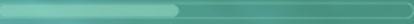




Expert Views

60% remaining



Storage A
Loading ...



AX-234r 09551P

AI and the Future of Insurance: Opportunities, Challenges, Adoptions, and Ethics



The Art & Science of Risk

December 2023

SD-41f 98102W

776 873329 09265210
 354 982651 09257726
 743 57236198 873532890
 067 735584 92752317
 6352 872524 83641069
 673 823642 9275540

14.3
 75
 ADGT...KLPOTUCB.N

• ERV...CUBW...FRYBBOIT
 • FRC TREESAQTV UYE06JNGBBTFLKMMH

27 NHT KLPOLK 789h TY66
 UYe6 OQA09 WQh561
 61 OREh UT450 NIK4
 QANh 9754K RFdpc iTr7
 82AS QMjh 0341H KmLP



Executive Summary

Today's insurance sector faces massive digital transformation challenges. The emergence of Artificial Intelligence, accelerated by the recent generative AI buzz since the debut of ChatGPT in November 2022, has elevated those challenges to a new height. Almost a year has passed now, and the initial frenzy over generative AI is somewhat subdued. It's time for a reality check.

How is the insurance industry adapting to this new digital transformation era? What are the real changes made? What were the expectations and assumptions that were not met? This article uses real examples and best practices to describe how AI can drive true transformation in multiple key insurance customer journey touchpoints, such as underwriting and claims. It will also discuss the ethical aspects of AI based on the recent findings of our internal experts' research.

Introduction

The AI universe is expanding rapidly. When ChatGPT, a generative AI-based chatbot supported by natural language processing (NLP), debuted last November, it created a global sensation. At the same time, many questions arose from people and businesses worldwide, and the insurance industry was no exception. Popular questions include: How can we use it? Which company is already using it, and how? Are there security concerns? How will it be regulated? Will it eliminate our jobs, or even worse, will it take over humans? Data scientists worldwide were flooded with these questions, some of which are difficult to answer.

The initial interest was high, but so were confusion and fears. This is completely normal and understandable. The speed of changes is so fast, it is hard to keep up. The insurance industry

generally takes a slow and conservative approach to innovation due to regulation and other factors. It is not easy for our industry to adjust and act swiftly. But we know this AI transformation is just the beginning, and insurers must make a move before it's too late.

This article discusses several critical points to consider in adopting AI to insurance businesses, including its developmental background, challenges and opportunities, real-life adoption cases, the role of reinsurers, and ethical aspects.

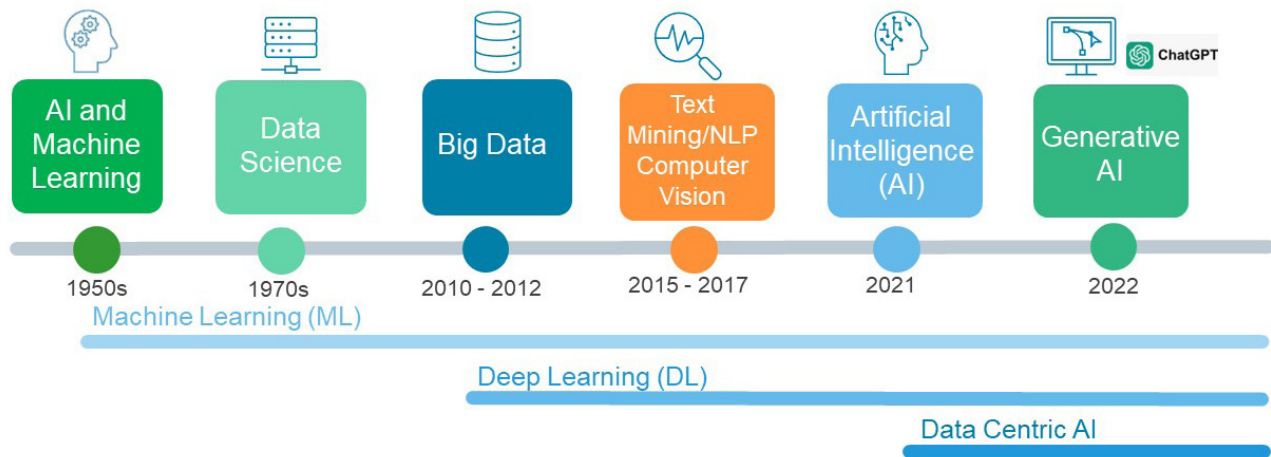


Quick History of the AI Evolution

AI is not a brand-new concept. The first idea of artificial intelligence originated almost 100 years ago, in science fiction movies and literature in the forms of a human-like robot, such as Maria from the 1927 German film *Metropolis*, based on a 1925 novel. We have come a long way since then, but this movie's theme of "AI against humanity" still exists to this day, causing public skepticism and a cautious approach toward AI adoption among some people.

AI as an actual discipline started post-World War II, established in 1956 by Professor John McCarthy of Dartmouth College.¹ But it was only after 2010 that AI became broadly available as a business problem-solving tool, thanks to the emergence of big data, cloud storage, and massive computing capability that enabled the rapid AI evolution. Machine learning (ML), which originated in the 1950s, evolved into more sophisticated subsets and fields such as Deep Learning (DL) and Natural Language Processing (NLP.) Generative AI, which originated in 2006, has suddenly become famous with the sensational debut of ChatGPT in 2022.

Graphic 1: Timeline of Industry AI "Buzzwords" Evolution





State of AI Adoption in the Insurance Industry

Many sectors including the insurance industry fully realized the massive value of this new technology and started adopting AI models into their business. Investors and venture capitalists are pouring billions of dollars into AI startups. One example is Mistral AI, a French start-up company that gathered a \$113 million seed this year, taking the bet to build their own Large Language Model (LLM) with huge cost and investment.

Despite hundreds of new generative AI-based product and service debuts announced in past years, some insurers feel they are not achieving the desired results. But this should not be a surprise.

As often seen in the initial stages of new technology adoption, users tend to develop over-expectations on the direct capabilities of the algorithms, only to end up in disappointment. In addition, the generic LLM and ChatGPT were not initially built

to serve insurance businesses. Therefore, insurers must develop their own generative AI deployment strategies to bring out the best value for their businesses. AI will be a massively powerful and useful tool for groundbreaking innovation, but it requires insurers to truly understand its capacities and the mechanisms to make that a reality.

We are still in the early stages of this revolutionary AI transformation. Companies can learn from mistakes and adjust. But they must move quickly. Many insurers face challenges in finding the right AI transformation strategist who can combine the latest data technology knowledge and in-depth insurance industry expertise to craft the right approach for the company's specific situation. Reinsurers can play an important role in filling these gaps by using their robust in-house data, superior analytical capability, and deep understanding of business needs.

Real Cases of AI Adoption

Long before the arrival of generative AI, AI had already been positively impacting various touchpoints of our business. It may not be as sensational as ChatGPT, but our industry has quietly but successfully deployed many AI-driven transformational business tools.

One good example of such "quiet AI transformations" is an AI-based data-capturing solution that significantly speeds up multiple touchpoints of the insurance application process. In 2021, SCOR's data science team successfully developed an AI-based solution leveraging the power of Optical Character Recognition (OCR), Natural Language Processing (NLP), and insurance knowledge.

OCR is the process that extracts an image of text into a machine-readable format. NLP analyzes and adds human language insights to extracted words. The combination serves as a dynamic tool, enabling much quicker and more efficient

electronic document reading. It is optimizing data capture for underwriting, treaty, and other touchpoints in the customer journey.

Since its launch, this solution has already delivered many benefits, including more than 60% time savings on the data capture process. This solution has many other potential future usages, such as detecting and removing personal information from raw data.

Some insurers are already integrating Open AI's GPT model into their internal business framework and applications. At SCOR, we use and have been industrializing GPT and equivalent LLM-models for information search, context detection, and summarization through an AI-powered assistant application. The benefits of using these advanced tools powered by generative AI to key business points are significant compared to traditional AI, which is already demonstrating promising results that confirm a true value-add.



Benefits and Risks of AI Adoption

Many changes come with benefits and risks. AI adoption is no exception. For consumers, the key benefits of using LLM and AI include:

- Automating the underwriting and claims processes leading to shorter turnaround times and cost reduction
- Generating generic financial advice automatically and, in the future, tailored financial advice as the solution advances
- Assisting policyholders in determining if they can make a claim
- Helping applicants understand terms and conditions
- Automating changes to policies
- Dynamic engagement tools

For insurers, AI and LLM bring many benefits such as:

- Reading medical evidence at underwriting and claims process for life and health insurance application
- Writing administrative or claims letters to policyholders
- Querying contracts with third parties (e.g., with reinsurers or distributors)
- Summarizing data (e.g., portfolio performance)
- Improving risk modeling and setting actuarial assumptions
- Automating tasks

Meanwhile, AI adoption also comes with a considerable number of potential risks, pitfalls, and challenges that require insurers' attention. Below are the examples and how insurers can avoid or minimize them.

- **Privacy and data security issues:** As the usage of AI-based tools rose, so did concerns around privacy and data security. Insurers need to prioritize, invest in, and adopt strong data protection policies, always using the most updated technology.
- **Data accuracy:** We need human intervention to review anything intended directly for customers to ensure no incorrect information is sent. We also need to ensure we are not making wrong decisions based on incorrect information. AI is not able to generate perfect responses 100% of the time. We need to be careful with ensuring the right information is given to customers, particularly at sensitive times like the point of claim.
- **Public and policyholders' perception:** Even if AI can be right 100% of the time, we still need to be mindful of the public perception of having AI answer their queries. Having AI assess insurance claims, particularly in declined cases, could increase insurer reputational risk. Insurers must be conscious of this risk and take a sensible approach to avoid their AI deployment to cause public and our policyholders' mistrust.
- **Regulatory scrutiny:** Insurers need to be mindful of adhering to relevant regulations. Many countries have strong regulatory controls around who (or what) can give financial advice. In the short term, AI is probably best placed to assist financial advisers or just offer generic information rather than tailored personal recommendations to people.



Success Factors in AI Adoption

The vast opportunities that generative AI and LLM offer could expose insurers to millions of choices. How can insurers make the right decisions to achieve the optimum efficiency and return on the AI investment?

One effective way is to separate their AI adoption opportunities into two categories: current business and future innovation. Insurers can then expand the list to fit their own business profile. This strategy enables them to allocate the right resources to the right initiatives, helping to set reasonable expectations.

Ethics and AI in Insurance

Any new technology adoption comes with initial fears or concerns. In adapting AI models to business, concerns specifically point to AI and ethics. Some fear that AI could introduce bias, discrimination, and unfair insurance practices. To address these concerns, insurers must reevaluate their pricing and risk selection practices for fairer insurance when they develop their AI deployment strategy.

But how do we do it? No one knows the answers yet.

Fairness in insurance risk selection and pricing is not a new topic in the highly regulated insurance industry, but the recent emergence of AI is bringing additional pressure. Insurance is a data-driven industry; hence, processes are already in place to monitor and control model accuracy and fairness. However, existing techniques need to be strengthened as the powerful AI model is capable of learning discrimination patterns from the input data, even if protected fields are not present. For example, in auto insurance, an AI model can guess or proxy the gender of the applicant by looking at the policyholder's car features.

Recent AI buzz has raised awareness of potential biases originating from data used by algorithms. We need to remind ourselves that AI models are not intentionally discriminating against anyone or anything. They are simply reflecting the data they have been trained on. For example, imagine building a company profile: if the majority of

the company's employees are white males, a model trained to generate a typical profile of its employee will show a picture of a white man unless it is given specific de-biasing instructions.

For decades, actuaries and data scientists have been tackling the issue of fairness by removing sensitive variables from the dataset, which could lead to unfair prices. However, with the current rapid expansion in AI capabilities, there is an urgent need to find a new technique to build a better fair pricing model.

To see how much sensitive variables such as gender, race, origin, or marital status could affect fairness in insurance modeling, a team of researchers, including SCOR's data scientists, conducted a model simulation study.³ The study found that simply removing sensitive variables does not necessarily lead to a fairer model, as they are often correlated with other risk factors.

To experiment with possible solutions, the team developed a new algorithm to mitigate proxy discrimination in its risk modeling. Figure 1 shows the real-case application for a fairer risk selection of patients with non-metastatic melanoma of the skin. As shown in the boxed areas of the two similar charts, the variable transformation has successfully annulled the correlations between the non-sensitive and sensitive variables. This first solution development for using linear models set some first principles in the preparation of the data before modeling.

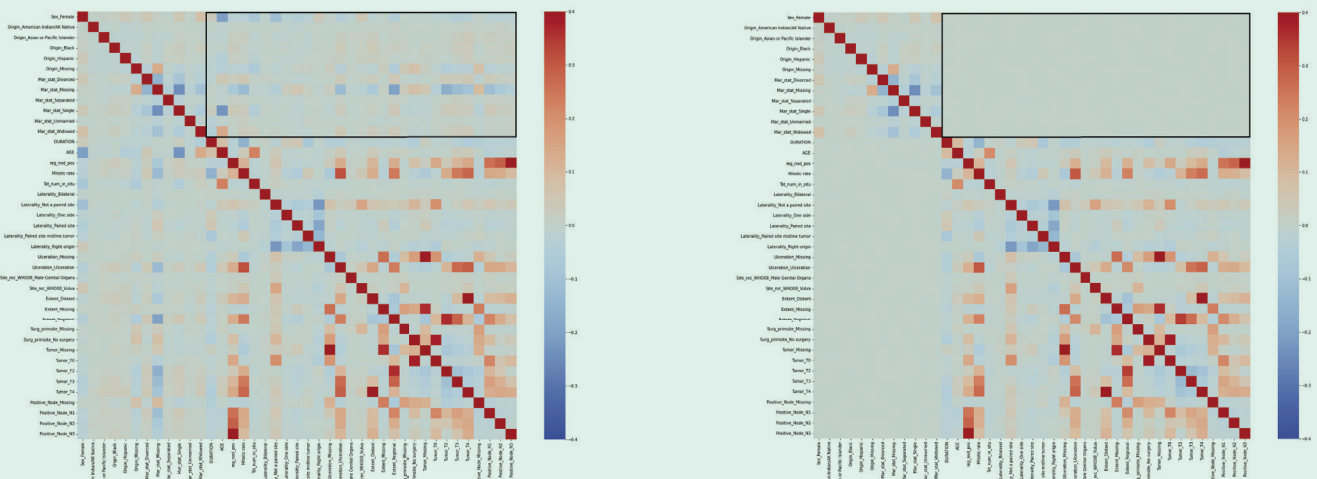


In coming years, it is inevitable that more extensive usage of AI will expose the insurance industry to discover bias in their data. We will need to be more vigilant to avoid proxy discrimination and maintain fairness in our decision-making process.

It is highly difficult to find a globally unified definition of fairness in insurance pricing and risk selection, as it greatly differs by country and is not easy to define or unanimously agree on. The definition is influenced by market-specific factors such as regulation, social structure, consumer sentiment, scientific advancement, technical capabilities, etc.

We can test AI models using different measures of fairness, but they could still lead to contradictory conclusions. Even when we have a clear idea of what fairness might mean for a particular AI model, there remains a challenge in measuring it if the data is insufficient (e.g., no access to protected variables during model calibration) or contains biases. Ultimately, it is up to authorities in each market to determine the most appropriate definition and, therefore, which is the most appropriate and ethical modeling.

Figure 1: Correlation matrix of the original dataset vs. non-sensitive transformed variables



Correlation matrix of the original dataset

Correlation matrix with the non-sensitive transformed variables

(source: EAA e-Conference on data Science & Data Ethics)



Conclusion

AI is not a powerful magic wand nor a threat to our society. While looking impressive, even the latest generation of AI tools are still only tools to help humans, not replace or divide them.

Melvin Kranzberg, an American historian who wrote Kranzberg's First Law, says, "*Technology is neither good nor bad, nor is it natural.*" It means that it is up to us to make a positive or negative use of AI, but there is no neutral outcome. This is a good principle to keep in mind when you build an AI integration strategy for the insurance business.

We are rapidly entering the next phase of the business AI adoption. It is time for insurers to look within their organization and proactively construct new goals and strategies that transform their business to maximize the use of this new technological tool with unlimited potential.

Endnotes

1. SITNFlash. (2020, April 23). The history of Artificial Intelligence. Science in the News. <https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/>
2. "SCOR Launches an AI-Powered (Re)Insurance Hackathon with Microsoft | SCOR." www.scor.com, www.scor.com/en/news/scor-launches-ai-powered-reinsurance-hackathon-microsoft. Accessed 29 Oct. 2023.
3. Sauce, Marguerite, et al. "AI and Ethics in Insurance: A New Solution to Mitigate Proxy Discrimination in Risk Modeling." ArXiv.org, 25 July 2023, arxiv.org/abs/2307.13616. Accessed 29 Oct. 2023. [2307.13616] AI and ethics in insurance: a new solution to mitigate proxy discrimination in risk modeling (arxiv.org)

This article was written by:



Antoine Ly
Chief Data Science Officer
ALY@scor.com

Please feel free to visit us at [scor.com](https://www.scor.com)

SCOR SE
5 avenue Kléber - 75795 PARIS Cedex 16
France

SCOR
The Art & Science of Risk

December 2023

No part of this publication may be reproduced in any form without the prior permission of the publisher. SCOR has made all reasonable efforts to ensure that information provided through its publications is accurate at the time of inclusion and accepts no liability for inaccuracies or omissions. Photo credit: © Adobe Stock