on the platform. More users mean more hosts and vice versa. This two-sided platform guarantees increasing attractiveness with the volume of transactions. The historical players in the hotel industry are struggling because, while Airbnb is indeed a formidable competitor in the accommodation market, it is also not a competitor that operates in the relevant hotel market. It does not have a hotel infrastructure, its location is at best known (California) and at worst floating, making it difficult to subject it to regulation and, in any case, it is not that of the hotel industry. And then, there is a formidable competitive advantage that characterizes the platform organization: they are agile, can innovate/test very quickly through experimentation and have a particularly strategic asset: user and transaction data. This is detailed knowledge of revealed preferences (trips, destinations, willingness to pay, family sizes, regularities, etc.). Under regulatory constraints, relatively lenient with a few exceptions (EU, in particular), they can monetize them to manufacture tailor-made products and offers (versioning) or even resell them in new advertising formats.

A large part of the platforms operates according to these principles, and all collect considerable quantities of very fine usage data, which allows them to qualify practices associated with the platform (Brousseau & Pénard, 2007[10]). This also allows them to acquire a power of prescription on tastes with a set of drifts or abuses that are difficult to be described precisely and regulated (Zuboff, 2019[11]).

While some platforms, such as Airbnb, remain thematic, other digital players have integrated different platforms and offer ecosystems of software/services that are more or less complementary and simultaneously increase all the aforementioned effects (network effects and lock-in, barrier to entry, dominant position, etc.). We can think of Amazon (E-commerce, Prime, AWS, Twitch, etc.) or even Meta (Facebook, WhatsApp, Instagram) and Alphabet (Google, Android, GMaps, Google Drive, etc.). At the same time, the volume, variety, and velocity of individual and behavioral data collected are increasing in dimensions that are proportional to the number of services offered and used by a user. Big Tech derives its economic power from this industrial organization. The ability of these companies to offer a new service or a version of this service (versioning) that exactly matches the preferences collected is also increased and also at the risk of locking users into filter bubbles (Pariser, 2012[12]) and of fueling addictive pathologies (Erhel et al, 2024[13]).

Let us now see how these principles apply to the insurance market[14].

[10]Brousseau, E., & Penard, T. (2007). The economics of digital business models: A framework for analyzing the economics of platforms. Review of network economics, 6 (2). https://doi.org/10.2202/1446-9022.1112

[11]Zuboff, S. (2019) The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. Profile Books

[12]Pariser, E. (2012). The filter bubble: What the internet is hiding. Policy Perspectives, 17 (6).

[13]Erhel, S., Drouard, J., Jacob, F., Lumeau, M., Suire, R., & Gonthier, C. (2024). Predictors of problematic internet use in the everyday internet activities of a French representative sample: The importance of psychological traits. Computers in Human Behavior, 153, 108099. https://doi.org/10.1016/j.chb.2023.108099

[14]Eling, M., & Lehmann, M. (2018). The impact of digitalization on the insurance value chain and the insurability of risks. The Geneva papers on risk and insurance-issues and practice, 43, 359-396. https://link.springer.com/article/10.1057/s41288-017-0073-0

Section 2: Typology of the Digital Transformation Triangle Peaks

To simplify, we will consider that each actor has a set of resources/skills, according to the Penrose model (1959)[15], which allows him to act on the insurance market.

There are three "Resources / Skills":

- (R1): it is the culture of the insurance profession (the skills, the standards, the regulations, the operation)
- (R2): it is the culture of behavioral data and the internal capacity to extract information
- (R3): it is the culture of innovation and experimentation of new business and/or service models

On each of the criteria, each actor can be in strength (+++), in weakness (0) or in the average of the state of knowledge and practices (++), with regard to the other actors.

We call the New Insurance Market the insurance market augmented by the opportunities and threats offered by digital technology.

The three actors are each associated with a particular typology:

- **Insurers** are subject to very strict rules. An "insurance company" has a very specific legal definition[16], and only these companies are legally authorized to sell insurance coverage.
- "**Big Tech**" are a few specific companies, sometimes grouped under the name "GAFAM," an acronym for the five American tech giants: **Google, Apple, Facebook, Amazon, and Microsoft**, but which may include other players. This term is fluid and designates a group of companies that can change over time, but are above all characterized by a large market capitalization, often in excess of US $1,000 billion.
- **Insurtechs** (contraction of "insurance" and "technology") are companies that use innovative technologies to transform the insurance industry. They are closer to *start-ups* than "big tech" and are often not authorized to sell insurance coverage.

2.1 INSURERS

Traditional insurers are subject to strict and often complex regulations, as they are considered **systemic financial players** due to the importance of their financial commitments to their policyholders. In order for a company to declare itself an "insurer," it must generally comply with a series of regulations and obtain specific authorizations depending on the country or region in which it wishes to operate:

- **Regulatory Authority Licensing:** In most countries, a company must obtain an insurance license from the financial or insurance regulatory authority. In the United States, each state has its own department of insurance that regulates and licenses insurance companies at the local level. The **National Association of Insurance Commissioners (NAIC[17]),** an organization of state insurance regulators, sets standards to facilitate coordination, but it does not issue licenses directly. For example, in California, the **California Department of Insurance (CDI[18]),** headed by an elected

[15] Penrose E. 1959. The Theory of the Growth of the Firm. Oxford University Press: New York.
[16] https://en.wikipedia.org/wiki/Insurance#Insurance_companies
[17] https://content.naic.org/
[18] https://www.insurance.ca.gov/

Insurance Commissioner, regulates insurers in the state of California and oversees their compliance with state laws. In Canada, at the federal level, the **Office of the Superintendent of Financial Institutions (OSFI[19])** is responsible for licensing and supervising federally regulated insurance companies (e.g., those that operate in multiple provinces). Provincial regulators, such as the **Financial Services Regulatory Authority of Ontario (FSRA[20])** or the **Autorité des marchés financiers (AMF)** in Quebec, oversee insurers in their respective jurisdictions. In the United Kingdom, the **Prudential Regulation Authority (PRA[21])** and **the Financial Conduct Authority (FCA[22])** jointly oversee insurance licensing in the United Kingdom. The PRA focuses on financial stability and solvency, while the FCA focuses on consumer protection and insurer compliance. In the European Union, licensing in one member state allows you to operate throughout the EU through the "European passport" system. In Germany, for example, the **Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin[23])** supervises insurers, ensuring their solvency, policyholder protection, and compliance with EU regulations, including Solvency II. In France, the **Autorité de Contrôle Prudentiel et de Résolution (ACPR[24]),** part of the Banque de France, is responsible for licensing and supervising insurance companies in France. The **Dirección General de Seguros y Fondos de Pensiones (DGSFP[25])** is the Spanish authority responsible for regulating and supervising insurance companies. In China, the **China Banking and Insurance Regulatory Commission (CBIRC[26])** supervises and licenses insurance companies. This commission also regulates banks and financial institutions in the country. Regardless of the regulator, they impose strict capital and solvency requirements to ensure that the company is able to cover the risks it insures. For example, in Europe, the Solvency II Directive imposes minimum capital ratios.

An insurance company must set aside a minimum capital and sufficient technical reserves to manage potential claims. This capital serves to protect customers against the risks of the insurer's bankruptcy. Insurers must publish detailed financial and solvency reports and comply with transparency obligations towards customers (such as the precise description of guarantees, exclusions and costs associated with insurance contracts). Certain categories of insurance, such as health or life, may have additional requirements due to their sensitive nature. For example, health insurance often has to comply with specific data protection regulations, and life insurance is subject to stricter solvency standards, etc.

It may be possible for some large companies (corporates) to create insurance companies quite easily to cover their own risks. These companies, **insurance captives,** are insurance companies created and owned by a company or group of companies (the "parent") for the purpose of insuring their own risks. The simplest case is the[27] pure captive (or single-parent captive), created and owned by a single company, which aims to insure the risks of its parent company and its subsidiaries. Other more sophisticated types of captives exist ("rent-a-captive" or “Protected Cell Captive”), but they do not aim to sell insurance coverage to third parties.

[19] https://www.osfi-bsif.gc.ca/
[20] https://www.fsrao.ca/
[21] https://www.bankofengland.co.uk/prudential-regulation
[22] https://www.fca.org.uk/
[23] https://www.bafin.de/EN/Homepage/homepage_node.html
[24] https://acpr.banque-france.fr/
[25] https://dgsfp.mineco.gob.es/en/Paginas/Iniciocarrousel.aspx
[26] https://www.cbirc.gov.cn/cn/view/pages/index/index.html
[27] https://en.wikipedia.org/wiki/Captive_insurance

Reinsurers' ROEs were around 14%, exceeding their cost of capital, a strong sign of financial health after years of weaker returns between 2017 and 2020 due to natural catastrophe losses[28]. Insurers in Europe and North America also saw their ROEs rise, supported by higher premium rates in the property and casualty (P&C) segments. Major P&C insurers, for example, saw combined ratios rise below 90% on average, benefiting from strategic pricing adjustments in response to inflation and climate risk. Zurich Insurance, AXA, and Allianz each reported ROEs[29] of around 10% to 13% in 2023.

Table 1

MARKET CAPITALIZATION AND REVENUE[30] IN 2022 USD, AND RETURN ON EQUITY, ROE[31]

Company	Market Capitalization	Revenue (2022)	Return on Equity
UnitedHealth	$500 billion	$320 billion	25%
Berkshire Hathaway	$700 billion	$302 billion	8.5%
Ping An	$130 billion	$200 billion	10.5%
Allianz SE	$110 billion	$165 billion	12.5%
Elevance Health	$115 billion	$156 billion	15%
China Life	$120 billion	$110 billion	11%
AXA	$66 billion	$110 billion	10.5%
Progressive	$145 billion	$72 billion	36%
Munich Re	$38 billion	$71 billion	12%
Swiss Re	$44 billion	$55 billion	10%
Prudential Financial	$45 billion	$60 billion	9%
MetLife	$50 billion	$75 billion	10%
AIG	$45 billion	$52 billion	6%
Chubb Limited	$80 billion	$41 billion	10%
Travelers Companies	$40 billion	$38 billion	12%

Note that insurers are only one component of traditional insurance. **Agents** and **brokers** are essential intermediaries between insurance companies and customers. Agents usually represent one or more insurance companies, but they can be divided into two categories. **Captive agents** work exclusively for a single insurance company. They sell only that company's products and do not have the independence to offer policies from other insurers. The captive model emerged with the large insurance companies of the 19th century who wanted to ensure strict control over the distribution of their products, guaranteeing exclusive loyalty to their brand. And unlike captive agents, **independent agents** can represent several insurers and offer a variety of products. This model has gained popularity to better meet the diverse needs of customers by offering them a wider choice. However, although they have more flexibility than captive agents, they are still bound by distribution contracts that may include sales targets. Brokers **are** intermediaries who are completely independent of insurance companies. Their role is to represent the interests of their clients rather than those of insurers. Traditionally, brokers help their clients analyze different insurance options, negotiate the best terms and identify the products best suited to their needs. The origins of brokers date back to the commercial practices of major European financial and commercial centers, such as London and the ports of northern Europe in the 17th century, where merchants and shipowners needed specialized intermediaries to underwrite marine risk policies. In the 19th century, with the professionalization of the sector and the rise of large insurance groups, captive agents multiplied.

[28] https://www.ajg.com/gallagherre/-/media/files/gallagher/gallagherre/news-and-insights/2024/april/gallagher-reinsurance-market-report-2023.pdf
[29] https://www.readyratios.com/sec/BRKA_berkshire-hathaway-inc
[30] https://companiesmarketcap.com/insurance/largest-insurance-companies-by-market-cap/
[31] https://www.macrotrends.net/stocks/charts/PGR/progressive/roe

However, as customer needs diversified, the role of brokers has strengthened, particularly for companies and large accounts. Brokers remain very influential, especially for complex policies and corporate insurance where expertise and customization are essential. As we will see, insurtechs have quickly positioned themselves in this niche.

The most immediate risk for legacy insurance companies is that they will find themselves in a Christensen dilemma situation. The Kodak case illustrates an extreme situation of the company which, in the 1990s, misunderstood the opportunities and challenges associated with a dual movement: that of a change in technological paradigm (film to digital) and that of a change in practices (photography on mobile phone, selfie, sharing on social networks, etc.).

Kodakization

Kodakization is a term that describes the situation where a leading company in its market becomes obsolete or even disappears due to excess inertia and an inability to adapt to technological innovations and changes in its environment. The term refers to the Kodak company, once a giant in the photography industry, which suffered a spectacular decline in the early 2000s because it failed to anticipate the rise of digital photography, despite its pioneering role in the field. Kodak has played a central role in the development of photography since the early 20th century, even inventing the first digital camera in 1975. Chemistry and chemists are at the heart of Kodak's photographic film technology. In this respect, these key skills for the historic business are not conducive to identifying and absorbing the opportunities offered by digital photography., Moreover, under the pressure of shareholders, the company was reluctant to commercialize novel and digital products, fearing that it would cannibalize its core film and film processing business, which was highly profitable. Rather than embrace digital, Kodak continued to focus on the film market, even as digital cameras began to gain popularity. Eventually, it lost its dominant position and finally filed for bankruptcy in 2012. The term “Kodakization” is often used as a warning for today's companies facing digital transformation and innovation.

Also, insurers are characterized by the following distribution of resources/skills. These companies are historically concerned with risk measurement and actuarial science and a large part of their business skills are associated with this. Their knowledge of risk management and its financing is obviously very strong. On the other hand, the culture of innovation and experimentation most often remains behind, particularly because size and routinization penalize them.

(R1)	insurance industry culture	+++
(R2)	behavioral data culture	++
(R3)	culture of innovation and experimentation	+

2.2 BIG TECH AND GAFAM

“*Facebook defines who we are, Amazon defines what we want, and Google defines what we think.*”
(George Dyson, 2012, Turing's Cathedral: The Origins of the Digital Universe)

Unlike "insurance companies," it is not possible to declare yourself "big tech." The "big tech" here will be the **GAFAM,** an acronym for the five American tech giants: **Google, Apple, Facebook, Amazon, and Microsoft.** These companies dominate several digital sectors, including online search, social networks, e-commerce, consumer electronics, and software. Originally, the acronym **GAFA** (without Microsoft) was used because Google, Apple, Facebook, and Amazon had immediate visibility and impact on consumers. Microsoft was later added to the term to become "GAFAM" because of its lasting influence, particularly with its flagship products like **Windows** and **Office,** its role in the cloud with **Azure,** and its strategic acquisitions (for example, LinkedIn in 2016).

- **Google**[32]**(Alphabet**[33]**):** Dominating online search and digital advertising, Google is also a force in the mobile sector with Android and in cloud services with Google Cloud. Google aspires to organize all the world's information, making each piece of data accessible, understandable, and immediately usable. Its model is based primarily on the collection, processing, and dissemination of data, whether through the search engine, advertising, or other services such as Google Maps[34] and YouTube. Its effectiveness depends on a thorough mastery of data management, the ability to make it useful, and its contextualization for billions of users. **Data are at the heart of its vision**.

- **Apple**[35] [36]: Apple designs and manufactures devices and services that enhance the user experience in their daily and professional interactions. Its products – iPhone, iPad[37], Mac, and Apple Watch[38], among others – are designed to offer an intuitive and coherent ecosystem that enriches every aspect of its users' digital lives. The quality of the hardware and design innovation occupy a fundamental place in its strategy, ensuring performance, reliability, and deep integration with its software. **Software integrated into hardware is historically at the heart of Apple's product offer.** However, a more recent differentiation towards the production and supply of digital content has been made.

- **Facebook (Meta**[39]**):** Rebranded in 2021 as **Meta,** which operates Facebook[40], Instagram[41], WhatsApp[42] and other platforms such as Messenger, focus on connecting people by building digital communities. Its goal is to facilitate large-scale exchange and communication, and to encourage the creation of social connections through networks and community features. Human interaction and community building are essential to its model, which draws its strength from social networks that allow everyone to interact, share and discover. **Social networks are at the heart of its mission**.

- **Amazon**[43]: A leading player in e-commerce, Amazon is also a giant in the cloud with Amazon Web Services (AWS[44]). Amazon presents itself as the world leader in online retail and aims to simplify access to goods and services for all. Its model includes direct sales of products, a marketplace that

[32] https://en.wikipedia.org/wiki/Google
[33] https://abc.xyz/
[34] https://en.wikipedia.org/wiki/Google_Maps
[35] https://www.apple.com/
[36] https://en.wikipedia.org/wiki/Apple_Inc .
[37] https://en.wikipedia.org/wiki/IPad
[38] https://en.wikipedia.org/wiki/Apple_Watch
[39] https://en.wikipedia.org/wiki/Meta_Platforms
[40] https://en.wikipedia.org/wiki/Facebook
[41] https://en.wikipedia.org/wiki/Instagram
[42] https://en.wikipedia.org/wiki/WhatsApp
[43] https://en.wikipedia.org/wiki/Amazon_(company)
[44] https://en.wikipedia.org/wiki/Amazon_Web_Services

allows third parties to sell, and a cutting-edge logistics infrastructure. The goal is to offer diversified products, delivered quickly and reliably, at competitive prices. **Retail is at the heart of its strategy**. Just like Apple, a more recent differentiation towards the production and supply of digital content has been made.

- **Microsoft:** Known for its software (Windows[45], Office[46]), Microsoft has become a major force in the cloud, while supporting individual users and organizations by providing them with digital tools, whether through software like Office, cloud solutions like Azure[47], or collaborative platforms like Teams, the company provides robust and scalable solutions for businesses and individuals. **Software and digital infrastructure are at the heart of its business model.**

There are other players, especially outside America, with **BATX**[48] representing Chinese giants **Baidu (百度)**[49]**, Alibaba (阿里巴巴集团控股有限公司)**[50]**, Tencent (腾讯控股有限公司)**[51]and **Xiaomi (小米集团)**[52], operating mainly in China and parts of Asia (Baidu is the Chinese leader in online search and AI services, Alibaba is a giant in e-commerce and digital finance (Alipay[53]), Tencent is particularly active in social networks with WeChat, mobile payments, and video games, and Xiaomi is known for its smartphones, connected devices and Internet of Things services).

These big tech companies frequently make acquisitions to absorb new competitors or strengthen their position in emerging markets. Facebook, for example, acquired Instagram and WhatsApp to expand its social empire, while Microsoft acquired LinkedIn[54] and GitHub. These acquisitions raise antitrust and competition issues, as they can hamper innovation by limiting the diversity of players in the market. It is important to remember that the GAFAMs share another common point: they all offer a payment solution (GooglePay[55], ApplePay[56], FacebookPay[57], MicrosoftPay[58]) with a dual purpose: first of all, to accumulate behavioral data on their users, but also to insert themselves sustainably into their respective ecosystems (eCommerce for Amazon, peer-to-peer transactions for Facebook, and integration with the OS and mobile devices for Apple and Google). In some respects, some authors refer to open prison (Ngwenyama et al, 2023). Facebook had also tried to offer a cryptocurrency, Libra, which later became Diem[59] (with the idea of boosting exchanges within the social network with its own currency).

GAFAMs have demonstrated significant levels of profitability and return on equity, typically outperforming traditional sectors in this area due to their asset-light business models and high operational efficiency. Alphabet (Google) and Microsoft, for example, have posted ROEs in the 20-30% range in recent years,

[45] https://en.wikipedia.org/wiki/Microsoft_Windows
[46] https://en.wikipedia.org/wiki/Microsoft_Office
[47] https://en.wikipedia.org/wiki/Azure_DevOps_Server
[48] https://en.wikipedia.org/wiki/BATX
[49] https://en.wikipedia.org/wiki/Baidu
[50] https://en.wikipedia.org/wiki/Alibaba_Group
[51] https://en.wikipedia.org/wiki/Tencent
[52] https://en.wikipedia.org/wiki/Xiaomi
[53] https://en.wikipedia.org/wiki/Alipay
[54] https://en.wikipedia.org/wiki/LinkedIn
[55] https://en.wikipedia.org/wiki/Google_Pay
[56] https://en.wikipedia.org/wiki/Apple_Pay
[57] https://about.meta.com/technologies/meta-pay/
[58] https://en.wikipedia.org/wiki/Microsoft_Pay
[59] https://en.wikipedia.org/wiki/Diem_(digital_currency)

reflecting efficient deployment of shareholder capital[60]. Apple has particularly excelled in this area, often exceeding a 30% ROE, reflecting its lucrative product ecosystem and strong brand value.

[60] https://ibima.org/accepted-paper/big-tech-financial-rollercoaster-gafams-2022-performance-review/

Table 2
MARKET CAPITALIZATION AND REVENUE[61] IN 2022 USD, AND RETURN ON EQUITY, ROE[62]

Company	Market Capitalization	Revenue	Return on Equity (ROE)
Google (Alphabet)	$1500 billion	$282 billion	27%
Apple	$2700 billion	$394 billion	147%
Meta (Facebook)	$800 billion	$116 billion	24%
Amazon	$1300 billion	$514 billion	27%
Microsoft	$2500 billion	$198 billion	43%

As we have just seen in the previous section, Big Techs are not players initially positioned on the insurance market, but recent decision-making and experiments suggest that they could benefit from resources and skills that could quickly make them competitive in the new insurance market. By taking up the resources/skills framework, Big Techs have a comparative advantage on at least two dimensions. The first is (R2) because most of them are "data driven."

They have a data culture, the internal skills to handle them and develop a very detailed knowledge of users/customers and know or have learned to identify sources of monetization (advertising, resale, dynamic pricing, etc.).

The second key resource/skill is that of the culture of innovation and experimentation. They obviously suffer from a large size which, in a way, can go with excessive routinization but, for all that, they maintain a deep culture of agility and trial/error/learning to deploy new services and new business models (Schmidt and Rosenberg, 2014). The lean start-up culture specific to digital entrepreneurship remains strong (Ries, 2011).

On the other hand, they are fragile or even have little capacity, alone, to go in the insurance market. They do not master the business codes, are poorly aware of the regulations and do not have the financial capacity to guarantee the insurance business. In summary, the comparative advantage of Big Tech on the new insurance market can be summarized:

(R1)	insurance industry culture	-
(R2)	behavioral data culture	+++
(R3)	culture of innovation and experimentation	++

2.3 INSURTECHS

The last player is even more difficult to define because it includes companies of very different natures[63]. Their goal is often to simplify and improve insurance services by automating processes, optimizing risk management, offering personalized products, or providing a better user experience. Insurtechs can be independent startups or technology initiatives within traditional insurers, as we will detail in the next

[61] https://companiesmarketcap.com/tech/largest-tech-companies-by-market-cap/
[62] https://www.macrotrends.net/stocks/charts/AMZN/amazon/roe
[63] Neale, FR, Drake, PP, & Konstantopoulos, T. (2020). InsurTech and the Disruption of the Insurance Industry. Journal of Insurance Issues, 43 (2), 64-96. https://www.jstor.org/stable/26931211

section. This difference is important, as "startups" are often synonymous with strong growth (with a significant survivorship bias including negative ROE[64]), while for an insurer, significant and uncontrolled growth is often a sign of significant future losses. The technical balance is managed through risk selection, terminations, and adjustments during policy renewals. Insurtechs, as technology startups operating in insurance, sometimes benefit from **less restrictive regulation** in certain jurisdictions than insurers, especially in the initial phases of their activity. A simple typology could be the following:

- **Distribution and Marketing Insurtechs:** These insurtechs innovate in the way of **distributing** and **marketing** insurance products, often online, using user-friendly interfaces and simplified processes[65]. We will find in this category **Digital Brokers (Neo-Brokers[66] [67])** that use digital platforms to simplify the choice and subscription of insurance (for example, Wefox[68]or CoverWallet[69]), **price comparison sites** , i.e., platforms allowing users to compare insurance offers quickly and efficiently (such as Policygenius[70] or LesFurets[71], in France) or, finally, platforms offering insurance **on demand**, i.e., policies that can be activated for short periods, often via a mobile application (such as Trōv[72] for valuables, or Cuvva[73] for temporary car insurance).

- **Policy Personalization Insurtechs,** aiming to personalize insurance offers based on customers' specific behaviors and needs, with **Usage-Based Insurance (UBI[74]),** which uses user data to adapt premiums based on actual usage (e.g., **Metromile**[75] for car insurance, or **Lemonade**[76] for home insurance, historically), or **Behaviorally Personalized insurance[77]** based on an assessment of policyholder behavior to adjust the rate, often in health or life insurance (with Oscar Health in the United States or Vitality, which offers a rewards program for healthy behaviors).

- **Claims and Compensation Management Insurtechs** that focus on automating **claims** and **compensation,** reducing processing times and costs, with **Automated Claims Processing Platforms** to improve efficiency and customer experience (such as Snapsheet[78] that facilitates the processing of auto claims or Shift Technology[79] specializing in fraud detection and claims management).

- **Reinsurance and Insurer Solutions Insurtechs** that offer services and technologies for **traditional insurers** and **reinsurers** to improve their risk management, profitability, and operational efficiency. Here we will find **Reinsurance and Securitization Insurtechs,** developing products to transfer insurance risk to financial markets, (such as Nephila Capital[80]), or **Risk Management and Analysis**

[64]Ma, Y.L., & Ren, Y. (2023). InsurTech—Promise, threat or hype? Insights from stock market reaction to InsurTech innovation. Pacific-Basin Finance Journal, 80, 102059.
[65]Stricker, L., Wagner, J., & Zeier Röschmann, A. (2023). The Future of Insurance Intermediation in the Age of the Digital Platform Economy. Journal of Risk and Financial Management, 16 (9), 381. https://digitalcollection.zhaw.ch/server/api/core/bitstreams/bc9f542e-6904-413b-aef9-0748c553dcf7/content
[66] https://www.bafin.de/SharedDocs/Veroeffentlichungen/EN/Fachartikel/2021/fa_bj_2106_Neo_Broker_en.html
[67] https://kanzlei-herfurtner.com/neo-brokers/
[68] https://www.wefox.com/fr-ch
[69] https://www.coverwallet.com/
[70] https://www.policygenius.com/
[71] https://www.lesfurets.com/
[72] https://en.wikipedia.org/wiki/Trov
[73] https://www.the-digital-insurer.com/dia/insurtech-analysis-cuvva/
[74] https://en.wikipedia.org/wiki/Usage-based_insurance
[75] https://en.wikipedia.org/wiki/Metromile
[76]La Barbera, S. (2023). Insurtech Revolution in the Insurance Sector: A Comprehensive Review of the Transformational Impact and the Lemonade Case Study. http://dx.doi.org/10.20944/preprints202307.0531.v1
[77] https://journals.sagepub.com/doi/full/10.1177/2053951720973707
[78] https://www.snapsheetclaims.com/providers/insurtech/
[79] https://www.shift-technology.com/
[80] https://www.nephila.com/

companies, offering risk analysis tools based on meteorological and geospatial data (such as AkinovA[81], a risk transfer platform, or Zesty.ai[82], which analyzes natural disaster risks).

- Real-Time Prevention and Monitoring Insurtechs, which aim to help customers prevent losses by exploiting sensors, connected objects and real-time data to minimize risks, with Connected Insurance (IoT), which uses connected objects to continuously monitor the customer's environment, particularly in home or auto insurance (with, respectively, Hippo Insurance[83] for home insurance in the United States, or Cambridge Mobile Telematics[84], which uses telematics data in auto insurance), Connected Health, with insurtechs providing health monitoring programs and connected devices to reduce health risks and encourage healthy behaviors (such as Vitality[85] or Oscar Health[86] [87]).

- Insurtechs for Artificial Intelligence and Automation, which focus on using AI and automation to transform the internal processes of insurance companies, increasing their productivity, and reducing costs. Here we will find Chatbots and Virtual Agents, used to answer customer questions and manage sales or claims processes (with Insurify[88], an insurance comparison chatbot, but also Lemonade), or Predictive Analytics, used to assess risks and predict customer insurance needs (with Cytora[89], a predictive analytics tool for risk management or Clara Analytics[90]).

Table 3
MARKET CAPITALIZATION AND ROE

Company	Market Capitalization	Revenue	Return on Equity (ROE)
Lemonade	$1.1 billion	$118 million	-34%
Root Insurance	$1.2 billion	$300 million	-30%
Oscar Health	$1.5 billion	$1.1 billion	+1.85%%
Hippo Insurance	$1.0 billion	$100 million	-25%
Metromile	$500 million	$100 million	-114%
Next Insurance	$1 billion	$200 million	-15%
Bright Health Group	$300 million	$1.5 billion	+1.31%
Clover Health	$1.0 billion	$1.1 billion	-22%
Zego	$1.0 billion	$200 million	-10%
Wefox	$4.5 billion	$300 million	N / A

[81] https://akinova.com/
[82] https://zesty.ai/
[83] https://www.builtinsf.com/articles/hippo-insurance-goes-public-spac-merger
[84] https://www.cmtelematics.com/
[85] https://www.insurtechinsights.com/vitality-using-technology-to-transform-health-insurance/
[86] https://en.wikipedia.org/wiki/Oscar_Health
[87] https://www.hioscar.com/
[88] https://insurify.com/
[89] https://www.cytora.com/
[90] https://claraanalytics.com/

Table 4
SOME INSURTECHS

Category	Function and Technologies	Examples
Distribution and Marketing	Simplify online subscription	Policygenius, Cuvva
Personalized Subscription	Adjusting fonts using big data and AI	Metromile, Vitality
Complaints Management	Automate and detect fraud	Shift Technology, FRISS[91]
Reinsurance and Solutions	Products for insurers and reinsurers	Zesty.ai
Real-Time Prevention	IoT to prevent disasters	Hippo, Cambridge Mobile Telematics
AI and Automation	Automate customer service and analytics	Insurify, Clara Analytics

From a regulatory point of view, the following differences can be noted:

- Intermediation vs. Direct Underwriting: Insurtechs acting as intermediaries (e.g., online brokers) are often subject to less stringent regulations than insurers because they do not take on the financial risk themselves. However, they must comply with consumer protection rules and certain licensing requirements.

- Insurance Licensing: Insurtechs that directly underwrite insurance policies must obtain a license, which subjects them to capital and solvency requirements comparable to traditional insurers. In North America, Root Insurance[92] has received licenses in several states for its pricing model based on customer driving behavior but must comply with state-specific auto insurance regulations.

- Data Protection: By using large amounts of personal data to personalize offers, insurtechs are subject to regulations, such as the GDPR in Europe or the CCPA[93] in California, which impose strict standards for data privacy and security. In France, Google was formally notified by the CNIL for GDPR violations, and Amazon was fined €35 million in Germany for targeting users without their explicit consent. In the United Kingdom, Facebook was targeted by the CMA (Competition and Markets Authority[94]) for its proposed insurance platform via Messenger[95]. The CMA was concerned that Facebook would leverage its dominant position to favor its own products over independent insurers. Alibaba and Tencent use their payment platforms to offer health and life insurance. However, the Chinese government limits their ability to access health data and imposes controls to protect user privacy. Google, through its partnership with Lemonade and other insurtechs, must ensure that user data complies with CCPA standards when it uses the data for insurance offers, or face penalties.

- Regulatory Sandboxes: In some countries, regulatory sandboxes (such as in Europe, the UK, or Singapore) allow insurtechs to test their products with light oversight, fostering innovation while controlling potential risks for consumers. For example, the sandbox of the UK Financial Conduct Authority (FCA) and Germany's BAFIN allowed German insurtech, Coya[96], to test new insurance products under light regulatory conditions before launching them on the market. Insurtech Zego[97] was able to pilot its insurance solution for ride-hailing drivers in this sandbox before becoming the

[91] https://www.friss.com/
[92] https://www.joinroot.com/
[93] https://www.oag.ca.gov/privacy/ccpa
[94] https://www.ft.com/content/7531df25-e4cc-4e46-aa12-c30e932e5951
[95] https://www.dig-in.com/news/insurtechs-sell-coverage-with-facebook-messenger-chatbots
[96] https://www.the-digital-insurer.com/dia/insurtech-coya-receives-license-from-german-regulator/
[97] https://www.zego.com/

first private transport insurance provider to receive a full license. In 2019, Singapore startup, **CXA Group**[98], tested a prevention-focused health insurance model, using personal health data collected under the supervision of the Monetary Authority of Singapore (MAS) before launching on the market.

Table 5
REGULATIONS

Region	Traditional Insurers	Insurtechs	Big Tech
Europe	Solvency II, customer regulation	Sandboxes and data protection requirements	GDPR, data usage control
United Kingdom	Solvency II post-Brexit, FCA	Sandbox FCA, PRA	CMA, GDPR for data
Asia	National solvency and capital requirements	Sandboxes Singapore and Hong Kong	PDPA Act[99] and Restrictions on Data Collection
North America	State regulation, NAIC harmonization	Flexible regulation, but capitalization for direct subscribers	CCPA (California) and Competitive Oversight

Table 6
REGULATIONS

Actors	Main Regulations	Key Constraints
Traditional Insurers	Solvency II and GDPR (Europe), NAIC (US), transparency, risk management,	Capital requirements, customer compliance, solvency monitoring, and rate regulation
Insurtechs	Specific licenses depending on the model, GDPR, CCPA, sandboxes	Flexibility for brokers, but capital obligations for direct subscribers
Big Tech	GDPR, CCPA, Competitive Surveillance, AI, and Data Protection	AI confidentiality and usage obligations, but not subject to solvency requirements

InsurTechs are more recent. Simply put, they are entrepreneurs identifying an opportunity, rooted in a lean start-up culture, who enter the insurance market with a new technological, service or business model offering. They can be new intermediaries and play the role of a platform between traditional insurers and policyholders. Most often, they can take advantage of a lever linked to a new technology (IoT, blockchain, Smart Contract, decentralized technology (P2P), AI, etc.) or go to a niche segment on a risk (e.g., cyber-risk, animal risk, etc.) or on a type of customer (VSE, SME, etc.). They are numerous and growing rapidly and, in a way, behave quite classically. Their dominant strategy remains that of the start-up: fundraising, financing, growth, and can create disruptions in the insurance market in the sense of Christensen (1997). And in this case, the behavior of Venture Capitalists and investment funds is crucial to understanding their dynamics. In the third quarter of 2023, investments started to rise again after the COVID period's lull, and they stand at $1.1 billion worldwide (CBInsight, 2023) (Figure 1 & Table 7).

[98] https://www.cxagroup.com/
[99] https://www.pdpc.gov.sg/overview-of-pdpa/the-legislation/personal-data-protection-act

Figure 1
INSURTECH FUNDING (CBS INSIGHTS, 2023)

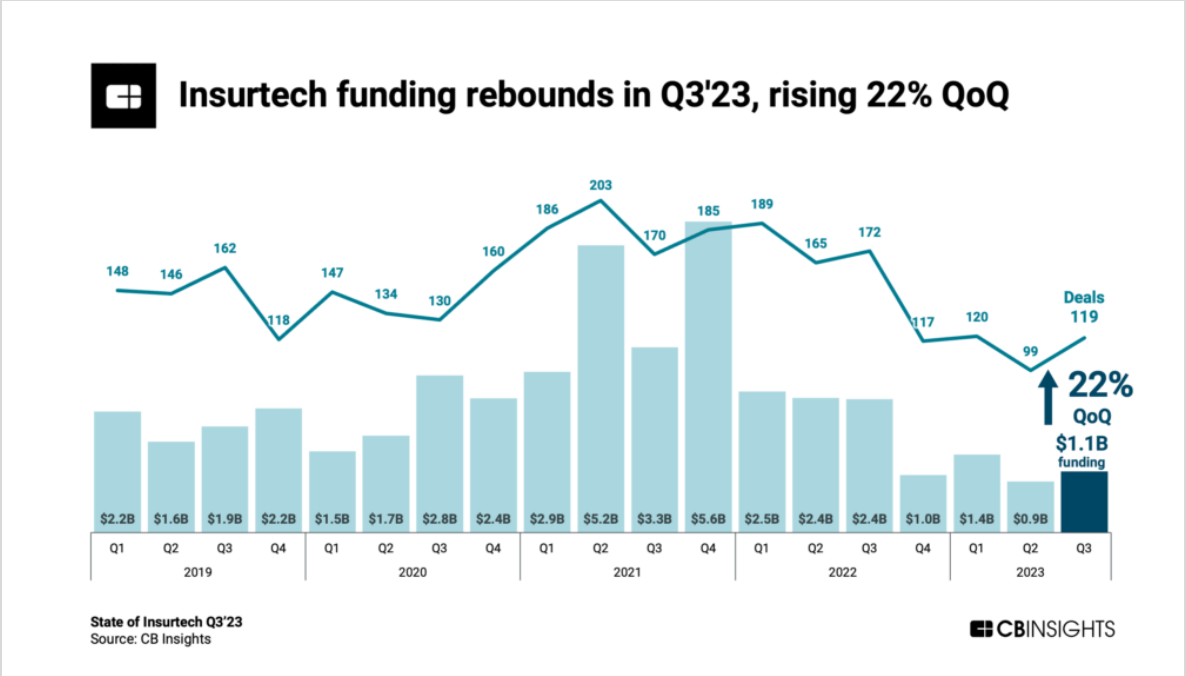


Table 7
INSURTECH: FUNDING BY YEAR

Year	Quarter	Funding (Billion USD)	Deals
2019	Q1	2.2	148
2019	Q2	1.6	146
2019	Q3	1.9	162
2019	Q4	2.2	118
2020	Q1	1.5	147
2020	Q2	1.7	134
2020	Q3	2.8	130
2020	Q4	2.4	160
2021	Q1	2.9	186
2021	Q2	5.2	203
2021	Q3	3.3	170
2021	Q4	5.6	185
2022	Q1	2.5	189
2022	Q2	2.4	165
2022	Q3	2.4	172
2022	Q4	1.0	117
2023	Q1	1.4	120
2023	Q2	0.9	99
2023	Q3	1.1	119

They can compete with historical players on part of their value chain.

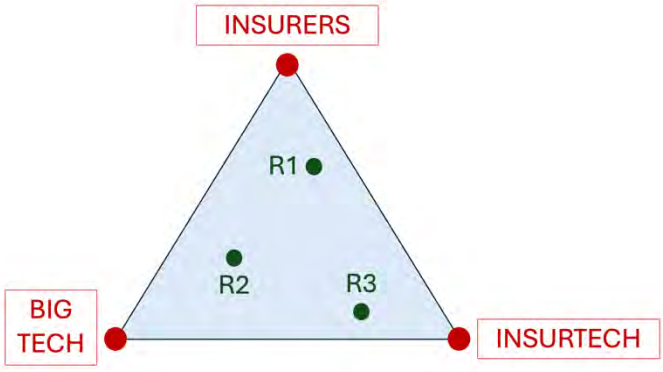
Note that historic insurers can also develop their own investment funds, like Allianz Ventures or American Family Ventures, to finance growth and establish partnerships with InsurTech.

They can either be bought out or supported by traditional insurance players. Most often, they position themselves between the insurer and the insured by optimizing risk management. The following figure is an overview of the 50 fastest-growing American start-ups in 2023. In terms of resources/skills, they often have a good knowledge of the insurance market, even if this may only be one aspect of it, in accordance with the niche that serves as their entry point (a technology, a customer category). They have a strong technological culture and mastery of the associated data, even if, due to the limited size of their market, they develop less expertise than Big Tech. On the other hand, they have, by nature, a very strong culture of innovation through prototyping and experimentation and are agile. This is linked to their size and their organizational capacity, which limits routinization and inertia.

(R1)	insurance industry culture	++
(R2)	behavioral data culture	++
(R3)	culture of innovation and experimentation	+++

Overall, we can represent the three resources/skills in the player space (Figure 2) and identify the comparative advantages of each player. InsurTechs have an advantage in organizational agility and their ability to explore technological and market niches. Traditional players have the financial resources and have mastered the insurance business. Big Techs have a very strong data culture and own data, often multi-dimensional, on individuals.

Figure 2
SPACE OF COMPARATIVE ADVANTAGE



Section 3: Markets and Players, the Corners of the Digital Transformation Triangle

The players just introduced are the main players found in the new insurance market. Let us now see what they can envisage, both with and without each other.

3.1 TRADITIONAL INSURERS

Legacy insurers see technology as an opportunity to modernize their business, particularly in risk management, underwriting, and customer satisfaction. But the transition is slow due to the complexity of their IT systems and strict regulations. Faced with increasing pressure to offer more personalized and digital services, they often adopt a strategy of partnerships with insurtechs and, to a lesser extent, with digital giants. The objectives of insurers are mainly to improve their operational efficiency, attract new customers, and retain existing customers. The limits are institutional inertia, the weight of compliance, and a corporate culture that is often slower to evolve.

3.2 THE GAFAM

Tech giants like Amazon and Google hold a huge amount of personal and behavioral data that could be very useful for insurance. For example, Google and Amazon hold data on their users' health, lifestyle, and even consumption habits, information that is strategic for assessing risk. The goal of GAFAM is to infiltrate the insurance sector via cloud services or infrastructures, or even offer their own insurance products, often in partnership with traditional insurers. The limits are probably the burden of privacy regulations and the public's distrust of these giants in terms of data management. GAFAM are not direct competitors of insurers, but they insert themselves into the value chain by providing cloud, data analysis, and customer experience management services. For example, Amazon Web Services (AWS) is a major provider of cloud services for insurance companies[100] [101]. In the same way, Microsoft Azure provides Cloud infrastructure and AI technology (CoPilot) for insurers[102].

3.2.1 RISK MODELING (CLIMATE EXTREMES)

Google Crisis Response[103]: The Google Crisis Response service offers sophisticated tools and predictive models to track and anticipate dangerous natural events, such as earthquakes, hurricanes, and floods. Using real-time data from sensors, satellites and other sources, Google generates precise alert models that are then integrated into its applications (Google Maps, search engine). These tools provide up-to-date information to populations and local authorities to anticipate risks and organize evacuations or emergency interventions. The objective is to provide critical information at each stage of a disaster, from prevention to post-crisis management.

Facebook Crisis Response[104]: Facebook's Crisis Response feature focuses on spreading alerts and information on its social network, facilitating rapid communication between affected people and their loved ones. When a disaster strikes, Facebook allows users to share local information in real time and use

[100] https://aws.amazon.com/financial-services/insurance/
[101] https://www.pwc.com/us/en/technology/alliances/amazon-web-services/transforming-insurance.html
[102] https://www.microsoft.com/en-us/industry/financial-services/insurance
[103] https://crisisresponse.google/
[104] https://www.facebook.com/about/crisisresponse/

the "Safety Check," a feature that allows individuals to report that they are safe[105]. Facebook also promotes fundraising and resource sharing tools, facilitating mutual aid within the affected community. This system aims to strengthen solidarity and communication among users during crises, by spreading essential information for safety and support.

3.2.2 CONNECTED HEALTH

On the hardware front: Apple launched its popular Apple Watch, while Google strengthened its position in the wearables market by acquiring Fitbit[106] [107]. The main goal of these companies is to integrate sensors capable of measuring biomedical constants, among other features offered by these smartwatches. Unlike Amazon, which encountered difficulties with its Halo bracelet[108], a device initially focused on health and which was withdrawn from the market. Apple and Google seem to have found a better balance between technology and health.

But we are also seeing Big Tech strategies that take advantage of very detailed data collection on behavior to adjust insurance premiums and offer novel and evolving contracts. Thus, TESLA[109] offers insurance that's as close as you can get to measured driving.

On the app level: Google and Apple are taking a similar approach to consumer-to-consumer (B2C) services with their respective apps, Google Health and Apple Health. However, Apple differentiates itself by adding a B2B dimension to its offering with its electronic health records system, Apple Health Records[110], which is available in the United States. This allows Apple to further integrate into the healthcare system, making it easier for patients and healthcare professionals to share medical information.

On the healthcare front: On the healthcare front, Amazon recently ended its Amazon Care initiative to focus on selling medications through Amazon Pharmacy[111], where regulations allow. The move marks a shift in strategy for Amazon, which appears to be prioritizing the distribution of pharmaceuticals over providing direct healthcare services. Facebook, meanwhile, tried to explore the preventative medicine sector, but ultimately abandoned the initiative, highlighting the challenges tech companies face in healthcare.

In terms of research and development: We are seeing a convergence among technology, data, and healthcare, exemplified by Verily[112], a subsidiary of Alphabet dedicated to healthcare (formerly Google Life Sciences). Microsoft is also involved in this area with its AI For Good initiative, although it is mainly focused on infrastructure with Cloud for Healthcare[113], aimed at supporting insurers and healthcare organizations in managing their data.

3.3 INSURTECHS

Insurtechs are technology companies that use advances in AI, machine learning, and big data to transform insurance practices. Their advantage is great agility and the ability to offer hyper-personalized products.

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[105] https://en.wikipedia.org/wiki/Facebook_Safety_Check
[106] https://en.wikipedia.org/wiki/Fitbit
[107] https://www.fitbit.com/
[108] https://www.aboutamazon.com/news/company-news/amazon-halo-discontinued
[109] https://www.tesla.com/insurance
[110] https://www.apple.com/healthcare/health-records/
[111] https://pharmacy.amazon.com/
[112] https://en.wikipedia.org/wiki/Verily
[113] https://www.microsoft.com/en-us/industry/health/microsoft-cloud-for-healthcare

For example, insurtechs like Lemonade use AI for instant underwriting, and algorithms to assess risk in real time. The goal of insurtechs is to capture market share by offering a smoother user experience and less expensive and more accessible products. The limitations are often a lack of awareness and trust compared to traditional insurers and difficulties in profitability. Insurtechs represent both a threat and an opportunity for traditional insurers. Some insurers invest directly in these startups to benefit from their innovations while remaining competitive.

Oscar Health was co-founded in 2012 by Joshua Kushner, Mario Schlosser, and Kevin Nazemi, with a mission to make health insurance more user-friendly and affordable, leveraging technology to improve the experience for members. The founders saw an opportunity after the passage of the Affordable Care Act (ACA), which created new regulations and exchanges, aiming to make health insurance accessible to a larger population in the United States. They were motivated by frustrations with the complexities of the healthcare system, from customer service to transparency in pricing, and aimed to redesign health insurance with a focus on user experience and digital access. Oscar Health differentiated itself by adopting a technology-driven approach, integrating a mobile app and website that allowed members to manage their healthcare needs more easily. Through its platform, users can find doctors, book appointments, review their medical history, and consult 24/7 telemedicine services. This direct-to-consumer model, along with Oscar's emphasis on primary care and wellness incentives, attracted attention as a disruptive force in the health insurance industry. Oscar initially targeted individuals in New York City but expanded into other states over the years. The company garnered significant venture capital backing and raised substantial funding to fuel its growth, including from firms like Thrive Capital, Google Capital, and Fidelity. Oscar Health went public in 2021, emphasizing its ongoing commitment to transforming healthcare access and creating a seamless experience for its members through technology.

Policygenius
Policygenius was founded in 2014 by Jennifer Fitzgerald and Francois de Lame, two former McKinsey consultants with backgrounds in insurance and financial services. Recognizing that many consumers found the insurance industry confusing and often intimidating, they set out to create a digital marketplace that would simplify the process of buying insurance. The goal was to offer a transparent and user-friendly platform where consumers could compare policies and access unbiased advice, helping them make informed decisions. Initially, Policygenius started by focusing on life insurance, where complexity and opaque pricing structures presented a significant barrier for consumers. As the platform gained traction, Policygenius expanded its offerings to include other types of insurance, such as home, auto, and disability insurance. Its model relates on providing educational content and a comparison tool that allows users to evaluate coverage options from various insurers. Policygenius differentiated itself by positioning as a "one-stop-shop" for insurance, building trust through comprehensive customer service that supports consumers throughout the policy selection process. Unlike traditional brokers, Policygenius operates online and appeals to a digital-first audience, often younger consumers who prefer managing their insurance needs through a digital interface. The startup saw rapid growth, attracting significant venture capital funding from investors like Norwest Venture Partners, Revolution Ventures, and KKR. Policygenius has become one of the largest online insurance marketplaces in the U.S., drawing on technology and data to simplify the purchasing experience. By 2020, it had raised over $150 million, using the funds to grow its team, invest in its technology platform, and broaden its insurance products. Today, Policygenius continues to innovate in the insurtech space, offering a user-friendly alternative to traditional insurance brokers by simplifying and demystifying insurance for consumers across the country.

Metromile was founded in 2011 by David Friedberg, former Google executive and founder of The Climate Corporation, alongside Steve Pretre. The concept for Metromile emerged from Friedberg's realization that most auto insurance models were inefficient for people who drove infrequently. He saw an opportunity to disrupt traditional insurance by introducing a pay-per-mile model, which would make auto insurance more affordable for low-mileage drivers. This model allowed Metromile to charge users based on the actual miles they drove rather than fixed premiums, using telematics and GPS technology to track mileage accurately. In the early years, Metromile focused on developing its app and technology to support its pay-per-mile insurance. They created the Metromile Pulse, a small GPS-enabled device that drivers could plug into their vehicles to track mileage and offer additional services. This technology enabled Metromile to collect data on driving patterns and vehicle health, which the app relayed to users. The app became popular for its features, such as street-sweeping alerts and mileage-based savings insights, which made it a practical tool for urban drivers. These innovations, along with partnerships with established insurers, helped Metromile expand into major U.S. markets. Metromile raised substantial venture capital funding to fuel its growth, securing backing from top investors like NEA, Index Ventures, and Intact Financial. In 2021, Metromile went public via a SPAC (special purpose acquisition company) merger, a popular route for tech companies at the time. Despite its innovative approach, Metromile faced challenges with underwriting losses and market competition. In 2022, Lemonade acquired Metromile, integrating its pay-per-mile model and telematics data to strengthen Lemonade's digital insurance offerings. This acquisition marked a new chapter, combining Metromile's technology and data insights with Lemonade's broader insurtech platform.

Zego was founded in 2016 by former Deliveroo managers, Sten Saar and Harry Franks, along with Stuart Kelly, with the vision to create flexible insurance for the gig economy. Saar and Franks observed the limitations of traditional insurance in serving gig workers, particularly in the delivery and ride-hailing sectors, where workers needed flexible coverage that matched their on-demand schedules. The company started by offering hourly insurance to delivery drivers, allowing them to pay only for the time they were actively working. This model addressed the high cost and inflexibility of conventional insurance and quickly resonated with gig workers looking for cost-effective, short-term coverage. The company rapidly expanded its product offering, moving beyond delivery drivers to provide insurance for ride-hailing services, fleets, and other commercial vehicle operators. Zego's tech-driven platform made it easier to customize policies and offered insights into driver behavior and risk assessment through telematics, which helped determine premium costs based on real-time data. This innovation allowed Zego to gain a significant foothold in the commercial insurance space, particularly with companies like Uber and Bolt, who partnered with Zego to insure their drivers, highlighting the effectiveness of usage-based insurance models. In 2019, Zego became the first UK-based insurtech to obtain its own insurance license, enabling it to underwrite its policies and expand more rapidly across Europe. With substantial investment from firms like Target Global and TransferWise co-founder Taavet Hinrikus, Zego raised over $200 million in funding. This support allowed it to scale up its technology and enter new markets, cementing its position as a leader in flexible, digital-first commercial insurance. By 2021, Zego achieved unicorn status, underscoring its rapid growth and pioneering role in transforming insurance for gig and commercial vehicle users.

Hippo Insurance was founded in 2015 by Assaf Wand and Eyal Navon, aiming to modernize home insurance by simplifying the process and making it more customer-centric. Wand, inspired by the inefficiencies and frustrations he experienced when insuring his own home, envisioned a model that would bring the entire insurance experience online and provide transparent, affordable, and accessible coverage. He wanted to address the gaps in traditional homeowners' insurance, which often included outdated policies and long, complicated application processes. Wand and Navon launched Hippo in 2017, initially focusing on digitizing the user experience for customers. To create a streamlined and user-friendly platform, Hippo used technology to speed up the quoting and underwriting processes, allowing customers to get quotes in under a minute by providing minimal information. The company utilized extensive data sources, including public

property records, to pre-fill much of the information for potential customers, which eliminated the need for long questionnaires. Hippo's platform also offered proactive features, like smart home device discounts and maintenance tips, which aimed to reduce claims by preventing incidents. This proactive, tech-driven approach enabled Hippo to differentiate itself from traditional insurers, catering particularly to digitally savvy homeowners. With significant venture capital support, including backing from firms like Andreessen Horowitz and Ribbit Capital, Hippo grew quickly and expanded its services nationwide. The company's growth allowed it to go public through a SPAC merger in 2021, valuing Hippo at approximately $5 billion. Today, Hippo continues to innovate in the home insurance space by leveraging smart home technology and data analytics to provide tailored policies and proactive risk management, which has made it one of the prominent names in the insurtech sector.

Coya was founded in 2016 in Berlin by Andrew Shaw, Dr. Peter Hagen, and Sebastian Heithoff, with the mission to create a fully digital, customer-centric insurance company that would address the evolving needs of the European market. Observing the outdated processes and often cumbersome user experiences of traditional insurance providers, the founders envisioned Coya as an insurtech that could streamline and simplify insurance for customers. They sought to build an insurance model that was not only more accessible, but also more transparent, leveraging technology to create a platform that would cover areas of insurance underserved by existing providers, such as renters' insurance, liability insurance, and home insurance. The company initially focused on integrating advanced data analytics and artificial intelligence to enhance risk assessment and customer onboarding processes. This digital-first approach enabled Coya to offer policies through an online platform where customers could easily customize coverage and manage claims. The focus on technology extended to providing a seamless user experience, with tools like real-time chat support and easy-to-navigate interfaces that made understanding and purchasing insurance simpler for younger, tech-savvy customers. In 2018, Coya received its insurance license from the German Federal Financial Supervisory Authority (BaFin), making it one of the first fully licensed digital insurers in Germany. The company attracted substantial investment from venture capital firms, including Valar Ventures and e.ventures, which enabled it to expand its product offerings and extend its reach across Europe. Since its inception, Coya has aimed to redefine insurance in the digital age, focusing on transparency, user-friendly design, and flexible policies that could adapt to the specific lifestyles and needs of modern consumers.

Zesty.ai was founded in 2015 by Attila Toth and Anand Gajjar with the goal of leveraging artificial intelligence and machine learning to improve risk assessment for insurers and property owners. The founders recognized that the traditional insurance industry relied heavily on historical data and manual risk assessments, which often led to inaccurate pricing and an inability to accurately evaluate the risk associated with natural disasters and property damage. They saw an opportunity to use AI-driven insights and high-resolution imagery to provide more precise property risk assessments, particularly for events like wildfires, floods, and hurricanes. Zesty.ai's platform uses satellite and aerial imagery, coupled with data from public records and geospatial information, to analyze risk factors specific to individual properties. The technology assesses variables like building materials, proximity to vegetation, and roof conditions to predict the likelihood of damage from environmental hazards. Zesty.ai's flagship product, "Z-FIRE," is particularly focused on wildfire risk, an increasing concern due to climate change, especially in areas like California. This AI-driven approach allows insurers to price policies more accurately and helps homeowners understand and mitigate their risk factors. The company quickly gained traction, forming partnerships with major insurers and reinsurers to incorporate its AI tools into their underwriting processes. Zesty.ai has secured funding from notable investors, including Luxembourg-based Insurtech.vc, and received industry recognition for its contributions to property risk assessment. The platform's innovative approach has made Zesty.ai a leader in the insurtech space, offering advanced tools that help insurers adapt to evolving climate risks and manage policy pricing more effectively.

Bright Health Group was founded in 2016 by Bob Sheehy, who was previously the CEO of UnitedHealthcare, along with co-founders Justin D. Dangel and Dr. AJ McGowan. The company was established with the goal of transforming the healthcare experience by creating a more consumer-centric approach to health insurance. Bright Health Group aimed to simplify the healthcare process and improve access to care by partnering with a select network of healthcare providers. The company focused on offering health insurance plans that were designed to be more affordable and easier to navigate for consumers. In its early years, Bright Health Group raised significant funding to support its growth and expansion, allowing it to enter various markets and offer a range of health insurance products. The company has since evolved and expanded its services, including the launch of its own health insurance plans and partnerships with healthcare providers to enhance care delivery.

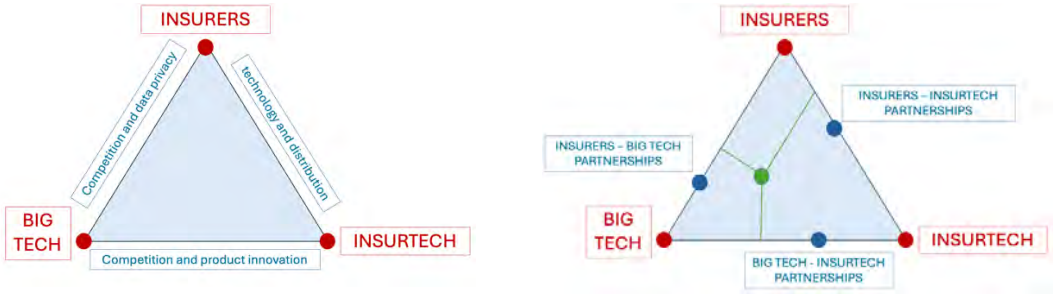
Insurify was founded in 2013 by Snejina Zachariah and a team of co-founders, including a mix of technology and insurance industry professionals. The company was created with the goal of simplifying the process of comparing and purchasing insurance, particularly auto insurance, for consumers. The idea behind Insurify was to leverage technology to provide a user-friendly platform where individuals could easily compare insurance quotes from various providers. By using artificial intelligence and data analytics, Insurify aimed to streamline the insurance shopping experience, making it more efficient and transparent. Insurify's platform allows users to input their information once and receive multiple quotes from different insurers, helping them make informed decisions based on coverage options and pricing. The company has since expanded its offerings to include other types of insurance, such as home and renters' insurance, while continuing to focus on enhancing the customer experience in the insurance industry. Over the years, Insurify has raised funding to support its growth and development, positioning itself as a significant player in the insurtech space.

Next Insurance was founded in 2016 by Guy Goldstein, Nissim Tzachor, and Alon Huri. The company was established with the goal of providing small businesses and self-employed individuals with tailored insurance solutions that meet their specific needs. Recognizing that traditional insurance products often did not cater well to the unique requirements of small businesses, the founders aimed to create a more accessible and user-friendly platform for purchasing insurance. Next Insurance focuses on offering a range of coverage options, including general liability, professional liability, and commercial auto insurance, specifically designed for various types of small businesses. The company leverages technology to streamline the insurance purchasing process, allowing customers to obtain quotes, purchase policies, and manage their coverage online. This digital-first approach aims to simplify the experience for business owners, making it easier for them to find the right insurance without the complexities often associated with traditional insurance providers. Next Insurance has experienced significant growth since its inception, raising substantial funding to expand its offerings and reach more customers. The company has positioned itself as a key player in the insurtech space, focusing on the needs of small businesses and self-employed individuals.

Section 4: Coopetition, the Edges of the Digital Transformation Triangle

Traditional insurers, insurtechs, and Big Tech have a relationship of **coopetition**[114] (cooperation and competition) (Corbo et al, 2023; Gnyawali & Park, 2011) (Figure 3). Some insurers are adopting or even investing in insurtech technologies to stay relevant in a rapidly evolving market. Others rely on Big Tech for cloud and data management services, but they are trying to avoid over-reliance on them to maintain their independence.

Figure 3
DIGITAL TRANSFORMATION TRIANGLE – COOPETITION STRATEGIES



4.1 INSURERS - BIG TECH

- Insurers → Big Tech: insurers need the skills of big techs[115]
- Big Tech → Insurers: Does Big Tech need insurers? As already mentioned, Tesla offers to reduce insurance costs by avoiding partnering with insurers[116] [117].
- Insurers benefit from GAFAM tools but keep their distance to avoid too much intrusion into the insurance sector.
- Technology players are putting data at the heart of their operational model, whereas insurers tend to operate in silos and marginalize the subject of data in relation to IT or actuarial science.
- Technology players are well-versed in experimentation and iteration, whereas insurers often demonstrate lower risk appetite and agility.

There are two possible movements, one of which could put historical insurers at risk of disruption. The first is where Big Techs are getting closer to insurers because they are seeking a resource/skill in cooperation that they do not possess: RS1: the insurance business and control of regulations.

Symmetrically, insurers can find new markets among Big Tech by entering the latter's platform ecosystems and a strong data culture.

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[114] Paul Terry Cherington, *Advertising as a Business Force: A Compilation of Experience Records,* Doubleday, for the Associated advertising clubs of America, 1913, p. 144.
[115] https://www.ancileo.com/a-look-at-5-big-tech-partnerships-in-insurance/
[116] https://www.bloomberg.com/news/articles/2022-05-18/what-is-tesla-insurance-elon-musk-sees-opportunity-to-cut-out-the-middleman
[117] https://www.cov.com/-/media/files/corporate/publications/2023/11/insurance-for-autonomous-vehicles-who-will-drive-those-risks.pdf

- **Berkshire Hathaway, Amazon,** and **JPMorgan:** In 2018, these three giants launched a joint venture, Haven[118], to reform the U.S. employee health insurance system. While the initiative has since been discontinued, it illustrates how big tech and financial companies can partner to try to transform the insurance industry.

- **Allianz** and **Google Cloud:** Allianz has partnered with Google Cloud to leverage AI and machine learning for data analytics, risk assessment, and loss prediction. Google Cloud enables Allianz to optimize its operations and deliver more personalized services. In 2021, Google Cloud **partnered** with **Allianz** (specifically Allianz Global Corporate & Specialty) and **Munich Re** to offer cybersecurity insurance[119], "Cloud Protection +."

- **Apple** and **Aetna:** Apple teamed up with the American insurer, Aetna, in 2018 to design e-health applications. But, more broadly, Apple collects a large amount of data on individual health via the iPhone and the iWatch. These are two technological objects that are very close to users and that produce information that we can imagine helps identify the user's health.

- **Swiss Re** and **Microsoft:** Microsoft Azure has become a key partner for Swiss Re, which is using the power of its cloud to modernize its risk analytics platform and automate parts of its business[120]. This allows Swiss Re to simplify its internal processes and make its services more efficient.

- **Google** and **Swiss Re:** Coefficient Insurance was founded in 2020 through a collaboration between Swiss Re and Verily, the life sciences subsidiary of Alphabet (Google's parent company). Coefficient specializes in employer stop-loss insurance, which helps self-funded companies manage high and unexpected employee healthcare costs by providing more precise, data-driven coverage. This approach, called "precision risk," leverages advanced data analytics, making benefits insurance more predictable and cost-effective. Swiss Re brings its expertise in risk management, while Verily contributes technology innovations and analytics capabilities in the healthcare space. Coefficient's stop-loss insurance model is particularly relevant for large U.S. employers that self-fund their healthcare plans and want additional protection against extreme losses. In addition to sharing technology and data analytics resources, the partnership allows Swiss Re to expand its presence in the U.S. employer insurance market, leveraging Verily's technology to innovate cost and risk management solutions over time. *"Under the partnership, Coefficient Insurance can leverage Verily's strengths in hardware, software and data science integration, as well as take advantage of Swiss Re's expertise and reputation."*[121]

- **AXA** and **Microsoft:** AXA has partnered with Microsoft to develop a digital health platform[122]. The goal is to enable policyholders to proactively manage their health with teleconsultation, medical advice, and prescription management services. Microsoft Azure provides the cloud and technology infrastructure to make this service accessible to AXA policyholders.

- **Progressive Insurance** and **Amazon:** Progressive, one of the largest U.S. insurers, has partnered with Amazon to offer home security devices (like Amazon's Blink security cameras) with discounts

[118] https://www.nytimes.com/2021/01/04/business/haven-amazon-berkshire-hathaway-jpmorgan.html
[119] https://www.allianz.com/en/mediacenter/news/business/insurance/210303_Allianz-partners-with-Google-Cloud-Munich-Re-for-cyber-risk-management-solution.html
[120] https://www.swissre.com/media/press-release/nr-20200312-swiss-re-announces-strategic-alliance-with-microsoft.html
[121] https://ancileo.com/a-look-at-5-big-tech-partnerships-in-insurance/
[122] https://www.axa.com/en/press/press-releases/axa-collaborates-with-microsoft-to-create-next-gen-health-well-being-services

on home insurance[123]. This aims to reduce claims risks, while adding a new distribution and customer acquisition channel through the Amazon platform.

- Nationwide and Amazon: Nationwide, a major U.S. insurer, has partnered with Amazon to offer home security services, integrating cameras and motion detectors into its home insurance policies[124]. The partnership aims to reduce the risk of intrusion and damage, while bringing a "proactive protection" dimension to Nationwide's home insurance.

- Lloyd's and Microsoft in cyber insurance[125]: Lloyd's of London[126], a long-standing player in the insurance market, has collaborated with Microsoft to create cyber insurance products for businesses using the cloud. Microsoft, which is well-versed in the vulnerabilities and risks associated with cyber-attacks, brings its expertise and technology to create bespoke cyber insurance, which benefits Lloyd's in strengthening its offering in a rapidly growing sector.

Competition and offensive strategies:

- Amazon vs. the Health Insurance Market: Amazon, through Amazon Care[127]and its healthcare division, has explored entering the health insurance sector, potentially threatening established insurers. By testing telemedicine services and health coverage for its employees, Amazon is hinting at its potential to compete with traditional health insurers.

- Google vs. the health data industry: Google acquired Fitbit and developed its own health division (Google Health[128]). By collecting health and wellness data, Google could one day position itself in the insurance market by offering services or working directly with health insurers, which worries some insurers because of Google's dominant position in the data field.

- Ping An[129] vs. Alibaba in China: Ping An, the Chinese insurance giant, is in direct competition with Alibaba, which launched digital health insurance through Ant Financial[130]. With hundreds of millions of users, Alibaba's Alipay platform represents a powerful competitor for Ping An. The competition has prompted Ping An to double down on innovation, launching digital health services, apps, and personalized insurance services.

- Google vs. car insurance in Europe: Google has tested the European car insurance market by launching price comparison tools[131] and insurance services. By targeting consumers directly through its platform, Google is putting insurers like AXA, Allianz, and Generali in competition, who fear losing control of the customer relationship to Google. Although Google has not yet launched its own insurance offer, its ability to aggregate and compare prices gives it influence over consumers' purchasing decisions. In 2016, Google closed its comparison site launched three years earlier in several European countries.

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[123] https://smallbiztrends.com/amazon-progressive-offering-small-business-grant-funds/
[124] https://news.nationwide.com/nationwide-offer-to-business-prime-members-can-help-protect-small-businesses/
[125] https://ukstories.microsoft.com/features/lloyds-banking-group-and-microsoft-form-partnership-to-accelerate-banks-digital-transformation-strategy/
[126] https://en.wikipedia.org/wiki/Lloyd's_of_London
[127] https://health.amazon.com/onemedical
[128] https://health.google/
[129] https://en.wikipedia.org/wiki/Ping_An_Insurance
[130] https://en.wikipedia.org/wiki/Ant_Financial
[131] https://www.canadianunderwriter.ca/insurance/google-compare-auto-insurance-launched-1003509911/

4.2 INSURERS AND INSURTECHS EDGE

- Competitive but often partnership-based relationship with traditional insurers seeking to modernize their offers.

Coopetition strategies:

- **AXA** and **Trōv:** AXA has partnered with insurtech, Trōv, to offer on-demand insurance in select markets[132]. Trōv provides a digital platform where customers can purchase insurance coverage for specific assets (electronics, sports equipment, etc.) with great flexibility.

- **Munich Re** and **Next Insurance:** Munich Re has invested in Next Insurance[133], an insurtech company specializing in small business insurance. This collaboration allows Munich Re to diversify its offerings and access a growing market segment thanks to Next Insurance's technology.

- **MetLife**[134] and **PolicyGenius**[135]: MetLife, a leading insurer, has partnered with insurtech company, PolicyGenius, to make it easier to compare and buy life insurance products online. The collaboration helps MetLife increase its access to the digital marketplace, while providing customers with a faster, more convenient experience to select and purchase insurance products.

- **State Farm** and **Zego**[136]: State Farm has collaborated with Zego, an insurtech specializing in insurance for rental and ride-sharing vehicle drivers, to develop solutions adapted to new mobility trends.

- **Zurich** and **CoverWallet**[137]: Zurich Insurance has partnered with insurtech, CoverWallet, to offer small businesses an online insurance underwriting and management platform. By collaborating with CoverWallet, Zurich is leveraging the insurtech's technology to offer a simple digital service to SMEs, a market often underserved by traditional insurers.

Competition and offensive strategies:

- **Lemonade** vs. **Traditional Insurers:** Lemonade offers faster, and often cheaper, digital home and renters insurance targeting younger consumers who are looking for products that are quick and easy to buy online. Traditional insurers, whose processes are often slower, are being forced to rethink their approaches to remain competitive in the face of this 100% digital approach.

- **Root Insurance** vs. **Allstate:** Root, an insurtech, uses a mobile app to assess a user's driving behavior and offers premiums based on real-time data[138]. This approach challenges the traditional premium calculation methods of insurers like Allstate, which have had to accelerate their own telematics and behavior-based pricing initiatives.

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[132] https://www.axa.co.uk/newsroom/media-releases/2016/axa-teams-up-with-silicon-valley-start-up-trov-to-deliver-market-first-in--on-demand--insurance/
[133] https://www.munichre.com/mrv/en/portfolio/next.html
[134] https://www.metlife.com/
[135] https://en.wikipedia.org/wiki/PolicyGenius
[136] https://www.zego.com/
[137] https://www.coverwallet.com/
[138] https://www.the-digital-insurer.com/dia/root-insurance/

- **Hippo** vs **State Farm:** Hippo[139] [140], an insurtech specializing in home insurance, has introduced a highly digital and flexible insurance offering that includes connected security devices (such as smoke and water sensors) to prevent claims. This has forced incumbents like State Farm to reevaluate their own offerings and adopt similar technologies to avoid losing market share in the home insurance segment.

- **Coya** vs. **Traditional European Insurers:** Coya[141], a German insurtech, has disrupted the European market with on-demand insurance for various goods and services (e.g., electronics, personal liability). European insurers, including Allianz and Generali[142], have been pushed to accelerate their digitalization and adopt similar flexibility in their own offerings to cope with this competition.

- **Apple Health** vs. **Health Insurtechs:** Apple, with its Apple Health platform and the Apple Watch, uses health data to potentially influence users' spending habits. Insurtechs like Oscar Health, which also leverage health data to adjust premiums and coverage, are challenged by Apple's presence in the health space, particularly because Apple could easily evolve into a form of insurance service based on user behavior tracked through its devices.

- **Facebook** vs. **Digital Insurers:** In 2019, Facebook explored the idea of integrating financial and insurance services on its platform. Although the project did not see the light of day, this prospect has encouraged insurtechs to innovate further to attract younger users. Insurtechs see Facebook as a potential competitor capable of distributing insurance products through its social platforms, which already have millions of active users.

Many traditional insurers have launched their own insurtechs to innovate and adapt to new technologies. For example, Allianz has created initiatives like **Allianz X**[143] to invest in technology startups, including insurtechs, or **Allianz Partners**[144], which focus on innovative insurance solutions, particularly in the mobility space. AXA has created several insurtech initiatives, including **AXA Next**[145], which focus on innovation and the development of new insurance solutions. Generali has launched **Generali Global Assistance**[146]**,** the **Generali Innovation Fund**[147], and other initiatives to integrate digital solutions and improve the customer experience. Munich Re has invested in insurtech startups and launched initiatives like **Digital Partners**[148], which focuses on the development of digital insurance solutions. MetLife has launched **MetLife Digital Accelerator**[149] to explore innovative insurance solutions and has invested in insurtech startups. State Farm has developed digital solutions and partnerships with startups to improve its insurance offerings and customer service, including **State Farm Ventures**[150]. In China, Ping An launched the **Ping An Technology Innovation Center**[151] [152], which supports startups and innovative projects in the technology and insurance

[139] https://en.wikipedia.org/wiki/Hippo_(company)
[140] https://techcrunch.com/2017/04/26/startup-hippo-insurance-launches-in-california-with-a-tech-enabled-home-insurance/
[141] https://en.wikipedia.org/wiki/Coya_AG
[142] https://www.future-processing.com/blog/the-state-of-digital-transformation-in-german-insurance-vertical/
[143] https://allianzx.com/
[144] https://www.allianz-partners.com/en_global.html
[145] https://www.axa.com/en/about-us/axa-next
[146] https://us.generaliglobalassistance.com/
[147] https://www.generali.com/who-we-are/Strategic-Plan-Lifetime-Partner-24/Lead-innovation/innovation/The-Generali-Innovation-Fund
[148] https://www.munichre.com/digital-partners/en.html
[149] https://www.techstars.com/blog/innovation-in-action/innovating-insurance-how-metlife-partners-with-startups-for-lasting-success
[150] https://ventures.statefarm.com/
[151] https://m.morphogo.com/details/59
[152] https://www.signalhire.com/companies/ping-an-fin-tech-accelerator

sectors. In Japan, Tokio Marine has created the **Tokio Marine Kiln**[153], which aims to encourage innovation and support startups in the insurance sector.

4.3 BIG TECH AND INSURTECHS EDGE

- Insurtechs use Big Tech platforms and infrastructure for their operations, but also seek to differentiate themselves from these large players.

Coopetition strategies:

- **Google** and **Oscar Health:** Google has invested in Oscar Health[154], an insurtech company specializing in health insurance. By collaborating with Google on data and analytics infrastructure, Oscar Health benefits from the technological power, while offering innovative health insurance products, focusing on data management and AI.
- **Google** and **Lemonade:** Lemonade, an insurtech known for its AI-powered digital underwriting and claims management model, has used Google Cloud for some of its infrastructure and data analytics. Google Cloud provides resources to host and secure customer data, while Lemonade benefits from scalable infrastructure.
- **Amazon** and **Next Insurance:** Amazon and Next Insurance[155] have partnered to offer insurance[156] for small businesses. Through Amazon Business Prime[157], SMBs can now easily purchase liability insurance, directly integrated into their Amazon accounts. This gives Next Insurance access to Amazon's vast commercial customer base.

Competition and offensive strategies:

- **Apple** and **health insurance startups:** With the Apple Watch and its health tracking features, Apple is well positioned to enter the health insurance space by leveraging the data it collects. This puts Apple in potential competition with health insurance insurtechs (like Oscar Health), which also use health data to adjust their coverage and services.
- **Amazon** and **online insurance distribution:** Amazon tested the UK car insurance market, offering comparisons and recommendations of insurance products[158] [159]. This puts Amazon in direct competition with insurtech platforms like Zebra[160] and Policygenius, which specialize in distributing and comparing insurance products online.

[153] https://www.tmkiln.com/about-tmk/innovation/
[154] https://www.fiercehealthcare.com/payer/google-parent-company-alphabet-inc-invests-375-million-into-oscar-health
[155] https://www.nextinsurance.com/
[156] https://www.nextinsurance.com/business/amazon-sellers/
[157] https://business.amazon.com/en/find-solutions/business-prime
[158] https://www.amazon.co.uk/insurance
[159] https://www.insurancebusinessmag.com/uk/news/property-insurance/amazon-insurance-store-closing-after-15-months-474144.aspx
[160] https://www.thezebra.com/

Section 5: Generative AI

The case of generative AI, and more particularly of large language models, sheds a somewhat particular light on the interactions between the different actors.

5.1 GENERATIVE AI IN INSURANCE

Generative AI is a branch of artificial intelligence that focuses on creating new and original content, such as text, images, music, code, and even videos. Rather than simply analyzing data or making predictions, generative AI models "produce" content based on examples observed in their training sets. These models can create text that appears to be written by a human, generate realistic images from text instructions, or even compose music.

Generative AI systems often rely on complex neural network architectures, such as generative adversarial networks (GANs) or transformers, which are at the heart of large language models. These architectures allow the model to learn the patterns, structures, and rules of the content in its training data, so that it can generate new content that respects its characteristics while being original. GANs are often used to generate realistic images or videos. They work through a competition between two neural networks: a generator that creates content, and a discriminator that tries to distinguish real content from generated content. This artificial competition improves the quality of the creations. Transformers, such as those used in language models (e.g., GPT or BERT), are particularly suitable for text generation. Thanks to their ability to process and generate text sequences, they can write articles, answer questions or even translate languages based on the knowledge integrated during their training. However, biases exist. The response is always probabilistic in nature, i.e., the AI produces a response that is dependent on its training set and the relative density of the content used for training. Hallucination can occur when the training sample is too small and/or when probabilities do not decide on one output option against another. In other words, generative AI cannot exchange on or produce content outside its training set. Consequently, all kinds of biases inherent in the quality of the data and/or input content are reproduced in the output proposed by the AGI (culture, gender, language, non-representativeness, etc.).

Insurers can use chatbots[161] powered by generative AI for customer service, policy inquiries, and claims updates. Unlike traditional rules-based chatbots, generative models can handle complex conversations, making customer interactions smoother and reducing the need for human agents. Generative AI can help design personalized products based on a customer's unique risk profile and coverage needs. This is becoming popular in life, health, and auto insurance, where generative AI can recommend policies tailored to individual health or driving histories.

Recently, generative AI models have been used to create economic scenarios, including economic disaster scenarios[162] [163]. This use can be relevant to make more robust capital calculations based on rare and extreme events too often perceived as unpredictable. It is also possible to explore hypothetical

[161] https://www.gptbots.ai/blog/insurance-chatbot
[162] https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/deloitte-launches-geospatial-and-ai-scenario-planning-monitoring-platform.html
[163] https://www2.deloitte.com/us/en/insights/industry/public-sector/automation-and-generative-ai-in-government/leveraging-ai-in-emergency-management-and-crisis-response.html

scenarios[164], by answering questions such as "what would happen if interest rates increased by 5%?" or "what would be the impacts of a collapse of the global supply chain?".

5.2 THE MAIN ACTORS

One of the most well-known language models, which has largely contributed to disrupting the triangle in recent months, is probably ChatGPT.

- **ChatGPT**[165] (GPT-4 and variants) developed by **OpenAI,** supported primarily by **Microsoft.** The GPT family of models (Generative Pre-trained Transformer, GPT-3, and GPT-4) and their chat versions (like ChatGPT) are used for text generation, information retrieval, customer support, and much more. Microsoft has integrated GPT into its products, such as Microsoft 365 (Word, Excel via Copilot) and Bing Chat.

But the other "big tech" players are not left behind:

- **Apple** is strangely the least visible company in this niche, despite the development of **Siri** for several years. Siri is not a large language model, strictly speaking. Originally, Siri is a voice assistant based on speech recognition and basic response generation systems, using natural language processing (NLP) technologies, but without the level of complexity or generative capabilities specific to LLM. Apple recently acknowledged this delay by signing an agreement with OpenAI to equip its new software suite (from the iPhone 16 and the last MacOS and IpadOS update) with an in-house AI called *Apple Intelligence* derived from ChatGPT. It will be gradually deployed between 2024 and 2025 in a non-homogeneous regulatory context. Indeed, the GDPR and the European AI-Act impose transparency on training data and compliance in terms of personal data usage, which limit the AI functions deployed in the EU.
- **Bard is Google**'s AI chatbot, based on the PaLM (Pathways Language Model) family of models, currently PaLM 2 and **Gemini**[166] (their most advanced LLM). These models are used in Google Search and other Google services to improve interactions and provide AI-based responses and are now directly accessible through Bard and integrated into Google products (such as Google Docs and Sheets). Google is also known for developing **BERT** (Bidirectional encoder representations from transformers), a pre-trained language model. And more recently, Google has also supported a startup, Anthropic[167], which has developed **Claude**, designed for text generation and natural conversation, aiming to be an "aligned" AI, i.e., it takes into account security and ethics.
- **Llama**[168] is a family of language models that **Meta (Facebook)** has partially opened to researchers, with versions Llama-1 and Llama-2. Meta focuses on transparency and academic research with these models, making them more accessible than some other proprietary models.

[164] Finkenstadt, DJ, Sotiriadis, J., Guinto, P., & Eapen, T. (2024). Contingency Scenario Planning Using Generative California Management Review Insights https://cmr.berkeley.edu/2024/01/contingency-scenario-planning-using-generative-ai/
[165] https://openai.com/chatgpt/overview/
[166] https://gemini.google.com/
[167] https://www.anthropic.com/claude
[168] https://www.llama.com/

- **Amazon** created the **Titan suite**[169] (consisting of several LLMs for different tasks) and the **Bedrock service**[170], an AI platform that offers access to various models, including Amazon's proprietary models. These solutions target companies using AWS.

5.3 INSURERS FACE GENERATIVE MODELS

Insurance companies may have some technical expertise in-house, but programming and training their own large language models (LLMs) requires considerable resources, both in terms of data and computing power. Some large insurance companies may have teams of data scientists and machine learning engineers capable of working on AI projects. However, developing an LLM from scratch is a complex challenge that requires advanced expertise. Training LLMs requires powerful computing infrastructures, often available only from large technology companies (big techs) that have data centers and cloud resources. Training such models requires highly specialized computing infrastructure (GPU computing power, or TPU), often only accessible by cloud providers such as Google, AWS, or Microsoft Azure. Today, the American graphics card manufacturer, NVidia[171], is almost the only one to provide GPU capabilities capable of training LLMs.

Few insurance companies have this level of computing capacity in-house, which puts them in a position of quite strong dependence on "big tech." The latter offers pre-trained LLM models (like GPT or BERT) that are ready to use and can be adjusted via transfer learning (fine-tuning) to meet the specific needs of insurers without having to start from scratch.

LLMs require large amounts of data to be trained effectively. Insurance companies may have domain-specific data, but they also need to ensure that this data is of high quality and compliant with data protection regulations. Indeed, the use of large language models in the insurance industry raises significant anonymity and privacy concerns, especially when it comes to sensitive data with the GDPR (General Data Protection Regulation), the AI Act in Europe, regulations like HIPAA (Health Insurance Portability and Accountability Act) or CCPA (California Consumer Privacy Act) in the U.S.

Also, quite naturally, insurance companies choose to collaborate with big techs to benefit from their expertise and infrastructures. This allows them to access pre-trained models and adapt them to their specific needs without having to invest massively in internal development.

- **Allianz Commercial** has set up a partnership between Allianz Consulting and **Microsoft** to study the feasibility of an internal application that would offer all the functionalities of an LLM[172], in particular advanced chatbots.
- In China, **Ping An** launched "Ping An Family Doctor" in 2024[173], a comprehensive proactive health management service system. It has constructed an innovative multimodal medical large language model (LLM) and 12 artificial intelligence (AI) business models on this foundation.

[169] https://aws.amazon.com/bedrock/titan/
[170] https://aws.amazon.com/bedrock/
[171] https://blogs.nvidia.com/blog/ai-decoded-lm-studio/
[172] https://commercial.allianz.com/news-and-insights/expert-risk-articles/AI.html
[173] https://group.pingan.com/media/news/2024/pingan-announces-brand-upgrade-of-pingan-family-doctor.html

- Swiss Re has partnered with Microsoft[174], and more specifically Copilot[175], to leverage large language models combined with data in the Microsoft Graph (calendar, emails, chats, documents, and meetings) to provide assistance to staff.
- Westfield Insurance has partnered with IBM[176]and Watsonx[177], with the aim of simplifying the explanation and documentation of computer codes used internally.
- State Farm used IBM Watson Advertising Conversations[178] to help deliver personalized safety and preparedness from major hurricanes in the United States.
- The chatbot, Flo, is an application on Facebook Messenger created by the insurer, Progressive, to answer customer questions, provide quotes and help with claims management[179].

Here again, several insurtechs have positioned themselves in the operational agent niche:

- Lemonade uses LLMs to provide efficient virtual customer service and quickly handle claims, via a chatbot named Maya[180]. This system is able to answer customer questions during underwriting and handle simple claims in minutes.
- Clover Health[181] is an insurtech focused on health insurance. It uses LLMs to personalize communications and treatment recommendations by analyzing policyholders' health information and predicting future medical needs. LLMs enable automated messaging and provide more empathetic and accurate customer support, particularly in risk prevention.
- Planck[182] uses generative language models to gather and analyze information about small businesses, providing detailed risk profiles for each company. Generative AI helps formulate coverage recommendations and generate tailored risk assessments.
- Mosaic[183] uses language models to analyze and synthesize large amounts of data from various sources (legal, regulatory, historical). Their AI can generate analytical reports for underwriters to assess risks.
- Spixii[184], used by Allianz[185], offers to handle customer queries, assist with claims and advise on policy changes. Again, these are conversational tools.

If actuaries rely too much on LLMs for analysis and decision-making, they risk losing some important analytical and technical skills, especially in interpreting results. Deep understanding of traditional models is crucial to validate and correctly interpret LLM predictions. Over-automation could also lead to a loss of control over decision-making processes if AI models make decisions with little human oversight. This could pose challenges in crisis management or in cases not anticipated by the models.

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[174] https://news.microsoft.com/de-ch/2024/09/03/microsoft-and-swiss-re-drive-innovation-with-generative-ai-rollout/
[175] https://copilot.microsoft.com
[176] https://www.ibm.com/case-studies/westfieldinsurance
[177] https://en.wikipedia.org/wiki/IBM_Watsonx
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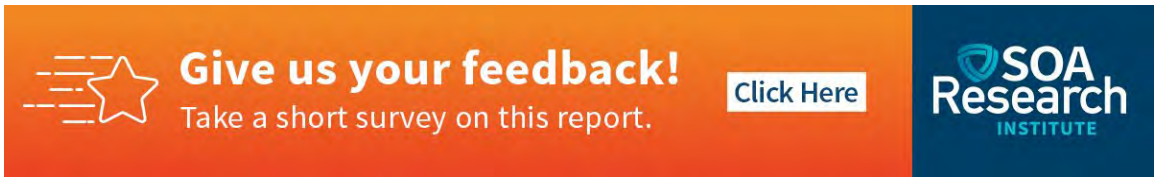

Section 6: Acknowledgments

The researchers' deepest gratitude goes to those without whose efforts this project could not have come to fruition: the Project Oversight Group for their diligent work overseeing, reviewing and editing this report for accuracy and relevance.

Project Oversight Group members:

Erika Dochney, FSA

Kar Khin Mok, FSA, CERA, ACIA

Paula Schwinn, FSA, MAAA

At the Society of Actuaries Research Institute:

Korrel Crawford, Senior Research Administrator

Dale Hall, FSA, MAAA, CERA, Managing Director of Research

Section 7: Authors

Arthur Charpentier [https://freakonometrics.github.io], PhD, Fellow of the French Institute of Actuaries, is a full professor in mathematics and actuarial science at UQAM, Montreal, Canada, and economics at Université de Rennes, in France. He is a member of the editorial board for the *Journal of Risk and Insurance,* the *ASTIN Bulletin,* and *Risks.* A few years ago, he edited *Computational Actuarial Science with R* (CRC), and more recently written *Insurance, Biases, Discrimination and Fairness* (Springer). He is also the former director of the *Data Science for Actuaries* program of the French Institute of Actuaries. He is a Louis Bachelier Fellow, and his recent work is about climate change and predictive modeling insurance, more specifically in the context of fairness and discrimination. *Alma mater* : MSc in actuarial science from ENSAE (1999, Paristech, France), MSc in mathematical economics from Paris Dauphine (1999, PSL, France), PhD in applied mathematics from KU Leuven (2006, Belgium), and HDR* in applied mathematics from University of Rennes (2016, France).

Raphaël Suire [https://sites.google.com/site/raphsuire], PhD, is Full professor in management of innovation at Nantes University / IAE, in France, and associate researcher at HEC Montréal / MOSAIC in Canada. His work focuses on the emergence of digital innovations and how they transform territories, organizations, and society. His work has been published in major journals such as *Journal of Economic Geography*, *Industrial and Corporate Change, Computers in Human Behavior, Regional Studies, Creativity and Innovation Management, Annals of Regional Science, etc*. More recently, he has focused on the deployment of generative AI in the digital and creative industries and its consequences. He received his PhD in economics from the University of Rennes 1 (France) in 2002 and an HDR (Habilitation) in economics and management from the University of Paris Saclay (France) in 2014.

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Society of Actuaries Research Institute
8770 W Bryn Mawr Ave, Suite 1000
Chicago, IL 60631
www.SOA.org