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Artificial Intelligence and Its Effects on Life Insurance Companies

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This article is about the potential impact and effects that artificial intelligence might have on life insurance companies. The reader should be aware that the author is not an expert on artificial intelligence (AI)—or any other form of intelligence for that matter.

This article is based on my observations of functions and tasks that are typically performed inefficiently, slowly or can only be performed with a significant headcount.

AI is an ambiguous term that can refer to a number of different things—including mechanized aliens that make guest appearances in Saturday afternoon TV movies. In this article, I use AI to refer to any software that is capable of learning and self-direction.

AI might be the most disruptive force that life insurance companies have faced. There will be winners and losers. Since most actuarial jobs contain some mix of low-level and high-level activities, it seems that actuarial jobs will change as the low-level activities are shifted to AI.

As actuarial work migrates to more and more high-level activities, it is possible that we will see AI used to enhance and expand the actuary's work rather than replace the actuary's work. This enhancement is an exciting prospect, but is further in the future than AI implementations that replace low-level work.

WHERE AI WILL BE ADOPTED FIRST?

Current and near-term implementations of artificial intelligence have been and will be focused on high cost, high return activities. The items discussed below are intended to be illustrative rather than encyclopedic.

Data Preparation

One of the cruel truths of complex financial instruments—including modern life insurance and annuities—is that they have complex and extensive data requirements for valuations and projections. Many life insurance companies require an

outsized allocation of resources to compile and format data for their periodic valuations, their annual budget/planning projections and capital adequacy projections.

This cruel truth seems to also afflict financial services companies other than insurers. Perhaps it is an unavoidable consequence of complex financial products. Data is often siloed, many items exist in spreadsheets with varying formats and layouts, sometimes data sources are updated willy-nilly, and there are typically enough manual items in the process to make an internal auditor nauseous.

Using AI to perform periodic data preparation is one of the early successes of artificial intelligence. This is an obvious choice for AI implementation since the data preparation is both an expensive process and one that is prone to material errors. AI for data preparation is a two-fer! Implementing AI for data preparation releases expensive staff for other tasks (or releases them from the enterprise, as the case may be). In addition, AI reduces errors in the preparation process because of the ability to review the process globally as well as locally, and because AI can be 100 percent attentive all the time—unlike people.

COMPLIANCE

Another obvious choice for early implementation of artificial intelligence is for compliance. Even a domestic insurer with no variable products and that is not a SIFI¹, has an extensive compliance burden dealing with a variety of state insurance departments on annual filings, premiums, contracts, illustrations, suitability, agent licensing and other issues.

There will also be periodic filings with the tax authorities, along with the corresponding tax payments or refunds.

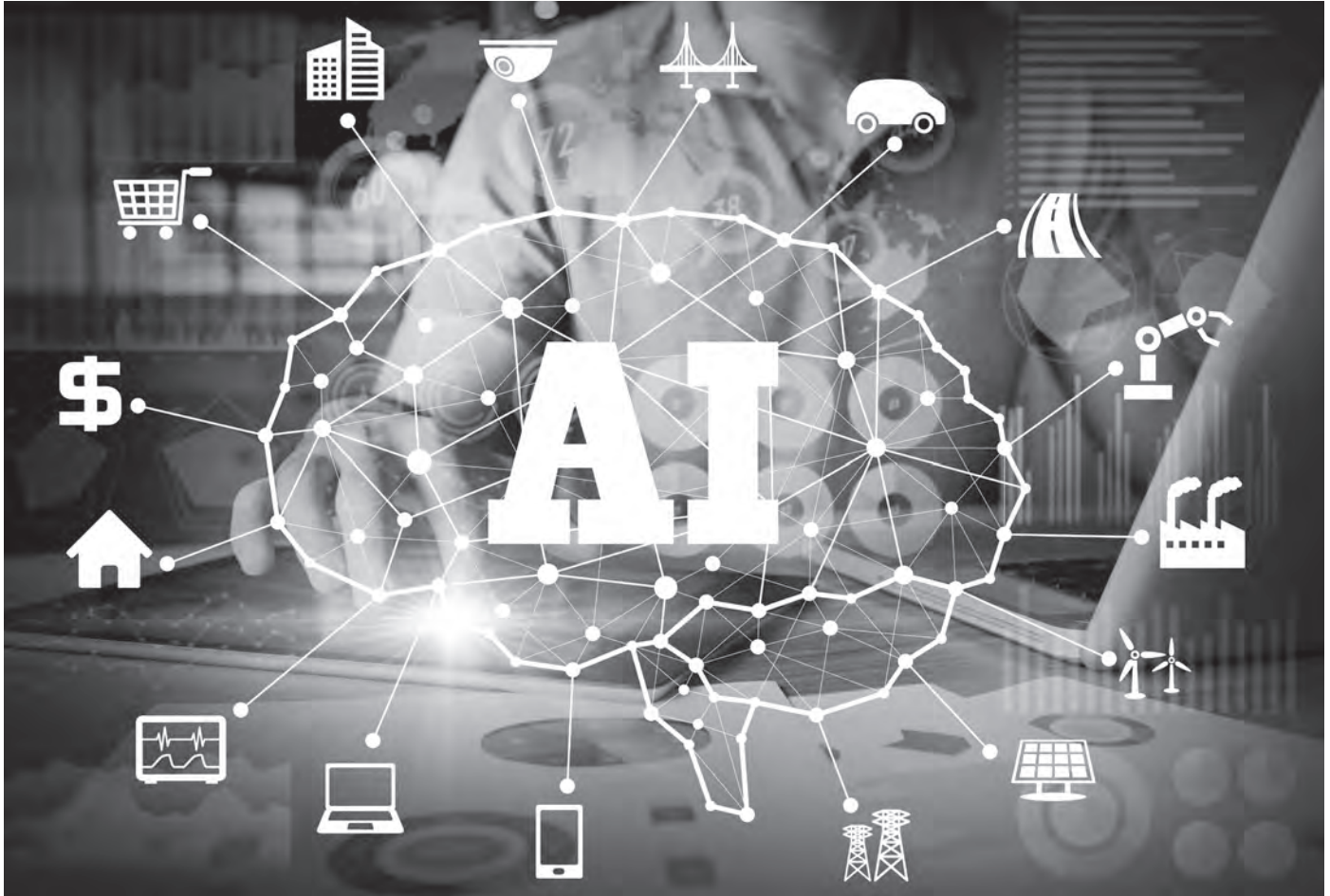
If the company is an SEC² registrant there is an additional layer of compliance for periodic reporting.

If the company operates internationally, there is another layer of compliance as each additional country has unique requirements. In addition, tax planning for international companies is more convoluted than for those companies operating in a single country.

All in all, most life insurers will have an expensive overhead burden attributable to compliance requirements.

AI for compliance—like AI for data preparation—is a two-fer, although the second reason is different for compliance. AI releases highly remunerated employees from compliance. It also enables the enterprise to more effectively align its compliance activities (including taxation) with its risk appetite.

Risk appetite, as promulgated by a company's Board of Directors, is not always easy to translate into operational activities.



With AI, risk appetite can be implemented in a systematic and consistent manner, allowing for more effective management of the company.

EXPERIENCE ANALYSIS

Once AI has been implemented for data preparation, it is a small step from there to experience analysis. Experience analysis is merely sorting data and counting specific items in a prescribed manner in order to develop decrement rates. The difficult part of experience analysis is data preparation!

An interesting consideration about using AI for experience analysis is the possibility of finding areas of homogeneity in experience that have been overlooked by traditional methods.

OTHER POTENTIAL AREAS FOR AI

There are other areas of actuarial work that are further off for AI implementation, but seem like they are real possibilities. These include:

- **Modeling:** An artificial intelligence could potentially perform modeling, either by running existing actuarial software, or by natively developing projection capabilities.
- **Pricing, valuation, planning and any other model driven projection.**
- **Product design:** AI could also potentially perform policy benefits and features design using market analysis.

PERSONALIZED PREMIUMS

One of the current trends in life insurance is the increasing number of risk classes as insurers seek to better match risk with premiums. AI will give insurers the ability to make fine distinctions in mortality risks, resulting in more risk classes.

Rather than dozens of risk classes, think thousands of risk classes—even hundreds of thousands of risk classes. If AI is astute at risk classification, it is possible that each policyholder would be in her own risk class. In other words, we would have personalized premiums—designed and calculated on a custom basis for each insured.

With personalized premiums, there will no longer be any risk pooling or risk sharing. All of the actuary's toolkit relating to group-average statistics that have served so well since Edmond Halley published in 1693 *An Estimate of the Degrees of Mortality of Mankind, Drawn from the Curious Tables of the Births and Funerals at the City of Breslaw, with an Attempt to Ascertain the Price of Annuities upon Lives* is useless in the brave new world of personalized premiums. Everything will be individual-based predictive analytics.

This will be a significant change in outlook for life insurance companies. As always, some companies will adapt early and well, while others will find this change to be disruptive and will resist as long as possible. But it seems that this development is unavoidable as long as our ability to identify individual risk continues to increase—especially as AI becomes available to purchasers of life insurance as well as sellers of life insurance.

The change from risk pooling to personalized premiums will require regulatory changes. Although the wheels of regulation turn more slowly than the wheels of commerce, regulation must eventually reflect the needs of society and the demands of culture. Sooner or later, regulation must, and will, reflect the realities of AI in life insurance.

REGULATORY AUTHORITIES

Given that they often have limited resources, have to deal with complex products from a diversity of companies, have to balance the competing needs of their various publics and have to consider not only statutes and regulations, but administrative rules and precedents as well, insurance regulators do a surprisingly good job.

However, the advent of AI in the life insurance industry will put additional stress on regulators as AI enables life insurers to more, faster.

Once more than a few insurers have wide scale AI implementations, regulatory authorities will either have to implement their own AI or scale back on the amount of review and enforcement that they engage in.

The use of AI by regulators will likely mirror the use of AI by life insurance companies—data preparation, compliance, assumption reviews and so on.

Life insurance companies should welcome the advent of AI in regulation since it is likely to result in more responsive regulators who are able to provide even more consistency in their review and enforcement.

IDIOSYNCRASY & THE BLACK HOLE OF OPTIMALITY

Because artificial intelligence is machine based, it is qualitatively different from human intelligence. Human intelligence is biologically based with its own set of strengths and weaknesses.

Much of human behavior is habitual and predictable. However, there is a remainder that is idiosyncratic—the quirky, the unexpected, the seemingly random and sometimes unpredictable acts that are markers of our personalities. While we all share a common humanity, we each have a distinct and separate personality and point of view.

Artificial intelligences differ by training methodologies and training data. While we can speak of “styles” of artificial intelligence, we cannot speak of these intelligences as having personalities.

Artificial intelligences are trained using some form of goal-seeking, which is typically minimizing some form of “cost” function, where cost is any difference between the prediction and the data. To the extent that AI learns from its mistakes, we should expect these intelligences to seem more and more alike as time passes.

In other words, the AI future is a vanilla future. The ruthless pursuit of optimality will force artificial intelligences to seem the same. If optimality can only be approximately determined, then there may be a handful of AI styles in any specialization. If optimality is more readily determinable, there could easily be only one AI style.

In the vanilla world of the AI future, insurance executives will need to consider, even more carefully than they do now, what their competitive advantages really are. If it turns out that capitalization is the only advantage a company has, perhaps it should just surrender by selling out. AI will tell you when this is appropriate and will ensure that the selling price is fair and equitable to all parties.

Fostering innovation will be especially challenging in this vanilla world. One of the things AI does not do well is innovation. And even if AI becomes capable of innovation, it is possible that one company's AI-based innovation looks just like every other company's AI-based innovation.

Where will a risk enterprise's distinctive characteristics come from? How will we preserve and develop enterprise idiosyncrasies and competitive advantages in the future? These are questions that will need to be addressed as we move into the AI world.

EXECUTIVE FUNCTIONS

Can artificial intelligence perform C-Suite functions? In theory this is possible. However, artificial intelligence is not currently able to make high level judgment calls in any

consistent or adequate manner. As the technology advances, and C-Suite decision making becomes possible for artificial intelligence, should we expect to see artificial executives?

There are at least two important considerations for this issue. The first is that technology is a human endeavor and technological advances and implementation are made for someone's benefit, not merely to be more technological. The decision to implement artificial intelligence in the functional areas of a life insurer is made in the C-Suite. Would the C-Suite decide to replace itself with artificial intelligence?

The decision to implement artificial executives would obviously have to be a Board of Directors decision. In today's culture and legal environment, such a decision seems impossible. Much would have to change in jurisprudence and in cultural acceptance of artificial executives. From this perspective, it will be a cold day in hell before we have artificial executives.

However, the other consideration may point in the other direction. If artificial intelligence takes the path of replacing people rather than augmenting people, there will be a natural impetus to replace the C-Suite with artificial executives.

This impetus comes about because of the need for human training. The ability to make high-level judgments is not an innate skill (Lloyd Bridges was just acting when he was able to make decisions without hearing the questions in the movie "Airplane"). There is a need for some form of apprenticeship or "learning the ropes" of insurance company operations. If artificial intelligence has largely replaced people in the functional areas of a life insurance company, what path of apprenticeship

is possible? If other financial firms have taken the same path to artificial intelligence, hiring executives from banking or Wall Street is similarly problematic.

Unless some alternate form of learning the ropes of life insurance is developed, it seems that there will be significant incentive to implement artificial executives.

CONCLUSION

Artificial intelligence in the insurance enterprise will bring disruptive changes to the actuarial profession. Since most low-level actuarial work is subject to being subsumed in AI, it is important for actuaries to consider their own idiosyncrasies, and the value that they provide to their employer. Who knows, maybe some AI personnel function may be hiring you in your next job. ■



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ENDNOTES

- 1 A systemically important financial institution (SIFI) is a bank, insurance company, or other financial institution whose failure might trigger a financial crisis, and thus they are more heavily regulated than many other companies.
- 2 The U.S. Securities and Exchange Commission (SEC) requires public companies to disclose meaningful financial and other information to the public.