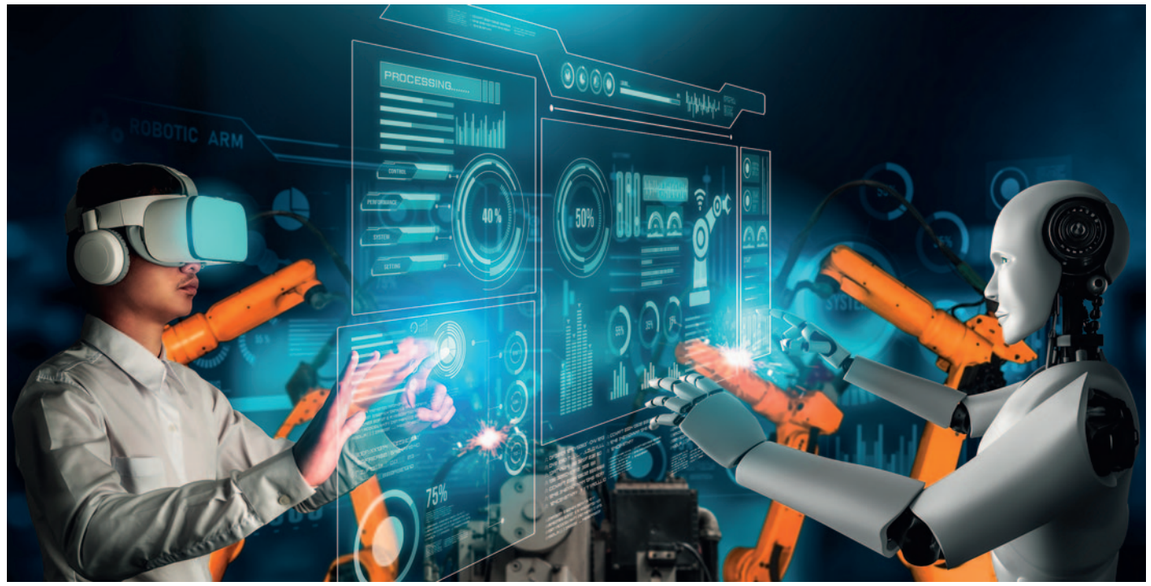
BY LARS JANSSEN, TOM PETERS
AND JAMES MORAN

Embracing AI: The Non-Life Actuary of the Future



Over the past decade, Bodily Injury (BI) claims have experienced adverse prior development across the Dutch insurance market. This is evidenced in published disclosures by nearly all Dutch non-life insurers, which indicate upward revisions of ultimate losses for BI claims. This issue is driven by changes in risks such as interest rates and inflation, evolving legislation, advancements in vehicle technology, and modifications in claims handling processes. These developments have pushed ultimate losses upwards, but the question remains whether current estimates are accurate. Given the interdependence of insurers' processes, both under- and overestimation of ultimate losses is known to cause knock-on issues with, for example, pricing processes. As such, accurately estimating ultimate losses for BI claims is crucial.

In this article, we advocate the use of Generative Artificial Intelligence (GenAI) and large language models (LLMs) to improve the available data, subsequently to be used by statistical models for more accurate reserving. While statistical reserving methods show promise, actuaries developing these models face challenges such as complex data structures, limited data availability at an early stage, and inconsistent data quality. These challenges highlight the need for robust data controls and processes to ensure the quality and reliability of statistical reserving methods.

MARKET BENCHMARK ON STATISTICAL RESERVING

In 2023, PwC conducted a global benchmark for BI reserving by interviewing experts in major markets. The study aimed to understand current and best practices around the use of both traditional as well as individual claims reserving methods.

The study showed that while most insurers aim to be data-driven, statistical models are typically used to support claim handlers or actuaries rather than being directly applied outright as the primary reserving method. For instance, statistical models are used to substantiate a specific selection within a traditionally derived reasonable range of reserve estimates. Additionally, some insurers apply statistical models to assist claim handlers in setting case reserves for large BI claims using extensive medical data, while others aid actuaries in selecting ultimate losses for higher-frequency claims.

UNLOCKING EARLY-STAGE CLAIM DATA TO IMPROVE RESERVING

A typically observed challenge in directly applying statistical reserving models to estimate the ultimate loss of BI claims is the (un)availability of precise data to actuaries in the early stages of the claim lifecycle. Early-stage data typically lacks predictive information for loss components such as missed income, making it difficult to accurately estimate ultimate losses. The data that are available at an early stage are often unstructured, comprising claim handler notes, legal documents, and correspondence, which is difficult to capture and process using traditional models and methods.

In addition to limited data availability and unstructured data being not directly suitable for modelling, the difficulty in modelling ultimate loss at an early stage is typically exacerbated by data being stored in databases that only capture the most recent data ('snapshot databases'), which is post-settlement for closed claims. By training models on these post-settlement claims and applying them on early-stage claims, where most data points are not yet captured, the initial expected losses are consistently underestimated. Consequently, large losses may not be apparent early on, leading to under reserving due to discrepancies between initial expectations and the final loss amounts.

To improve early-stage modelling, we propose moving to a point-in-time architecture; a database architecture which stores snapshots throughout the lifetime of the claim. This is expected to improve model performance of initial claim predictions. This approach facilitates tracking of changes over time and enables the identification of early indicators for large ultimate losses, akin to a 'canary in the coal mine'. For example, factors like injury type, age, occupation, and family situation help early estimation of payouts on loss components related to missed income. In our experience, much of this information typically becomes available within a few months through the liability statement.

Liability statements, or similar documents attached to the claim file in the early stage of the claim handling process, are typically only available as an unstructured text document. To unlock the information available in this document, LLMs can be used to systematically extract key information for subsequent loss modelling. Once this data is available for both current and historical claims, it can enhance the accuracy of early-stage statistical reserving models and provide a deeper understanding of early-stage indicators influencing the final settlement.

LLMs can also help move from a 'snapshot' database to a 'point-in-time' database by accessing the data within already existing unstructured documents. This allows historical data to be retrospectively created on old claims without the need to slowly build up the data over time on new claims only.

ENHANCING DATA QUALITY WITH GENAI WHILE CONSIDERING TREND CHANGES

GenAI can improve the quality and consistency of data in BI claims handling by automating the capture and pre-population of structured information from unstructured data sources. This includes details such as the nature of the injury, treatment received, and any ongoing medical issues from various documents such as emails, call transcripts, and claim handlers' notes. By streamlining these operations, GenAI reduces the workload on claim handlers, allowing them to focus on more complex and high-value tasks. However, it is important to acknowledge that implementing GenAI in this way may unintentionally cause changes within the claim handling process.

It is a well-known issue that changing claim handling processes can cause trend changes, causing future development patterns to no longer be comparable with prior analyses. Over the last decade, several such changes have occurred in the Dutch market. Direct consequences of these trend changes include increased uncertainty in the reserves, and there are also indirect impacts, such as increased uncertainty in pricing. Therefore, any proposed changes to claim handling processes must be thoroughly evaluated to ensure they are worth the impact on reserving and pricing accuracy.

Instead, we recommend insurers evaluate the application of GenAI methods that complement, rather than alter, existing claim handling processes. This can be achieved by having Finance and Actuarial teams perform supplementary analyses without changing claim handlers' processes.

EMBRACING AI FOR A COMPETITIVE EDGE

In a rapidly evolving insurance landscape, the integration of AI technologies such as GenAI and LLMs is becoming increasingly essential in the mid to long term. Actuaries who embrace these advancements will not only enhance the accuracy and efficiency of their reserving processes but also position themselves at the forefront of industry innovation. We expect that sizeable insurers, with substantial funding and resources, are able to start implementing these changes and can continuously keep refining these processes. Small and mid-sized insurers may struggle to make budgets available for a continuous process and hence need to ensure they implement these processes *first time right*. The future of the non-life insurance sector hinges on the ability to adapt and leverage these new technologies. ■

L. Janssen MSc AAG (left) is Director Non-Life.

T. Peters MSc (middle) is Manager AI & Data Science.

J. Moran AMASSA is Senior Associate.

They all work at PwC – Risk Modelling Services (RMS).