WHITE PAPER

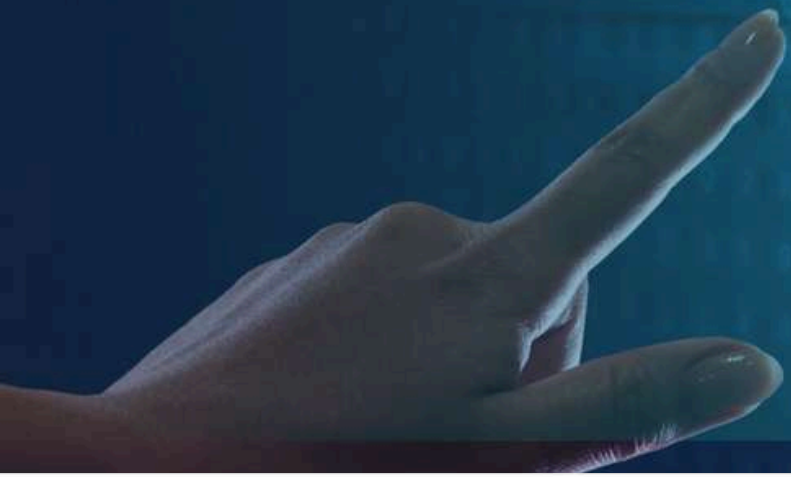
DIGITAL SUNDAI

Erasmus Centre for Data Analytics

Erasmus University Rotterdam

The impact of GEN AI on THE INSURANCE VALUE CHAIN

Based on interviews with insurance professionals and AI consultants



INTRODUCTION

This white paper aims to provide a holistic view of the current state and potential impact of Gen AI adoption in the insurance industry, and how it can create value along the insurance value chain. Based on both academic research and industrial reports, the relevant capabilities of Gen AI and its various potential use cases are identified. As the technology is at its hyped stage and continuing to grow, it is critical to understand the practical implications and a roadmap for how to successfully exploit value out of it. To provide realistic and in-depth insights regarding the adoption of Gen AI in the insurance value chain, interviews with AI consultants and insurance experts were conducted. This contributed to understanding the landscape of Gen AI and formulating a framework that can be referred to for insurance companies when taking a step towards leveraging this technology into their value chain.

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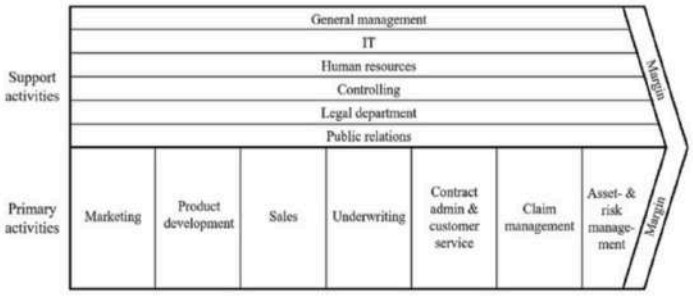
DUTCH INSURANCE INDUSTRY

Overview

The Dutch insurance industry is one of the most mature and regulated markets in Europe, characterized by high competition and significant contributions to the country's economy. It consists of various segments, including life, non-life, and health insurance, with health insurance being mandatory for all residents under the national health insurance system. With the recent technology innovations, more and more insurers are heavily focused on innovation, leveraging technology to streamline operations and enhance customer experience. However, they also face regulatory pressures, which require strict risk management and capital adequacy standards.



Source: Eling, M., Nuessle, D., & Staubli, J. (2022). The impact of artificial intelligence along the insurance value chain and on the insurability of risks

Like many other industries, insurance companies are exploring the impact of Gen AI and curious about how to implement the technology into their value chain (demonstrated in the image above) and drive efficiency and improve performance and customer engagement, while mitigating emerging risks and data privacy concerns.

THE TECHNOLOGY OF GEN AI MODELS

Major generative language models such as Chat GPT, Llama, and Claude are based on transformer architecture and hold the potential to transform various aspects of the insurance value chain.

GPT (Generative Pre-trained Transformer): Developed by OpenAI, is designed as a general-purpose language model. It is optimized for generating highly coherent and contextually relevant text and is widely used for commercial applications, such as chatbots, and content generation.

LLaMA (Large Language Model Meta AI): Developed by Meta, LLaMA is rather designed to be more efficient and scalable, focusing on accessibility for researchers. It aims to deliver strong performance in natural language tasks while using fewer computational resources, making it more suited for academic and specialized research

Claude: Claude is an AI language model developed by Anthropic, focused on safety and ethical AI usage. Its architecture is aimed at ensuring that its responses align with user intent and societal norms.

GEN AI CAPABILITIES

As we have all seen by now, Gen AI goes beyond traditional AI. It uses neural networks to generate new content such as text, images, and data insights beyond pre-determined rules. Particularly, towards the document-heavy nature of the insurance industry, Gen AI can serve as a revolutionizing tool by utilizing the following relevant capabilities:

- **Content Generation**: Automating the creation of texts, marketing materials, reports, and brainstorming.
- **Summarization**: Condensing large amounts of information, aiding in text-heavy processes such as claim processing and underwriting.
- **Question-Answering**: Automating customer inquiries and policyholder interactions with human-like conversation.
- **Classification**: Categorizing data for fraud detection, claim processing and customer segmentation.
- **Extraction**: Pulling out key information from both structured and unstructured datasets for each step of the value chain.

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CURRENT STATE OF GEN AI ADOPTION
in the insurance value chain

What is driving companies to adopt Gen AI?

As Gen AI rapidly gains attention, a growing interest within the insurance industry and the action for adopting this technology is becoming evident. The ***technological*** aspect is one obvious reason for their interest in adoption. Given its knowledge-based nature and the operation that involves processing vast amounts of unstructured data, the industry is meant to be impacted by the capabilities of Gen AI. One of the major strengths of this technology is its ability to process input and generate output at high speed, which is attractive to insurance companies as it could improve operational efficiency and allow employees to focus on more strategic efforts, potentially reducing costs. Unlike other traditional AI, its user-friendly interface lowers the barrier to entry and enables professionals at all levels to benefit from it.

From an ***organizational*** aspect, many interviewees shared how the top management support and company culture are playing a substantial role in driving Gen AI adoption. One interviewee shared how Gen AI was distinct from any other technology in the adoption context.

"Often it's a technology push. This time it wasn't. Because there were a lot of internal interests across everyone from top to bottom and were asking for it. I did not see that ever in my 20-year career..."

However, it is important to recognize that interest and enthusiasm alone are not enough for successful adoption, and it requires a lot of investment and commitment within the company to execute successful adoption.

Similarly, ***environmental*** drivers like competitive pressure create FOMO across the industry, as companies feel compelled to innovate in response to the widespread hype and success stories of Gen AI across the industry.

Based on interviews:

Starting with the Company-GPT

Many interviewed companies have already embarked on the journey of Gen AI adoption with the introduction of internal, ring-fenced GPT models for employees to explore and experiment with its capabilities in a controlled environment. Just like the commercialized ChatGPT, they intend intended for employees to use it as a tool for summarization, brainstorming and searching basic things up.
While the enthusiasm for Gen AI is high, companies remain cautious about expanding Gen AI to customer-facing operations due to concerns around data privacy, biases, and the technology's maturity. In the following pages, factors inhibiting the adoption of Gen AI in insurance companies are demonstrated as well as a roadmap for how to effectively navigate their value creation within the value chain by using Gen AI.

TOE-framework

The drivers and barriers of adoption are based on TOE-framework, a model used to analyze the factors influencing the adoption of new technologies within organizations. It examines three key contexts: technological, organizational, and environmental to understand how these factors both facilitate and inhibit technology adoption.

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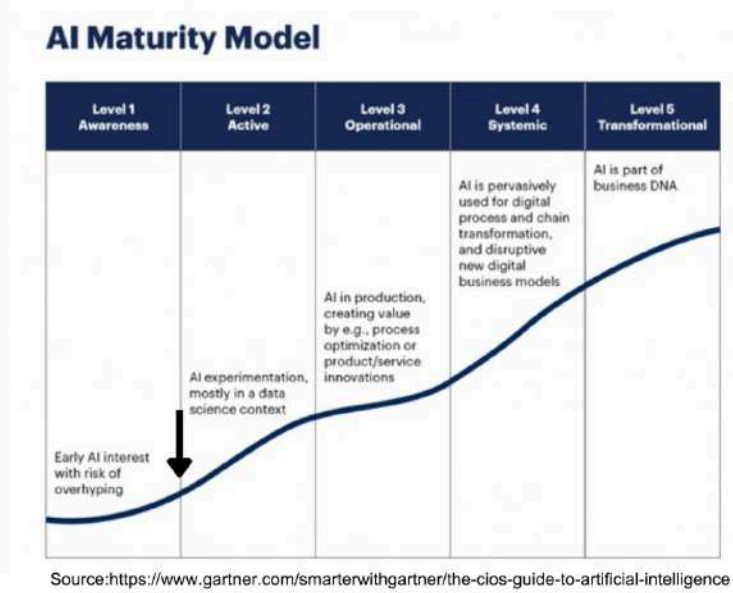
CURRENT STATE OF GEN AI ADOPTION
in the insurance value chain

Current maturity level

The AI adoption can be categorized into different stages of maturity, which are identified by Gartner's AI Maturity Model. This helps organizations assess their level of AI adoption and integration across various stages of maturity (Panetta, 2019). Applying this model to the context of this research, the majority of insurance companies can be positioned between Level 1 and 2, where the interest of Gen AI is very high and is currently expanding the availability of company GPT in the organization and experimenting with what they can do with it. Those who have already had some use cases put into production can be seen as the entering phase of Level 3.



Source:https://www.gartner.com/smarterwithgartner/the-cios-guide-to-artificial-intelligence

The main Gen AI capabilities that are currently utilized are *extraction, summarization, and content creation* and are strictly only for internal use, as one AI Project Manager noted:

" We feel with the current state of technology those large language models are just not ready yet to be exposed to our customers."

In-progress use cases

Based on the interviews, the following three use cases stood out the most where some companies are currently at the development phase or already deploying.

1. **Knowledge base assistant**

This is an LLM trained with internal data such as policy documents and is integrated into a knowledge base system of each value chain. For example, customer service can leverage this use case by allowing call centre agents to quickly access and summarize up-to-date documents and information from various domains in order to provide answers to the customers swiftly in a natural way. Moreover, legal departments as well as underwriting domain could also reduce significant time on looking up necessary information or documents in their tasks.

2. **Automated call logging**

This use case utilizes Gen AI's ability to automatically transform phone conversation with customers into written text and categorize interactions or make summaries and store them in CRM systems afterwards. This use case is expected to reduce the average handling time and after-call workloads and improve customer service efficiency.

3. **Content creation**

This use case utilizes Gen AI's capability of content generation for websites and marketing materials, ensuring consistency in tone and quality, and allowing staff to focus on refining and approving content rather than creating it from scratch.

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VALUES AND RISKS OF GEN AI
in the insurance value chain

Gen AI offers significant value to the insurance value chain when implemented effectively. Although many insurance companies are still in the experimental phase of Gen AI adoption, they are already beginning to realize short-term benefits.

However, it's crucial to recognize that beyond these immediate gains, Gen AI has the potential to fundamentally transform operations and reshape customer journeys, paving the way for long-term innovation and cost efficiency across the industry.

Short-term value

Gen AI is delivering tangible value across the insurance sector, particularly in **productivity and efficiency gains.** Early adopters report modest productivity increases of 1-3% through internal company GPT systems, with automation tools like call logging expected to further reduce handling times and enhance service quality. Rather than overhauling operations, insurers are using Gen AI to streamline routine tasks, freeing up time for more complex, value-added activities. **Data-driven decision-making** can be unlocked by transforming unstructured data—such as claims information—into usable formats, enhancing risk assessment and underwriting processes. It also optimizes knowledge management by consolidating information across platforms, allowing for quicker data retrieval and the preservation of institutional knowledge. These early gains demonstrate the potential for Gen AI to drive significant operational improvements as its adoption deepens across the insurance value chain.

Long-term value

Following the tangible value creation, Gen AI is expected to offer substantial long-term benefits. One of the most significant advantages is **cost savings**, as Gen AI automates routine tasks and processes, particularly in marketing and customer service, reducing the need for manual labour and cutting operational expenses. **Improved customer satisfaction** is another anticipated benefit, as Gen AI enables employees to focus on more complex customer needs by handling repetitive tasks, leading to better service and quicker resolutions. Moreover, Gen AI enhances efficiency by streamlining back-office operations, minimizing errors, and accelerating processes, which ultimately contribute to a smoother customer experience. Finally, Gen AI can unlock **new revenue streams** by analyzing data across business lines, uncovering patterns and insights that would be difficult to detect manually. This allows insurers to innovate and expand their offerings, creating new opportunities for growth.

Unintended risks

While the potential benefits of Gen AI are substantial, companies must also be vigilant about the unintended risks that come with its implementation. The following risks can pose significant threats if not properly managed. It is also worth noting that risk tolerance varies across different parts of the value chain, such as marketing versus underwriting.

Biased outcomes: Gen AI models may produce biased results if trained on flawed or unbalanced data, leading to unfair practices such as discriminatory pricing or claims decisions.

Lack of transparency: The "black box" nature can make it difficult to explain decision-making processes, undermining trust in generated outputs.

Data leakage: Uncertainty around data handling and storage can result in privacy breaches, particularly with sensitive customer information, affecting compliance with GDPR.

Energy consumption: The high energy usage can conflict with sustainability goals, potentially harming the company's image as a responsible corporate entity.

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EXPLORATORY USE CASES FOR THE INSURANCE VALUE CHAIN

Besides the in-progress use cases introduced earlier, there are various exploratory use cases that could generate long-term value in each value chain, possibly in the combination with traditional AI. Here are some of the ideas of how Gen AI can transform conventional tasks.

Marketing

Responsible for enabling sales through market and customer research and advertising.

Gen AI use cases

* Automate various marketing material generation in different languages
* Utilize NLP for data-driven market & customer research

Product development

Designing, refining, and deploying insurance products and services using market and customer data.

Gen AI use cases

* NLP-enabled customer segmentation and sentiment analysis
* Extracting various data for product comparisons

Sales

Involve recognizing the addressable market and strategically entering it to distribute insurance products and services to customers.

Gen AI use cases

* Enable extensive customer insights and sentiment analysis
* Extracting various data to empower customer engagement and targeted sales strategies
* Sales support chatbots offering personalized advice and recommendations to customers

Underwriting

The process of analyzing risk and calculating premium rates, typically done by an actuary.

Gen AI use cases

* Enhanced analytical capabilities by synthesizing information from various sources for risk assessment

Contract administration & customer service

Include administrative tasks such as issuing policies, billing, answering inquiries, and managing changes, cancellations, and renewals.

Gen AI use cases

* Automate policy renewal and endorsement
* Customer service chatbot offering personalized assistance and responses

Claim management

Includes settling claims and payments as well as fraud investigation.

Gen AI use cases

* Streamline claim reviews by extracting and summarizing information from diverse documents
* Fraud detection assistant
* Claims leakage detection assistant

Asset & risk management

Responsible for financial risk management and leveraging and investing assets to generate revenue.

Gen AI use cases

* Enhanced data-driven analysis utilizing various textual sources

What are the current barriers to successfully adopting Gen AI?

Interview participants have shared the factors and barriers that are inhibiting or slowing down the adoption of Gen AI in the value chain.

Technological constraints

While the technology offers substantial benefits such as automating processes and increasing efficiency, **inaccuracies** in Gen AI outputs, especially in areas like claims management, pose serious risks. The potential for "hallucinations" or errors in AI-generated data creates legal and trust issues. Additionally, ethical concerns, including **bias** in decision-making models and **data privacy issues**, further complicate its integration, as organizations must ensure customer data remains secure and unbiased decisions are made in underwriting processes.

"...if there's bias in the model, that means that it would make unfair decisions."

Organizational constraints

A **lack of training and clear strategic alignment** can hinder its implementation. Many organizations face challenges due to limited resources and the daily operational demands on employees, which prevent them from fully exploring Gen AI's potential. Moreover, without clear **buy-in from senior management** and alignment with overall strategic goals, the adoption process is likely to face delays and inefficiencies.

"Everyone is super enthusiastic about this technology, but there's very few people who actually know how it works."

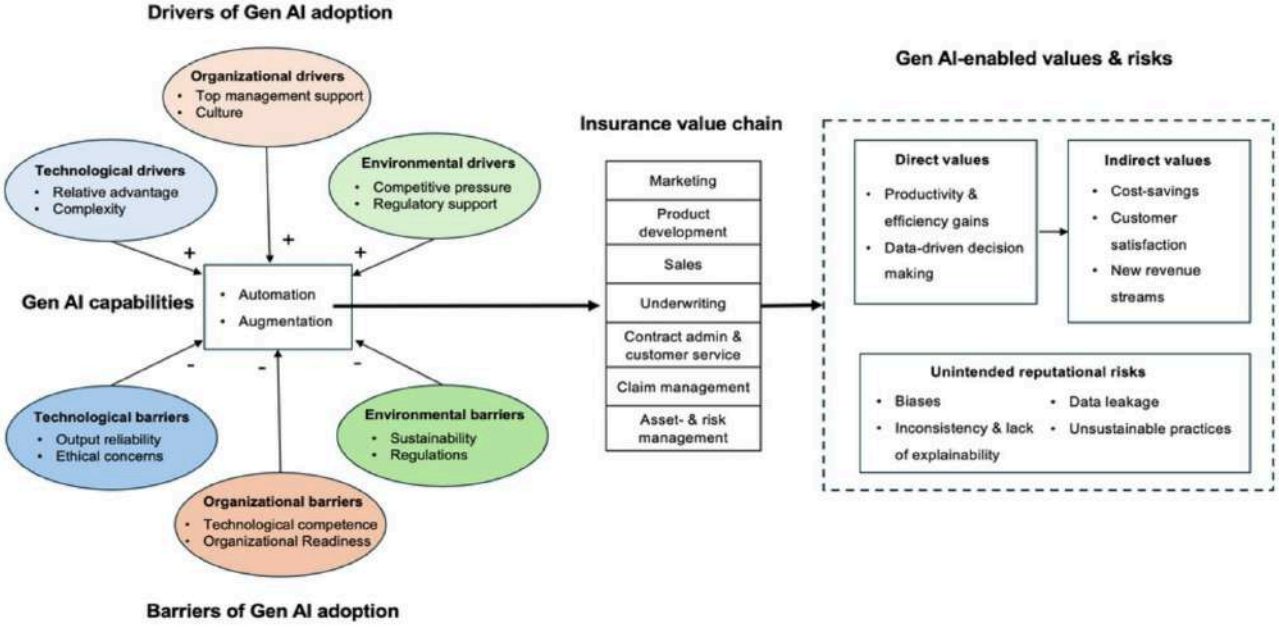
Environmental constraints

The **high energy consumption** associated with training large language models (LLMs) raises concerns about sustainability, as insurance companies strive to reduce their carbon footprints. Additionally, **regulatory frameworks** governing the use of AI, including compliance with laws such as the European AI Act, introduce another layer of complexity. Companies must balance their enthusiasm for Gen AI with strict adherence to regulatory guidelines to avoid legal risks and penalties.

"Everyone is super enthusiastic about this technology, but there's very few people who actually know how it works."

Conceptual framework

This white paper is grounded in academic research and includes a comprehensive theoretical framework designed to illustrate the entire process, from adoption to the value creation. The framework serves as a visual representation, mapping out how Gen AI can influence various processes within the insurance value chain, ultimately driving improved business outcomes. This structured approach ensures a holistic understanding of the role Gen AI plays in transforming business processes in the insurance industry.



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Roadmap to overcome barriers and risks

As insurance companies navigate the complex landscape of Gen AI adoption, they face a range of risks and barriers that must be strategically addressed to harness the technology's full potential.

This roadmap outlines a comprehensive approach to overcoming these challenges, drawing on insights from industry experts and research.

Step 1: Define Strategic Vision & Objectives

Without a clear vision, companies risk experimenting with Gen AI for the sake of novelty, leading to "random acts of digital" that don't deliver meaningful results.

Therefore, establish a clear strategy for Gen AI adoption that aligns with business goals, such as boosting efficiency and improving customer service.

Ensure leadership understands both the potential and risks of Gen AI.

Step 2: Build Cross-Functional Teams

Build cross-functional teams that include both business leaders and technology experts. Let the business lead the vision for Gen AI implementation, with technology as an enabler rather than the driver.

Provide training to boost AI literacy across departments to align Gen AI's potential with business objectives. These collaborative efforts and better AI understanding ensure the successful and practical deployment of Gen AI across the company.

Step 3: Develop Responsible AI

Establish a governance framework to mitigate ethical, regulatory, and operational risks associated with Gen AI. This ensures trust and compliance, preventing customer mistrust and regulatory penalties.

For example, implement solutions like Retrieval Augmented Generation (RAG) to ensure the accuracy and reliability of AI outputs. Regularly audit models for bias, accuracy, and hallucinations, and ensure compliance with emerging regulations like the EU AI Act.

Step 4: Invest in data readiness

Make sure to invest in ensuring that your data infrastructure is ready for Gen AI adoption. This includes clean, structured data, proper data pipelines, and ensuring data privacy and compliance measures are in place.

Gen AI relies on large amounts of high-quality data. Without proper data management, AI initiatives may fail to scale, deliver inaccurate results, or violate privacy regulations.

Step 5: Build AI Talent and Capabilities

Develop internal capabilities through a combination of building and buying talent. Create new roles, such as prompt engineers, and build internal teams that can drive Gen AI adoption while also leveraging external expertise for specialized needs.
Successful Gen AI adoption requires specific skills and expertise. By building a mix of internal talent and partnerships, companies can ensure they have the right capabilities to support Gen AI initiatives over the long term.

Step 6: Measure ROI & Continuously Optimize

Many companies get stuck in pilot projects, testing technologies without delivering business value. Hence, it is important to always prioritise use cases that demonstrate **measurable business impact** and move away from isolated pilot projects that don't scale.

By focusing on high-impact, scalable use cases, companies can avoid getting stuck in endless testing.

About the research

This research is conducted by Mayu Tanioka as part of her Master's thesis for the MSc in Business Information Management at Rotterdam School of Management, Erasmus University Rotterdam. It involved an in-depth exploration of Gen AI and its impact on the insurance value chain. Primary data was gathered through interviews with IT professionals from insurance companies and AI consultants between May and June 2024.

About the collaborators

Digital Sundai, founded in 2019 in Amsterdam, specializes in enhancing organizational performance through Digital and AI solutions. The company is founded by Robin Zondag, a senior consultant with over 20 years of experience in the digital and AI service industry. It offers consultancy and cutting-edge solutions to help corporate clients boost their performance.

Erasmus Center for Data Analytics (ECDA)

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