THE Actuary

VOLUME 15 ISSUE 5

OCT 18 NOV

THE COOL FACTOR

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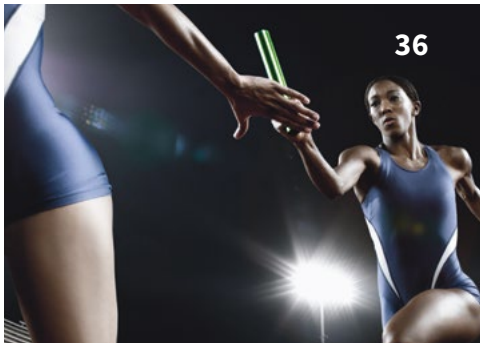

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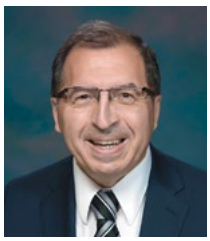
Looking Back (and Forward)

Serendipity is the phenomenon of finding valuable things while seeking something else. In many ways, it has been a serendipitous year.

Many of you know that I previously served as president of the Canadian Institute of Actuaries (CIA) and that my employment background included working for insurance companies, consulting firms and reinsurance. That exposure to the actuarial profession in the United States, Canada, Europe and Asia provided a very broad perspective and demonstrated to me just how varied, vibrant and successful our profession has been.

During my year as president of the Society of Actuaries (SOA), I devoted most of my time to strategy, education topics, issues involving other practice areas and relations with other organizations—and there were quite a few challenges, indeed! A lot of progress was made in each of those areas, and I would like to thank all those on the SOA Board of Directors, the SOA staff and the many tireless volunteers who helped make this progress possible.



MIKE LOMBARDI, FSA, CERA, FCIA, MAAA, is president of the Society of Actuaries. He can be reached at ***mlombardi@soa.org***. Find him on LinkedIn at *bit.ly/MLombardiSOA*.

But the work of building a great profession is never done—the work must go on. In a larger sense, this task goes well beyond me—and well beyond the SOA Board. Regardless of our home country or practice areas, we are members of the same profession and we face the same challenges. During visits to actuarial clubs; employer visits; conferences; and meetings of the SOA, the International Actuarial Association (IAA) and other actuarial organizations, many of you shared your thoughts and ideas about how to move the profession forward.

Throughout the year, I also stressed the need to maintain our relevancy as a profession. Technology startups are making a dent within InsurTech. Artificial intelligence is here. Data science is constantly improving. Models and management of risk are what we know and do best. We must either learn how to harness these developments more efficiently to do our jobs, or we risk someone else taking the lead.

Our subject-matter expertise is the foundation of our strength as a profession. In addition to our subject-matter expertise, our other great collective strength is our commitment to volunteerism. We are here today as a successful and respected profession thanks to those who came before us. We stand tall because we stand on the shoulders of giants—actuarial pioneers who devoted their lives to ensuring the profession we enjoy today would grow and thrive. We owe a huge debt of gratitude to them and to all the many tireless volunteers for their contributions.

As SOA members, you, I, we—all of us collectively—play a key role in shaping our common future. We face two roads ahead of us—one of threats, doubts and fears; the other of opportunity, confidence and excitement.

Let us resolve, together, to choose the brighter path and focus on making our profession even more successful and vibrant in the years to come.

Thank you. ■

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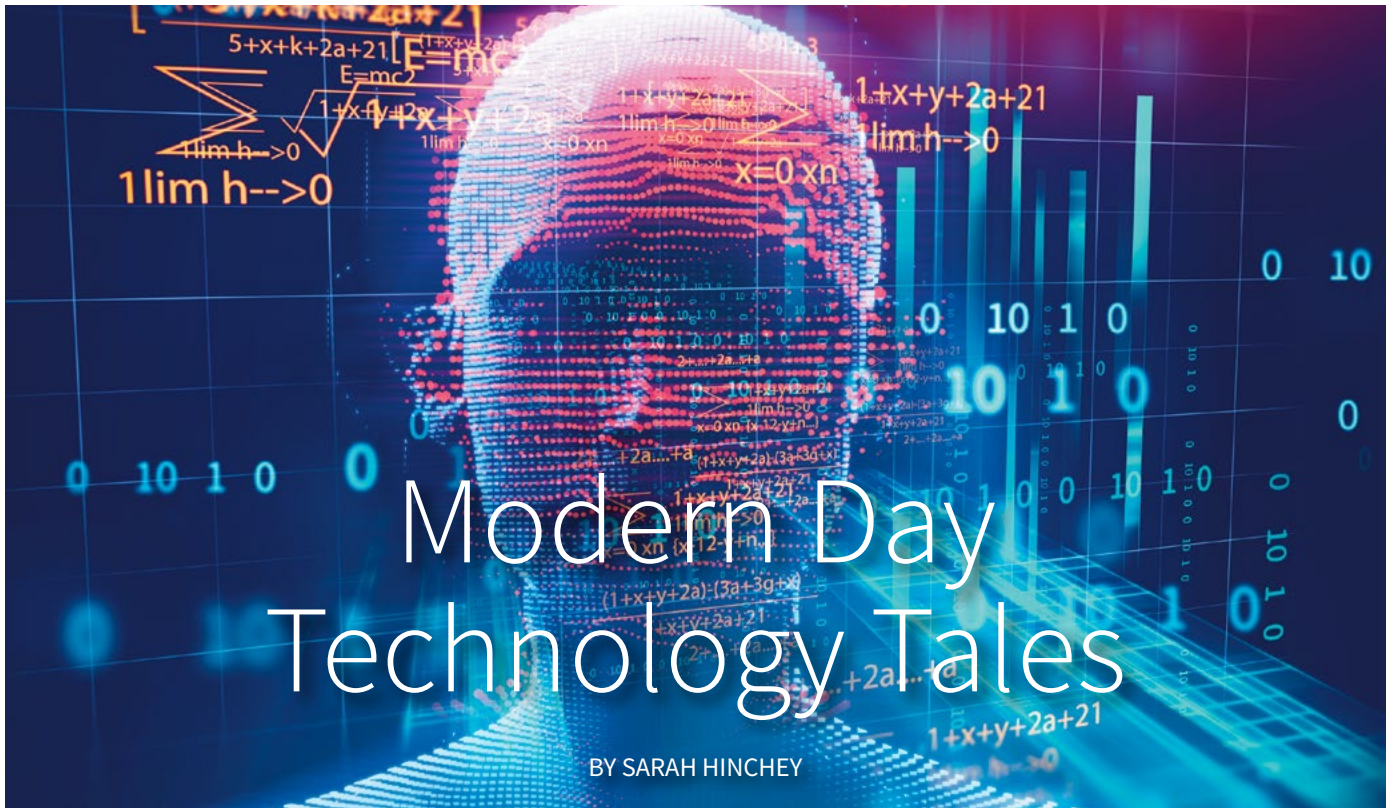
EDITORIAL



Modern Day Technology Tales

BY SARAH HINCHEY

Traditional distribution models, product designs and business processes are being challenged by new "born-digital" startups and growing consumer expectations.

DIGITIZATION, MODERNIZATION, TRANSFORMATION: These are some of the terms used to describe the changes the financial services industry is undergoing globally. Traditional distribution models, product designs and business processes are being challenged by new "born-digital" InsurTech/FinTech startups and growing consumer expectations. Companies are rapidly adopting new technologies such as artificial intelligence (AI), robotics and process automation to fuel change and innovation. This issue of *The Actuary* explores some of the emerging trends in the industry.

Emerging Tools and Technology to Modernize the Actuarial Function

The article "More Than Machines" brings to life how cognitive technologies including AI, machine learning and robotics have the potential to fundamentally change the future of work for actuaries, enabling actuaries to deliver greater value for and improve partnerships across their broader organizations. Benefits of the optimization of the actuarial role are discussed, as well as educational and professional implications.

Actuaries in InsurTech

Given the historical role of actuaries as the "engineers" of the insurance industry, it only makes sense that actuaries play a prominent part in the growing InsurTech marketplace. This year, we continue the "actuaries in InsurTech" theme with two articles from actuaries working at New York–based startups.

In the article "The Cool Factor," you will hear firsthand from one trailblazing actuary who has taken her career to new heights at a startup that is reinventing the income annuity by using modern day technology to make it easier for people to save for retirement. Her story is a great inspiration for how actuaries can leverage their skill sets to succeed in nontraditional roles.

In the article "Seeking Simplicity," you will hear from a pioneering actuary who is taking a ground-up approach to reimagine the customer experience at a startup life insurance agency that is recognized across the industry as a leader in customer experience excellence. As the head of policy design, he shares his perspective on adapting to startup life and some of the challenges he has overcome.

New Data Sources Create New Opportunities

Regulatory changes and incentives have accelerated efforts in the health care sector to digitize the collection and storage of, and patient access to, patient health care data. The widespread digitization of health records has incidentally created opportunities for life insurers to improve their customers' experiences by utilizing electronic health data to modernize their new business, underwriting and claims management processes. The article "Picture of Health" provides a background on this emerging data source in life insurance while highlighting a specific example of one insurer's experience and lessons learned through an electronic health data pilot project.

Behavioral Economics

Some organizations are pairing new tools and technology with business models and solution designs grounded in behavioral economics to achieve their goals. In the article "Upping Your Game," the author gives readers a background in behavioral economics principles and discusses how to apply them to help organizations improve decision-making.

Wrapping It Up

I hope you enjoy reading the articles in this issue of *The Actuary*. They have been sourced to cover a wide variety of technology and innovation-related topics, and collectively the authors provide a clear demonstration that we can continue to develop ourselves as individuals—while building the reputation of the profession as a whole—by stepping outside of our comfort zones and continually expanding our knowledge and skill sets across new tools, technologies, roles and ways of working. Enjoy the issue! ■

ABOUT THE WRITER

SARAH HINCHEY, FSA, CERA, MAAA, SCPM, is a manager for Deloitte Consulting in San Jose, California. She can be reached at ***shinchey@deloitte.com***.

Actuary of the Future Section Update

Earlier this year, the Actuary of the Future (AOF) Section Council had an all-day in-person meeting at the Society of Actuaries (SOA) office. This meeting was long overdue, as most council members had never met each other in-person before. The meeting proved to be invaluable in building bonds within the council and generating discussions to better serve our section members. The two main portions of the meeting were to review existing frameworks and brainstorm new ways to bring value to our members. The council is excited to bring the renewed vision to life.

Here is what the AOF Section can offer to SOA members, students and candidates:

- We aim to keep actuaries at all levels current with the latest advances.
- We discuss topics ranging from exam preparation, job search and career development to industry trends and everything in between.
- We publish newsletters that showcase ideas and perspectives from different authors.
- We send out a monthly "AOF Hot Topics" email with summaries to a curated list of news articles.
- We collaborate with other sections to bring you exciting events such as a speculative fiction contest and networking mixer.

For college students and candidates, we host webcasts that teach about the actuarial profession from a panel of working actuaries. We also produce podcasts interviewing actuaries from different backgrounds and career paths. Additionally, we have an internship program for students and candidates looking to join the AOF Section Council.

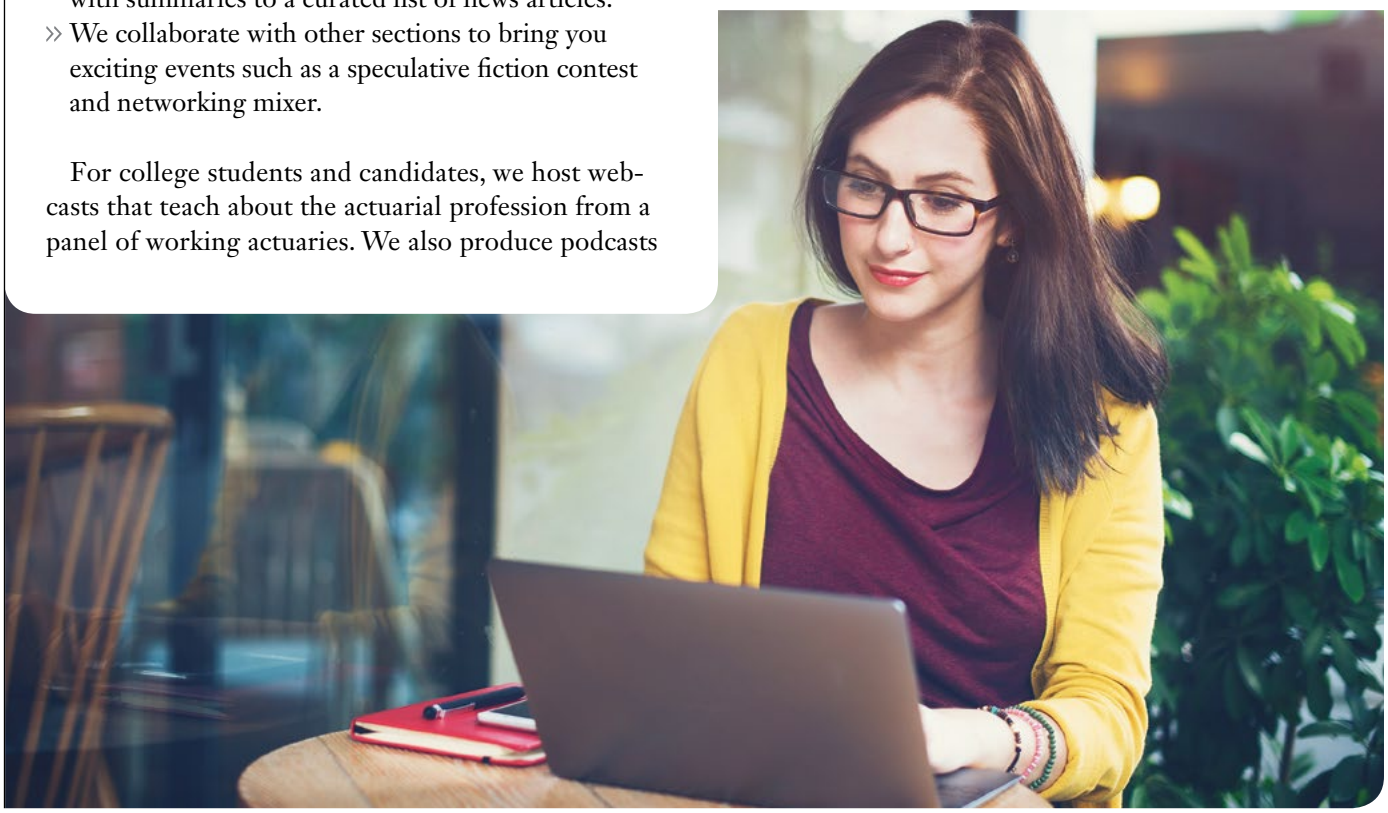
Our offerings for experienced actuaries include sessions at SOA meetings, such as the SOA Annual Meeting & Exhibit, Health Meeting, Predictive Analytics Symposium, and Life and Annuity Symposium. We also host webcasts that count toward continuing professional development (CPD) requirements and are free to members one year after their release date.

The AOF is in the unique position to present a wide range of topics and bring a diverse audience together. The Section Council is committed to serving its members as best it can and welcomes all feedback and suggestions.

If you are looking for a place to start getting involved with the SOA, look no further. Join the AOF Section today, and better yet, volunteer with us!

ABOUT THE WRITER

EMILY HSU, FSA, CERA, ACIA, is a senior assistant actuary at Sun Life Financial. She can be reached at ***emily.hsu@sunlife.com***.



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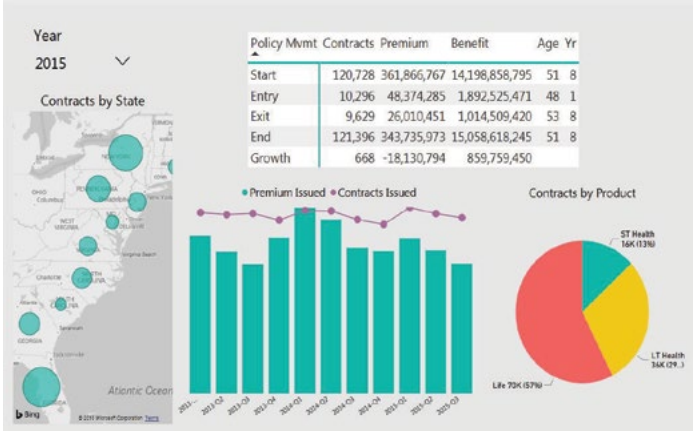
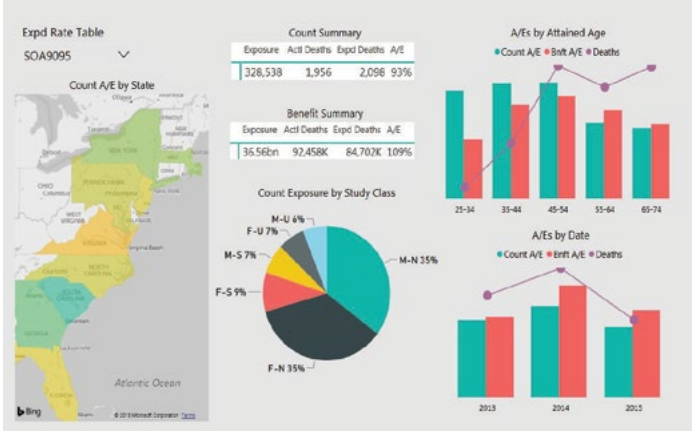


Mortality



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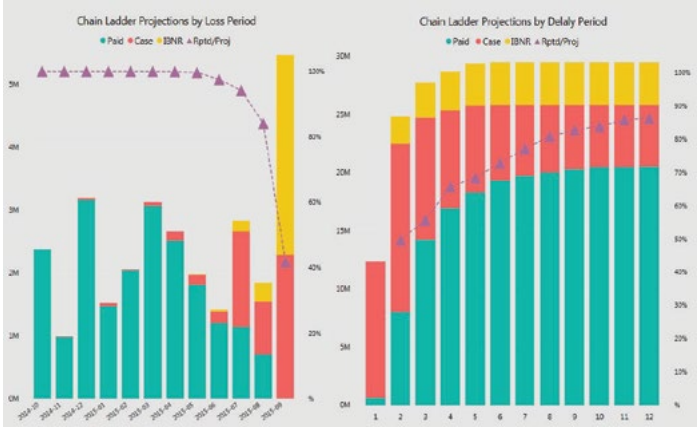
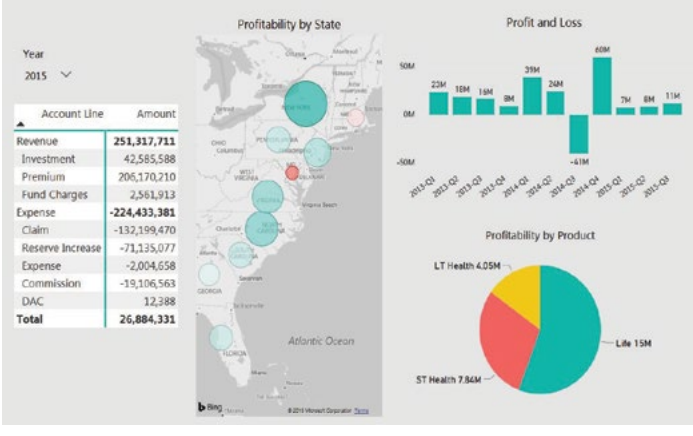


Profitability



Predictive Analytics and InsurTech in Hangzhou

Big data, cloud computing, blockchain and digitization are already having an impact in the insurance industry and will influence the role of actuaries moving forward. These changes will also trigger new risk scenarios and risk management tools.

The SOA hosted a Predictive Analytics and InsurTech Seminar on Sept. 6 in Hangzhou, China. This seminar explored the comprehensive potential of data science for the insurance industry and took a close look at the impact of big data, cloud computing and blockchain on this industry.

This seminar was designed to provide a learning and networking platform in Asia for SOA members and non-members to share their experiences in predictive analytics and InsurTech topics.

The SOA in Brazil: Universal Life Insurance

The SOA held the 2018 SOA Universal Life Insurance seminar on Sept. 4 in Rio de Janeiro, Brazil. This seminar presented an overview of the development of universal life insurance through the perspective of the Brazilian insurance market. A panel of international speakers provided insight into the evolution of universal life, practical risk management and other issues that actuaries, regulators and insurers had to overcome.

SOA Predictive Analytics Seminars in Asia

The predictive analytics market growth in Asia has been rapidly gaining momentum and is expected to expand exponentially in the coming years. Companies are using predictive analytics to enhance customer service and productivity, and to edge out competition and drive revenue growth.

The Society of Actuaries (SOA) conducted a series of events in Asia in August—with the support and help of local actuarial organizations—to give actuaries a front-row seat to these developments. Predictive analytics seminars were held in Kuala Lumpur, Malaysia; Hong Kong; and Taipei, Taiwan; on Aug. 27, Aug. 29 and Aug. 31, respectively. Presenters and speakers for the events included actuaries, data analysts and senior leaders from Milliman, RGA Reinsurance Company, AIA Bhd, Pacific Life Re, Ernst & Young, Insurance Authority, The Terry Group, Ortec Finance Asia, CASH Algo Finance Group, FWD Life Insurance Company and Peak Reinsurance Company Limited. Topics discussed included predictive analytics in policyholder behavior, distribution, underwriting and claims; FinTech and predictive analytics; advanced risk management techniques in the era of FinTech; using predictive analytics to solve business problems; building analytics teams; upskilling actuaries into data science; and professionalism to mitigate risks of predictive analytics.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FEATURE

More Than Machines

The evolution of the actuary through automation

BY DARRYL WAGNER, TONY JOHNSON, NATE POHLE AND JAMES DUNSETH

It's Day 0 of the month-end valuation process. As the actuary leaves the office for the day, an automated script, or bot, prepares and executes a series of model runs to calculate reserves. With the job complete and model results automatically stored in a shared location, the bot analyzes the results and recognizes that the change in reserves is out of tolerance relative to prior quarters. The bot completes an analysis of the underlying drivers of reserve change and discovers the number of terminations increased for policies with a loan, and the number of policies with a high loan-to-cash value ratio also increased. The bot summarizes its findings using natural language generation in the quarterly analytics package, highlighting the trend in reserves using a visualization dashboard.

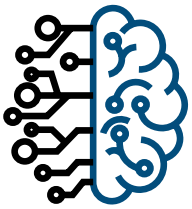
At 8 a.m. on Day 1 of the valuation process, the actuary walks into the office, reads an email containing the analytics dashboard from the bot and starts the day by exploring the increase in loan utilization. After a quick conversation with the marketing department, the actuary learns that a campaign to promote policy loans to policyholders took place during the quarter. So, on Day 1 of the monthly close, the actuary explained the unintended consequences of the loan campaign. Prior to implementation of the bot, the actuary may have spent two days calculating reserves and two days performing analysis. The connection to the loans may have taken weeks or months to discover. This is the future of work; this is the reimagined world of the Exponential Actuary™.

The exponential actuary—an actuary who is augmented by emerging, exponential technologies—is poised to leave behind traditional tasks to focus on higher-value, strategic roles within the organization. This new breed of actuary should arise to navigate this shifting landscape by embracing technology and focusing on outcomes that require uniquely human skills.

Current Actuarial Challenges

Today, many actuaries find themselves overwhelmed by manual machine-type or lower cognitive work that inhibits productivity. As an example, some actuaries work with more than 200 spreadsheets that are linked together to calculate, capture and allocate investment income. Others find themselves waking at 3 a.m. to confirm

This new breed of actuary should arise to navigate this shifting landscape by embracing technology and focusing on outcomes that require uniquely human skills.



Exponential technology creates an opportunity to transfer the "machine work" to machines and expand the role of the actuary.

the valuation process completed effectively and to execute the next job. Others spend countless hours executing controls or refreshing actuarial memos after completing analysis on the actuarial results. As actuaries become overwhelmed by these operational and stewardship activities, they may lose track of the overall outcomes that necessitated the task in the first place. Due to constrained capacity, actuaries may operate suboptimally or lack focus on strategic activities that provide powerful insights into the business. The actuarial workforce is valuable yet expensive, and these constraints prevent many companies from achieving a high-quality return on their human capital. Exponential technology creates an opportunity to transfer the "machine work" to machines and expand the role of the actuary.

EXPONENTIAL TECHNOLOGY APPLICATIONS FOR ACTUARIES

The rapid development of technology, especially cognitive technology, is disrupting the insurance industry. Some of these technologies, including different types of language technology, machine learning and crowdsourcing, have actuarial applications. They include:

- **Data wrangling software.** Streamlines and automates data validation, manipulation and cleansing.
- **Robotic process automation (RPA).** Software or bots provide macro-like capabilities that can be deployed at an enterprise or business unit level. Bots can open emails and attachments, log into web/enterprise applications, move files and folders, fill out forms and perform calculations.
- **Natural language processing (NLP).** Ingests unstructured data (e.g., emails, tweets, memos) and creates data designed for machine consumption.
- **Natural language generation (NLG).** Ingests structured data and outputs data designed for human consumption. NLG can be used to generate a memo from data that mimics how a human would write by varying language to reflect a change in the underlying data.
- **Machine learning.** Uses algorithms such as neural networks to learn and become more accurate as the tool experiences more data. Such tools can be used to identify trends and anomalies within data or rank and identify the most relevant variables. Actuarial applications include both reserving and experience studies.
- **Crowdsourcing.** Leverages a large network of people to solve problems or provide services. Insurance organizations are exploring internal and external crowdsourcing applications.

Exponential Technology

Cognitive technology—defined as technology that can "perform and/or augment tasks, help better inform decisions and accomplish objectives that have traditionally required human intelligence, such as planning, reasoning from partial or uncertain information, and learning"[1]—is now affecting the insurance landscape. The rapid development of technology, especially cognitive technology, is one of the major disruptors of how work is completed for many back-office functions. The rate at which the maturity and availability of technology has increased now outpaces the rate at which many companies have adopted these technologies. Although the insurance industry—and the actuarial profession in general—is behind other industries and sectors in the use of these "exponential" technologies, all is not lost.[2] Some of the most exciting and pertinent technologies with actuarial applications include data wrangling software, robotic process automation (RPA), natural language generation (NLG), natural language processing (NLP), machine learning and crowdsourcing.

Automation, Augmentation and Actuarial Modernization

Exponential technologies are capable of both automating actuarial tasks and augmenting actuarial outcomes. Many actuarial roles involve spending a great deal of time working with spreadsheets, drafting memos and performing basic review and analysis. Much of the effort expended by actuaries is prime for automation, especially tasks that are repetitive, routine, rules-based, computational and/or have low cognitive requirements. Bots can perform these tasks faster, cheaper

The use of automation augments the role of the actuary by providing capabilities that allow the actuary to provide more value to the enterprise.

and with few to no errors. The use of automation augments the role of the actuary by providing capabilities that allow the actuary to provide more value to the enterprise. At the same time, it also helps the actuary to focus on the pipeline of value-added activities that are often deprioritized because they are seen as "nice to have" rather than a "must have." Decades ago, the introduction of computers gave actuaries a tool that could price products and calculate reserves more quickly and accurately. More recently, enterprises have incorporated predictive analytics to help drive informed decisions. Exponential technologies give actuaries a similar opportunity to explore uncharted waters.

With automation and augmentation by technology, actuaries can elevate themselves into a more strategic, valuable role by redesigning how their work is done and what they can accomplish. This involves analyzing how work is currently performed and what opportunities exist to enhance future business outcomes using technology. Based on such analysis, processes and outcomes can be redesigned to apply exponential technology to create a reimagined role for the actuary.

Machine Learning in Action

Consider how technology could disrupt the experience studies space. Actuaries

AUTOMATION IN ACTION

Voya experienced the benefits of modernization by transforming its annuity experience studies process. The modernized process mapped data across multiple administrative systems to a central, policy-level database and moved the legacy process to an IT-controlled production process using an Oracle-based platform. This solved challenges by reducing rounds of querying, which previously included several different administrative systems and extensive manual data manipulation. With this transformation, Voya achieved several successes:

- **One source.** Actuaries can now quickly query the new one-stop seriatim database to satisfy ad-hoc data requests. Past requests required a painful process of querying several tables across several administrative systems, resulting in inefficiently combining multiple outputs in order to respond.
- **Less error.** An IT-controlled process requires far less manual manipulation, thus greatly decreasing the operational risk of human error.
- **More time.** The expected time to prepare studies went from weeks to hours. This provides actuaries with more time to explore and improve their analysis. For instance, they connected to data sets through a data visualization software, Tableau, to analyze dynamic formula assumptions via an interactive dashboard.

By transforming the experience studies process, Voya transformed the role actuaries play—focusing more on analysis and less on data processing—and ultimately benefitted from modernizing.

ABOUT THE WRITER

TIM KOENIG, ASA, MAAA, is a senior actuarial associate at Voya Financial. He can be reached at ***Tim.Koenig@voya.com***.

Approximately 50 percent of the material comprising the first year of a four-year technical degree is obsolete by the end of the program.[7]

spend a great deal of time performing experience studies and profitability analysis through iterative processes to identify drivers of policyholder behavior and the impact of those drivers on the profitability of the enterprise. An experience study tool, with a machine learning algorithm at its core, can automate the actuary's work and augment the outcome of the study. Machine learning algorithms such as neural networks can be trained using thousands of data sets to develop expertise in a particular product line. When such a tool is applied to experience data, it considers all possible variables and identifies drivers that the actuary might not have considered when doing a manual review. An actuary equipped with a machine learning experience study tool can perform more frequent experience studies that are coupled with greater insights due to the additional correlations identified in the underlying data. Moreover, in an inforce management context, the time saved in performing the study can help companies more quickly identify policies likely to lapse and create opportunities for actuaries to partner with the business to develop programs and new products to increase (or decrease) the persistency of the inforce population.

Evolution and Adaptation

Actuaries should focus their efforts on outcomes requiring uniquely human skills to complement the capabilities of machines. Machines are strong at executing routine tasks without bias. However, critical thinking, creativity, communication and resilience are uniquely human abilities that define the exponential actuary.[3,4,5] According to one estimate, the half-life of an acquired skill has fallen to five years.[6] Another suggests that approximately 50 percent of the material comprising the first year of a four-year technical degree is obsolete by the end of the program.[7] The exponential actuary

must engage in lifelong learning over the course of his or her career. While the typical actuary may not currently be adept in some of these areas, companies can help their actuaries develop these skills with the assistance of the right trainers and training programs.

Implication 1: Training and Education

The first implication of the evolved actuarial role is that training and education of students and actuaries of all levels will require updating. Today, many new actuaries grow in their careers through the apprenticeship model—where work experience is a large component of qualification. For example, entry-level actuaries master the occupation by painstakingly working through manual calculations that trace through the details of reserve calculations. In a future where machines manage many of these entry-level procedures and actuaries shift to augment the machine, new ways of learning will be required to train actuaries on the ins and outs of the business. The responsibility for this will fall on companies, professional organizations, universities and, of course, the individuals themselves.[8,9]

Companies may consider tasking junior-level actuaries with performing independent analysis to validate and understand the output the machines produce. Professional organizations and universities, on the other hand, can work together to help identify which enduring, uniquely human skills are most vital to the actuarial profession, adjust the curriculum accordingly and teach students how to apply these skills on the job. For example, in addition to solving problem sets, students could spend more time answering questions that engage cross-functional student teams and help identify risks and opportunities. Actuaries themselves should prepare for a career of lifelong learning to stay abreast of technological trends and quickly master cutting-edge technical skills. Such efforts from all parties could supplement learning lost from the automation of manual activities and could help employees enhance skills machines are not able to replicate.

Implication 2: Professionalism

A second implication is that with an elevated and transformed role in the business, exponential actuaries will need to adapt their professional judgment and conduct. On one hand, the actuary will need to learn to trust the work of the machine to benefit from the opportunities brought by using it.[10] The machines lack human intuition to account for certain external factors and considerations of which actuaries are aware as a normal course of their roles. As such, actuaries will need to consider how and when to challenge the results of the machine. Today, it is common for actuaries to rely on the work of other actuaries and trust the work of other professionals. *Actuarial Standard of Practice No. 23* discusses the use of data and reliance on data created by someone else, and the considerations one must take into account when utilizing work produced by others.[11] To what extent would this change if the data supplier is a bot? Similar professional standards will need to be created for the human-robot relationship. In an increasingly automated and augmented actuarial profession, it is easy to visualize a greater proportion of the actuary's time being spent on quality review and other professionalism activities—an important example of applying uniquely human skills. Undoubtedly, actuarial standards and the actuary's duties to stakeholders must not be compromised.

It is easy to visualize a greater proportion of the actuary's time being spent on quality review and other professionalism activities.

Benefits

Just as many stakeholders are responsible for the education of the exponential actuary, many stakeholders stand to benefit from optimization of the actuarial role. First and foremost, actuaries themselves should be excited by the opportunity to have their work automated and aug-

mented by technology. Actuaries could gain a greater work-life balance and flexibility through reduced workloads. Fewer actuaries would need to work weekends or go out of their way to make sure their model runs are completed on time. Moreover, actuaries gain the opportunity to enhance their professional potential by spending less time on manual tasks, focusing instead on the work they are interested in and passionate about, and potentially expanding their position within their company.

Organizations and the actuarial profession stand to benefit as well. Actuarial functions within various organizations may be able to provide a higher return on their actuarial talent once individuals are enabled by technology. Prospective actuarial candidates may be naturally drawn to work at organizations that invest in cutting-edge technologies and strategies. Hence, organizations that apply this "future of work" framework for actuaries can potentially create a workplace that attracts skilled candidates. Similarly, for an organization's current employees, individuals have an opportunity to complete more interesting work and reach their professional goals while being less encumbered by manual and mundane tasks. The actuarial profession may benefit from increased relevance as the profession becomes more outcomes-based and strategy-focused. As the day-to-day activities and the value the profession provides become more attractive, an increased number of individuals could be driven to explore careers in the actuarial field. This is why professional actuarial organizations like the Society of Actuaries (SOA) must prepare their members for their exponential role.

Conclusion

Discussions of automation in the workplace often evoke fear, as professionals worry that robots will take away their jobs and make them obsolete. However, the actuary's responsibilities are defined in terms of outcomes and stakeholder impacts rather than tasks. Instead of worrying about machines taking away work, actuaries should embrace such change by transferring machine work to the machines and shifting to more strategic tasks that enhance the actuary's role within the enterprise. Companies can facilitate this movement by identifying opportunities for automation and augmentation, investing in exponential technologies, defining new strategic actuarial positions and supporting employee learning. A workforce of exponential actuaries can rapidly accelerate productivity, capabilities and impact enabled by technology. ■

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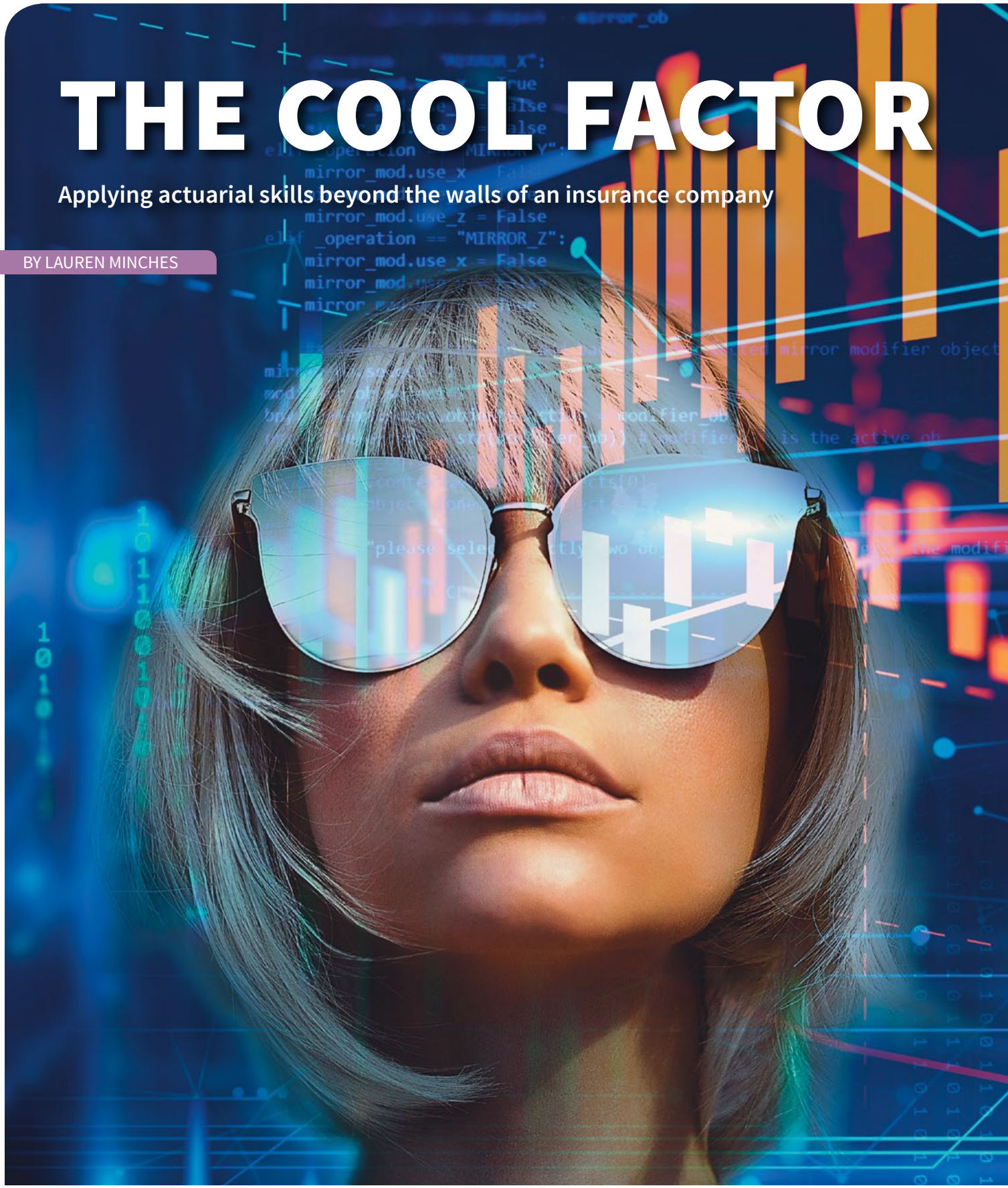
THE COOL FACTOR

Applying actuarial skills beyond the walls of an insurance company

BY LAUREN MINCHES



I decided, somewhat ambivalently, to become an actuary in 2008. It's not that I had another career path in mind, it was just that I'd need to tell my dad, who is also an actuary, that he had been right all along.

At the time, the reasons for me to become an actuary were numerous. I had the right skill set. I loved probability and risk. The job security was unparalleled. Salaries were great. I enjoyed preparing for exams … and so on. However, the profession was missing something that I felt I would have if I were to become an investment banker instead: the cool factor. Being an actuary just wasn't cool—at least that's what I thought back in 2008. Still, from 2009 to 2015 when I was happily employed doing actuarial work at New York Life, I felt the same way. The job was great, but it wasn't fun to talk about what I did.

Today, I feel very different. I'm an actuary working at a retirement pension startup. In that environment, it is very cool that I'm an actuary. Before I tell you why, let me complete the picture about myself.

A Bit of Background

After graduating from Columbia University with a degree in Operation Research and Financial Engineering, I joined New York Life's actuarial student program in 2009. During my six years there, I completed all of my exams and got work experience in life insurance pricing, financial reporting and financial projections. In my last role at New York Life, I worked in annuity competition and analytics, which was the jumping-off point to my future role at a startup.

I left New York Life in 2015 in search of more opportunities for personal growth. I felt great about having become a professional actuary, but I knew that I needed to work in a different type of environment going forward. I spent one year traveling and hosting language exchange events in New York City before looking for something new. Then I turned to the InsurTech world for opportunities to use my actuarial skills in a different environment.

While searching online for startups in the insurance space, I discovered a team—at the time called Abaris Financial—that had created an online marketplace for income annuities. Anyone could come to the site, enter his or her personal information and get real-time quotes from 15+ insurance companies. In the annuity world, this was a big deal! If you go looking for an annuity from an insurance company, you eventually hit a dead end on its website where you're forced to enter your phone number to receive a call from one of the company's agents. It could take you weeks, if not months, to get income annuity quotes from multiple insurers. But Abaris let you do it in 30 seconds. The company took care of the tedious task of lining up the income annuities from different companies, all with divergent and confusing terminology, so you could compare them on an apples-to-apples basis. Once you chose which annuity you wanted, Abaris took care of the application process and placed the business. They were quickly becoming the go-to place for the DIYer in the market for an annuity.

But there was one thing Abaris didn't have: an actuary! So I joined the team in 2016 to advance the company's understanding of the product and its pricing, deepen the relationship with annuity providers, work on customer education and the online experience, build new retirement tools and contribute to the business strategy.

A Blueprint for the Personal Pension

This year, Abaris rebranded as Blueprint Income and introduced a new product called the Personal Pension. Abaris had made it easy for anyone *already* in the market for an income annuity to get one, but the company's mission is much

greater than that. Its mission is to make it easy for anyone to retire with a guarantee, which is hard to come by now that employers aren't offering pensions. Innovations to the annuity space could make getting guaranteed retirement income as easy as investing in a mutual fund. In doing so, we hope to turn today's annuity into an asset class that becomes the pension of the future.

With the launch of the Personal Pension, we were able to address a few of the weaknesses holding the annuity back. First, the Personal Pension is a subscription-based purchase that requires a much smaller upfront commitment, and then it is built up over time. Second, it's an account of multiple insurers' annuities, eliminating the need for a customer to select a specific insurer. Third, you can apply for and manage it online, making it a suitable product for a digitally minded consumer.

Our future plans include creating third-party application programming interface (API) connections to make it possible for people to purchase annuities wherever their money is today, and adding direct API connections to our insurance partners to speed up and reduce the cost of the application process and policy management.

Living My Dream

My job at Blueprint Income is a dream job. I get to play with spreadsheets and put together reports, but my audience members are customers instead of others within my company. I've learned to put aside my ego and spend my time doing what the customer says he or she wants versus what I think the right thing to do is. I've learned to communicate faster and more simply, and to be more engaging, since customers have endless choices for how to spend their time. I've learned how to build something from scratch with neither a foundation nor more experienced people upon whom to lean. I've experienced being responsible for real numbers—web traffic, users, sales—and needing to be very careful about how I spend my time.

Being at a startup has transformed my perception of "work" and has turned me into a much more effective team member. It has also changed the way I view myself as an actuary. Unlike back in 2015, I now feel both proud and cool to say I'm an actuary. There are three reasons why.

❶ | The Actuarial Skill Set and Reputation

I've found that being surrounded by people similar to you clouds your understanding and appreciation for your skills. Are you really good at building a financial model if everyone around you can build them, too? Do you really have an outsized understanding of actuarial math if everyone else around you can also do a mortality-weighted present value calculation?

Venturing out beyond the traditional actuarial community allows your actuarial skills to shine. Because fewer people around you have those same skills, they become that much more valuable. And, thanks to the reputation of the actuarial profession, people tend to assume you have those skills before you've even had a chance to prove them. It's very cool to be viewed as having important and unique skills, even by those who don't know you well.

❷ | A Risk-oriented Mindset

It's very rare outside of the actuarial community that people make risk-weighted decisions. In fact, many people tend to discount risk and not take it seriously, or they don't properly weigh the potential for gain versus loss. They most certainly don't consider the tail scenarios.

Thanks to my actuarial education, I see risk everywhere, but in a good way. Being risk-minded has helped me make big decisions that others can't wrap their heads around—for example, my decision to quit my job back in 2015. To make that decision, I thought through the upside and downside potential. I defined what I thought would be the worst-case scenario, and because I was OK with it, I could then make the decision to quit.

A risk-oriented mindset is empowering, both at work and at home. As actuaries, we're able to bring fresh perspectives to new environments simply because we've been taught to evaluate situations differently than the average person.

❸ | My Confidence in the Profession

Before quitting my job at New York Life, I decided the worst-case scenario was a number of months of lost income and then going back to the same type of job I had before. That is a pretty good worst-case scenario, made possible by the Society of Actuaries (SOA) and other professional organizations. Our actuarial credentials and the demand for those credentials have given me the confidence to take risks with my career. In fact, some might say that my ability to hop off the traditional career path but still feel confident that I'll be OK is pretty cool.

Conclusion

As a good actuary, I should end this article with some disclosures. My decision to share my life decisions, including

Venturing out beyond the traditional actuarial community allows your actuarial skills to shine.

quitting my very good job at New York Life, should not be taken as advice or a recommendation to do the same. These types of decisions offer no guarantee of success or favorable performance in the future. But, for me at least, it has spiced up my life journey, given me newfound appreciation for my profession and made me very excited for what the future may hold. ■

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Seeking Simplicity

The InsurTech revolution strives to create the best possible customer experience

BY MARK A. SAYRE

At Haven Life Insurance Agency, our mission is to make life less hard. After all, between balancing work, school, family, bills and occasionally treating yourself (no judgment), life can be pretty hard. Even for those of us who obsessively maintain a to-do list and relish the experience of striking a completed item from the list, we finish most weeks with more on our list, not less. Given this ever-expanding list of competing priorities, anything that is difficult, confusing or time-consuming quickly descends to the bottom. And, let's be honest, for many people,

buying life insurance is all three of these things—the wrong kind of triple threat.

But signs of change are emerging, as more and more startups like Haven Life enter the life insurance space. These startups are reimagining the customer experience and leveraging the newest technology to make life insurance easy, understandable and fast. Because that's a triple threat even Broadway might cast.

The fact is that life insurance is a very important financial product for anyone whose loved ones depend on them for financial well-being. Nevertheless, according to LIMRA,[1] individual life insurance ownership in the United States has trended down since the 1960s and currently remains stagnant. At Haven Life, we believe the industry has stagnated due to underinvestment (or inefficient investment) in technology, which has driven a widening gap between what our customers expect and what the industry is able to provide.

To be fair, making life (insurance) less hard is no easy task, especially for actuaries. Historically, actuaries have focused on product design and pricing—if an adviser or a customer has a problem, the first place an actuary tends to look for solutions is in the product itself. Actuaries find solutions in an adjustment to contract language or coverages, adding or adjusting a product rider or rethinking pricing or investment strategies. These solutions can often be very effective, but over time, this product-first approach to solving customer problems leads to more complexity and difficulty, not less. The end result is a hodgepodge of products that solves a wide array of problems for a small set of customers. If we want to reverse the trend, it's time to start thinking in reverse. How can we solve a small set of problems for as wide a customer base as possible?

Building a Customer-first Digital Insurance Agency

When we set out to create Haven Life, the most substantial problem for which we needed a solution was selling a policy online. At the time, most life insurance websites were a means for lead generation. They included some basic education on the products offered and you could occasionally compare quotes, but in order to do so, you had to include your email address or phone number.

As soon as your phone number was received, the buying process would then move entirely offline, to the phone or even in-person. There was a perplexing yet simple explanation for why the process could not be continued online (after all, this was 2015 and internet sales were widespread in nearly every other industry). The reason was process.

Every insurance company has a new business process that supports life insurance sales, guiding a case from illustration to application taking, then to requirements gathering, underwriting and finally to policy issuance. These processes have been built up over time to cover a vast array of use cases, a wide range of life insurance products (term, universal, whole, survivorship, etc.) and a blend of distribution channels (captive agents, brokers, etc.). In most cases, companies built their new business process on legacy platforms that are lacking in operational efficiency. Sometimes, a single function (such as application taking) may be spread across different software solutions based on distribution channel or product type.

In brief, it's complicated. And it's hard to change. So we decided that the best option was to start over. Like many other startups, we went back to the drawing board. We built everything from the ground up, and we didn't cut any corners. From redesigning the quote and calculator tools to be more user-friendly and fun, to combining a traditionally multipart application into a single, dynamic online application, to working with Massachusetts Mutual Life Insurance Company (MassMutual)—the insurance company that issues and underwrites the policies Haven Life sells—to build an underwriting platform that extensively uses algorithmic underwriting, we did it all.

We used the newest technologies, such as full stack JavaScript (TypeScript more precisely) and Angular, and adopted metadata and rules that allow us to more easily evolve the platform as our business changes. Our ability to support the customer journey on a single technology platform built entirely in-house also gives us the capability to own and understand the data so we can leverage these insights with each new evolution (for example, by identifying the most common steps at which customers get blocked, we can add help at each of these moments).

While none of this technology is simple, we bring it together in a way that drives what we believe is the simplest buying experience in the industry for the customer.

Innovating, Always

No matter what business you're in, established or just getting off the ground, things are always changing. Since launching a little more than three years ago, we have embraced continuous innovation—not product innovation in a traditional sense, as we still sell a single product (medically underwritten term life insurance, issued by MassMutual) with minimal "bells and whistles;" rather, our innovation centers around how we can continuously deliver a faster, easier, more transparent

experience for customers (the life insurance triple threat).

In learning how and where to innovate, we use a combination of quantitative data (such as completion rates and most common final completed question in the application), qualitative data (from user surveys and focus groups) and targeted A/B experiments that can measure the impact of a single change on our key metrics. (For those who may be unfamiliar, A/B experiments allow us to test out two versions of a page or process, in parallel, on customers, to evaluate which approach is most effective.) Some of our earliest experiments were related to the adoption of a single, combined application.

Our effort to combine the plentitude of life insurance questions into a single online application was a breakthrough in driving a better customer experience, but it also introduced a new problem. In the process of combining, we opted to create a highly reflexive structure of questions so the application could be relatively dynamic to the health and lifestyle of the applicant. The result was a set of nearly 80 base questions and more than 600 total reflexive questions. This demanded a great deal of applicants, as the questions ranged from health status to personal information (such as Social Security number, driver's license number and payment information) and family information to set up beneficiaries. We noticed that customers would frequently be stopped on the site by the need to track down information that wasn't at their fingertips.

The first change we made was moving the payment information required for temporary coverage from within the application to the results page. It was a clear success, with a noticeable increase in customers who successfully completed the application. Shortly after that, we moved some of the more sensitive information required for identity verification to the end of the application and added new language before the application to help individuals understand what information they should have on hand in order to successfully complete the application. With each change, we have been able to make a meaningful impact on the customer experience. They haven't all been successful, but they have all taught us something.

Another big change was around the underwriting process itself. The first iteration of Haven Life enabled customers to go directly from quote to application to coverage all on the website. But the coverage was only temporary while the customer completed a medical exam. Many applicants did ultimately complete the medical exam, but others gave up—after all, these are busy people! So we launched one of our biggest innovations yet: the *InstantTerm* process.

A real-time approach to underwriting positioned us well to transition from being able to offer temporary coverage to being able to fully bind coverage without requiring a medical exam within a matter of seconds. (With the *InstantTerm* process, based on the applicant's responses to health questions, some applicants qualify to finalize coverage without a medical exam, although those who don't qualify will be required to take a medical exam. Issuing the policy or paying its benefits depends on an applicant's insurability, which is based on his or her answers to the health questions in the application and the truthfulness of the answers).

To accomplish this feat, we needed to bring new data sets and algorithm enhancements that could help to ensure competitive rates. Unlike other experiments that can (and should) be incremental in nature, this initiative required months of preparation, including analysis and research, contract negotiation, reinsurance approval, and multiple modifications to our algorithms and code base. Even still, we applied an experimentation mindset, releasing *InstantTerm* Version 2 in mid-2017 and Version 3 in late 2018, although these complex exper-

As the industry changes, it will become increasingly difficult to focus on simplicity. But we will continue to fight for simplicity at all costs, because it's what our customers demand from us.

iments take slightly longer than our usual two-week tech release cycle.

Thinking about the future, there are three areas where I see continued improvement and refinement both at Haven Life and throughout the life insurance industry:

1. Reducing the number of applicants who require a medical exam
2. Further streamlining the application questions and reflexive structure
3. Better integrating algorithmic capabilities with the design and positioning of products

It may seem strange to some that for all this focus on innovation, we continue to offer a single, simple product. For me, that isn't strange at all. What we have heard from customers and what we have seen from our data indicates that the life insurance industry is behind in delivering the experience customers want. Our data suggests customers may be less interested in more products and more complexity; they want a modern, transparent and fast way to protect themselves and their families. Our objective is to create the best customer experience possible, and we'll continue pushing forward toward that goal, one small step at a time.

Adapting to Thrive

Looking back on our large number of accomplishments in these three short years, I feel a sense of awe, with a slight touch of panic. I'm sure many of the readers in similar situations can relate to that feeling! As an actuary, the pace of change at Haven Life is a noticeable departure from previous roles I've held. While this new pace is refreshing, it has required a substantial amount of adaptation on my part.

The first change is accepting failure as a possible outcome of the development process, and perhaps even embracing failure as part of learning. Actuaries are no strangers to risk and uncertainty, but that doesn't hold us back from trying to cover every possible scenario through countless sensitivity tests and risk appetites. I've learned that sometimes we need to let go of the need to understand everything about the risks involved and allow ourselves to learn as we go. That doesn't mean throwing caution to the wind—but it does mean getting comfortable with the potential for failure. Fail fast, and we can fail small. Fail small, and we can try again.

The second adaptation was getting comfortable with a certain level of chaos as we work to bring new ideas to market. Focusing on simplicity requires a lean organization that prioritizes speed and innovation over standardization and process. Within this structure, teams can move quickly and autonomously to achieve their goals. However, this sometimes means different teams operating at different speeds in different directions. And in this rapidly changing landscape, communication isn't always the top priority, which can lead to collisions. In return for autonomy and speed, I've learned to accept some amount of chaos. But with the right principles, and with a strong sense of faith in colleagues to do and want the right things, the chaos never lasts for long.

As we grow and as the industry changes, it will become increasingly difficult to focus on simplicity. The temptation will be strong to put more process and structure in place. The desire to slow down and make sure everything is 100 percent right will strengthen as the memories of our past failures linger. But we will continue to fight for simplicity at all costs, because it's what our customers demand from us. The past three years have been challenging, invigorating, exciting, maddening and just plain fun. I can't wait for the next three. ■

Customers may be less interested in more products and more complexity; they want a modern, transparent and fast way to protect themselves and their families.

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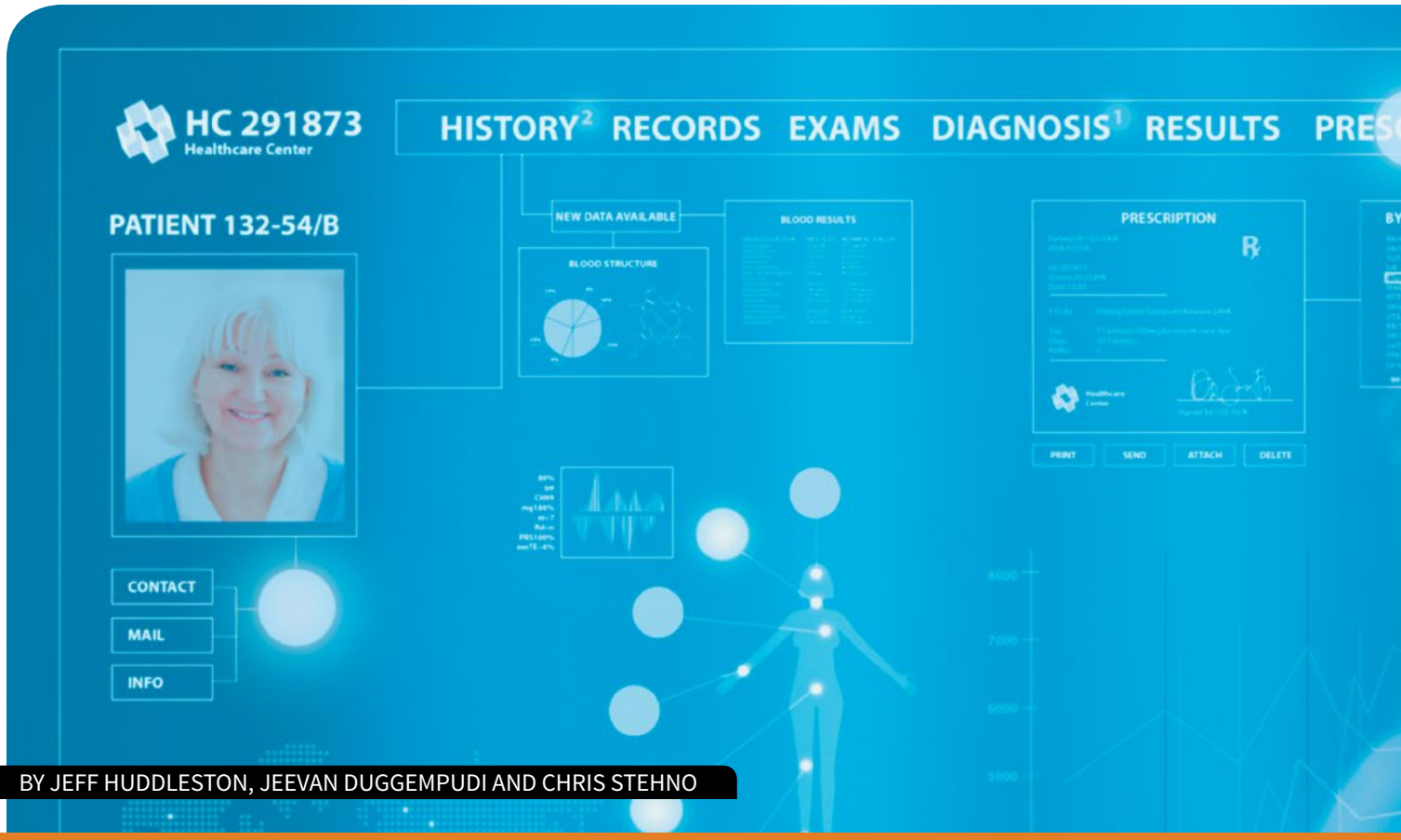
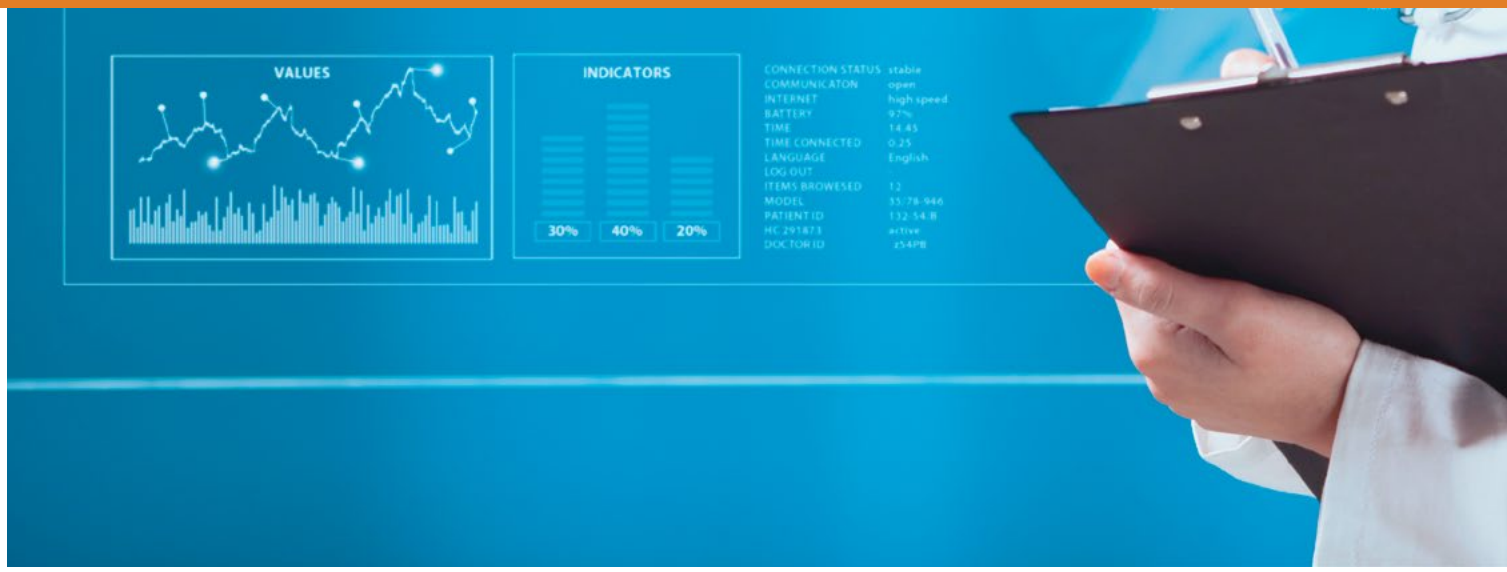


BY JEFF HUDDLESTON, JEEVAN DUGGEMPUDI AND CHRIS STEHNO

Picture of Health

Electronic health records have the potential to disrupt and improve the underwriting process



The systematic collection and storing of patient health information electronically has existed in various forms for several decades. Recent developments in technological and regulatory environments have accelerated the development, availability and effectiveness of electronic health records (EHRs)—also referred to as electronic medical records (EMRs)—for use in a variety of insurance use cases. This article will examine the current state of EHRs in the insurance world and explore in detail one specific case study of EHRs in life insurance underwriting (see the case study on page 33).

Incentives for Modernization

The American Reinvestment & Recovery Act (ARRA) was enacted on Feb. 17, 2009, with the purpose and goal of modernizing our nation's infrastructure. The Act specifically included the intent to modernize our health IT infrastructure in the section titled "Health Information Technology for Economic and Clinical Health (HITECH) Act." Early in 2010, the Office of the National Coordinator for Health Information Technology (ONC) released its recommendations to the Centers for Medicare and Medicaid Services (CMS) concerning meaningful use of EHRs, and it defined the 25 criteria required for EHRs to become certified.

Performance thresholds were set for each of these 25 criteria, detailing what a health care provider must do to qualify for HITECH incentive payments. These incentives began in 2011 and continued for five years. Today, incentives and penalties continue to encourage EHR compliance through programs like the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), which changed the calculated Medicare payments. With the introduction of MACRA, the Medicare EHR Incentive Program, commonly referred to as "meaningful use," was transitioned to become part of MACRA and is now one of the four components of the new Merit-based Incentive Payment System (MIPS).

To summarize this brief history, if you are a health care provider and you are not meeting the meaningful use certification criteria for EHRs, you are leaving significant money on the table!

Widespread EHR Adoption and Access

At the start of 2016, the ONC reported that more than 99 percent of hospitals (critical and small rural) and more than 60 percent of all office-based physicians had demonstrated meaningful use and/or adopted, implemented or upgraded EHRs.[1,2] These adoption rates are excellent news for a wide variety of patient and business applications, including underwriting. However, one issue still exists: How do you get at all of this wonderful data?

That answer is easy. All EHR records have been consolidated at the national level and are being held by the ONC in the National Insurance Library (NIL). And if our sarcasm didn't register with you, the true answer is that a national or even state-based data set does not exist—or does not exist in a useful or meaningful way.

By definition, health information exchanges (HIEs) are the mobilization of health care information electronically across organizations within a region, community or hospital system. The term HIE may also refer to the organization that facilitates the exchange.

The ONC, through grants legislated by the HITECH Act, had promoted the development of HIEs (often called regional health information organizations, or RHIOs) for the means of electronic exchange of information and for the development and maintenance of HIE standards. However, to date, HIEs and RHIOs continue to struggle to be self-sustaining, and the vast majority are tied to federal, state or independent grant funding to remain operational. The future of these programs is up in the air as the state and federal regulations that define HIEs and the broader health IT landscape are emerging (or stalling).

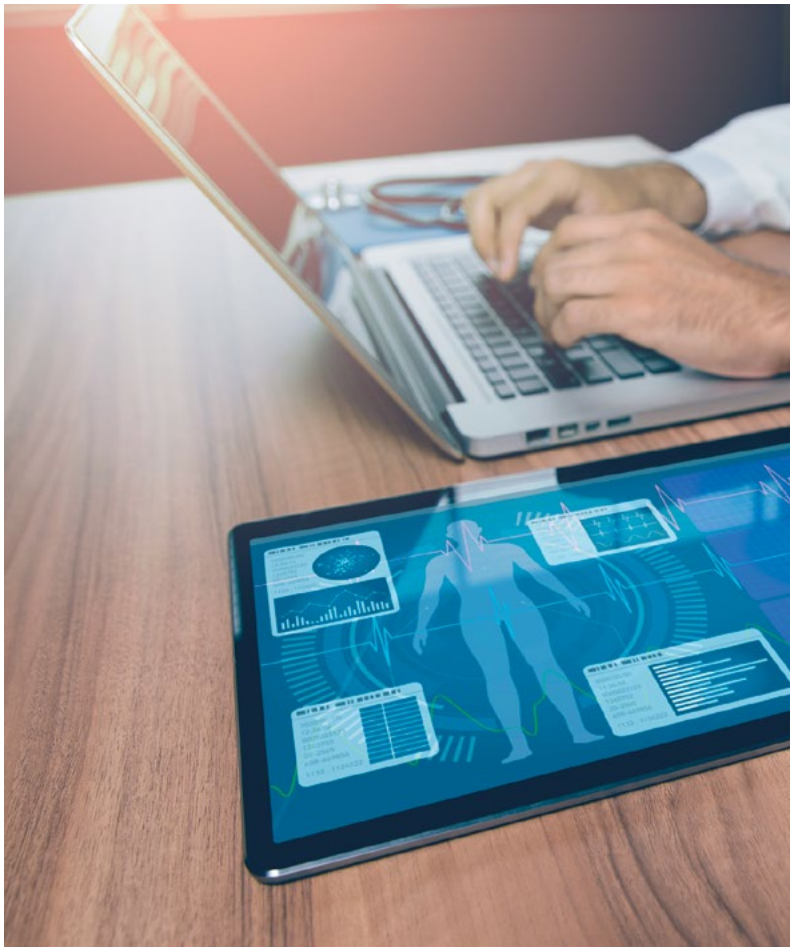
One thing that does exist, however, is the right of patients to access their EHRs. Going back to 1996 (the year Michael Jordan's Chicago Bulls set a new NBA season win record), the Health Insurance Portability and Accountability Act (HIPAA) granted individuals access to their own EHRs and defined the providers' obligation to give them access.

The move to a patient-centered approach to owning and being able to access one's own medical data appears to be the newest and strongest trend. In fact, the ONC issued a new report, titled *Improving the Health Records Request Process for Patients: Insights From User Experience Research*,[3] which addresses patients' needs and current issues. The ONC has gone even further to develop a *Patient Engagement Playbook*. Chapter 2, Section 5, titled "Support Electronic Record Requests,"[4] provides actionable tips for health care providers to make the medical record request process more streamlined, transparent and electronic.

Insurance Applications

EHRs offer opportunities in many different insurance applications. The use of EHRs in traditional group health insurance is well-established and offers numerous benefits to providers, plans and consumers. Additional opportunities to use EHRs in insurance are emerging in nontraditional areas:

- **Individual life insurance underwriting.** This opportunity is explored on page 33 using a real-world case study. EHRs have the potential to significantly disrupt individual life insurance underwriting by reducing the cost, time, complexity and invasiveness required compared to traditional medical underwriting requirements (paramedical exam, lab exam, etc.).
- **Supplemental health insurance underwriting.** For specialty supplemental health or voluntary benefit types of insurance, or individual disability income or long-term care type coverage, EHRs offer the ability to improve the underwriting and policy issuance experience for both insurance carriers and consumers. EHRs can simplify, expedite and improve the risk assessment process while reducing the cost and invasiveness to the end consumers.
- **Claims management.** For many types of insurance with repeatable claim events linked to consumer health (i.e., disability income, long-term care, etc.), EHRs can improve the risk and costs associated with claims management.



EHRs, primarily gathered through patient portal technology, have the potential to fundamentally disrupt and improve the insurance risk assessment process. In life insurance specifically, EHRs in combination with lab-free and automated underwriting programs can help life insurance companies realize the vision in which two-thirds of applications are issued without manual review, drastically reducing application time and cost while improving the customer experience. However, effectively operationalizing EHRs into existing processes is a journey that requires comprehensive program design, effective communication, integrated planning and stakeholder buy-in from across an organization. ■

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CASE STUDY

EHRs for Individual Life Insurance Underwriting

BY DAVID MOORE

Many life insurance carriers have implemented some type of accelerated underwriting program for life insurance. As promising as some of these programs are, however, there is still a balance between efficiency and risk management that needs to be maintained to facilitate continued growth. Carriers could implement an automated process with a fully underwritten price by obtaining medical records at the time of application rather than waiting for labs and physician statements (as is current practice).

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Evaluation of EHRs Versus Attending Physican Statements

Nationwide (the company where I work) recently conducted a pilot project with a third-party provider to capture data from EHRs and then compared the EHR-sourced data against data gathered from traditional underwriting requirements. The pilot ran both retrospectively—where we reached out to customers with inforce policies and asked them to provide access to medical records—and prospectively—where we gathered EHR data in parallel to an application going through the traditional underwriting process.

Choice of EHR Source

Life insurance companies are exploring two methodologies for gathering EHR data. Our initial pilot used a portal to allow the life insurance applicant to sign into his or her account with his or her medical provider, and then port the medical records to the insurance company for review. The second method involves the applicant providing authorization, and then a third-party aggregator or HIE collects the medical records from the various data sources. This is similar to how insurance companies work with providers to gather prescription drug data. The third-party provider in this case has created a special process or algorithm to aggregate medical records from multiple parties in the health care industry, and the third-party company contracts with several health care data sources (including health plans or provider networks) to facilitate the data collection for the insurance carrier.

There are pros on cons to each approach. The biggest challenge we observed in our pilot for the user-directed sign-on approach is that applicants and advisers are hesitant to use it. It represents a change in the usual process, and even with incentives, it is difficult to change behavior. When the EHR data was shared, we found the EHR either provided the same quality of data as the attending physician statement (APS) or it would have led to the same underwriting decision as the traditional process in most cases.

For the data aggregator or HIE, the hit rates are still very low, as those working on these solutions are still growing their network of data contributors. It is a concern that using this type of process could provide several cases where either no data is returned or the data is very sparse and captures only a fraction of the applicant's medical history. There is a fear that implementing this type of approach with a low hit rate could actually make the underwriting process worse because the traditional underwriting requirements are delayed while waiting for the EHR to be retrieved and assessed.

Potential Beyond Replacing the APS

When reviewing the data gathered from EHRs, we looked at it based on two dimensions. First, does the EHR match the data provided by the APS for the given insured? Some people may want to stop here; however, EHRs provide the potential to go beyond the traditional point-in-time requirements and look at the health of the applicant over a period of time. Longitudinal information can give considerably more insight into the health of an applicant over time. We are excited by the possibility of revisiting underwriting guidelines and looking closely at disease progression.

Next Steps

Based on our initial pilot project comparing the data available from EHRs against traditional life insurance requirements, we recognize EHRs are not yet ready to be used for underwriting. For a process to be adopted, we need to make sure it delivers quality data in a consistent manner. User portals are still seen by the applicant as an extra step in the process and are not being embraced despite their potential. Health records obtained by data aggregators are returning a low hit rate that won't satisfy the requirements of the insurer to reduce the amount of time and effort spent to underwrite a case.

Despite the issues observed in our pilot project, the potential is high in the near future for insurers to use EHRs for underwriting. First, it would improve the quality of underwriting by using verified medical data at the time of the application. Second, it would improve the user experience by reducing the burden placed on the users to answer questions.

The effort required to make this a reality is not trivial, and insurers are looking for innovative partners to help them achieve this automation rather than driving this research and development work internally. ■

ABOUT THE WRITER

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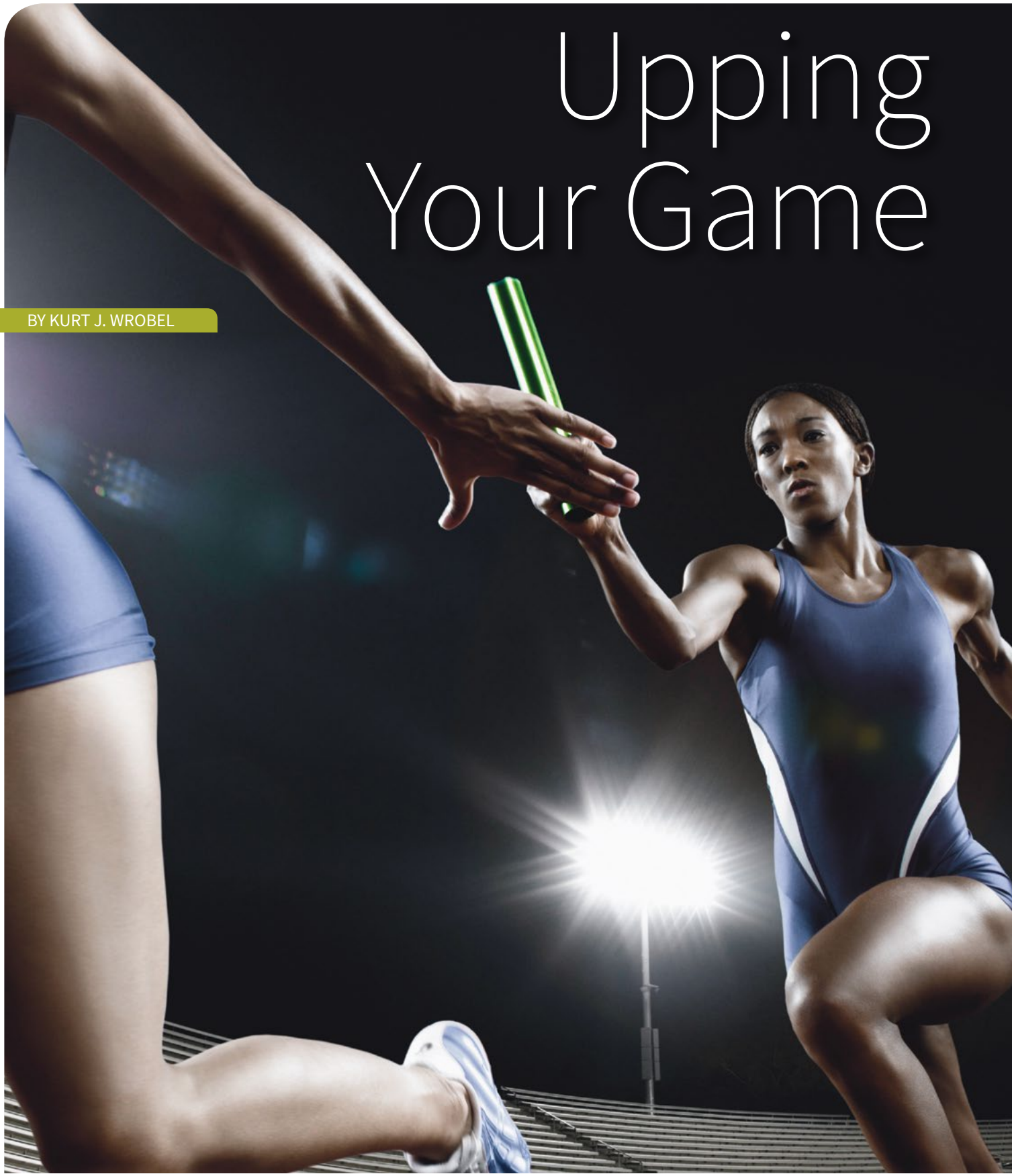
Upping Your Game

BY KURT J. WROBEL



How to use behavioral economics to optimize decision-making and become a better actuary

Behavioral economics—this often-used term is a relatively new method for understanding how individuals make decisions. The concepts have been successfully applied across a wide range of fields, and the economics profession has recognized its influence with three Nobel prizes.

One concrete application of behavioral economics has been at technology startups, where companies are developing programs to reduce operational costs and create a better overall consumer experience. Lemonade, for example, is a property and casualty insurance startup that uses the principles of behavioral economics to ensure the truthfulness of submitted claims. Instead of using more traditional insurance techniques, the company requires people to sign an honesty pledge and submit a video describing their property loss. Using algorithms based on behavioral economics, the company makes an evaluation of the claim and makes a payment quickly—in as little as three seconds!

Behavioral economics can be seen as a reaction to traditional economic theory and assumptions. In traditional economics, people are assumed to rationally maximize their happiness or "utility function" with a given income level. In making purchasing and other decisions, people are assumed to logically review all available information and systematically make decisions to optimize their happiness. Because people are assumed to always behave rationally, this framework implicitly expects that people can incorporate complex information and data to make the best possible decision. A tangible example of this rational decision-maker who always makes optimal decisions based on all of the available information is Spock from *Star Trek*.

In contrast to this rational framework for decision-making, behavioral economics assumes people will make decisions based on survival strategies. In an ancient environment—where we needed to survive rather than make rational and statistically sound decisions—our primary goal was to develop simple explanations that would prompt immediate actions to ensure survival; it was not to make well-reasoned and statistically sound decisions based on data. Daniel Kahneman described this biologically evolved behavior in his book *Thinking, Fast and Slow*: "We are born prepared to perceive the world around us, recognize objects and fear spiders."[1]

As actuaries, this insight is important. Most people do not have a predisposition for answering questions in a statistically sound manner like most actuaries. This is not a value statement, but simply recognition of reality. After spending years studying actuarial science, we have developed skills to answer important business questions using statistical tools, and we are much more likely to use them compared to people in other professions.

We are susceptible to acquired blind spots, which we need to recognize when making decisions.

Considering the lessons from behavioral economics, recommendations developed from statistical tools must account for this gulf between rational statistical decision-making and the survival strategy response among those who do not have a background in risk assessment. In addition, while we may use a well-reasoned analytic framework in most circumstances, we also need to understand the situations where actuaries and other technical experts will have blind spots that can be predicted through behavioral economics. We are susceptible to acquired blind spots, which we need to recognize when making decisions. This article will discuss how the principles of behavioral economics can be used to improve our own practice as actuaries and help ensure better decisions for our organizations—including communicating with nontechnical leaders, managing statistical biases among nontechnicians, understanding biases among actuaries and other technical experts, and using the power of teams to manage individual biases.

Creating the Best Possible Story: Communicating With Nontechnical Leaders

Behavioral economics literature suggests that information needs to be presented in a clear and easy-to-understand manner to effectively influence a decision-maker. While this may seem obvious, research emphasizes this crucial point and its overwhelming importance in making a compelling presentation. One article referenced in *Thinking Fast and Slow*, "Mind at Ease Puts a Smile on the Face," succinctly relays how to develop a straightforward presentation so it is viewed favorably and in a sympathetic light. As Kahneman notes, "When you feel strained, you are more likely to be vigilant and suspicious."[2]

Developing a good story—one that is concise and easy to understand—is the most important part of a clear analytical discussion. Think of it as a 60-second elevator pitch that must be explained simply and understood quickly. The story should start with a question or objective supported by high-level metrics that highlight the problem being confronted. Personal stories, visible actions and outcomes should be utilized along with data to create a connected story. The discussion should also include an operational plan and metrics to make sure the project stays on track. While the structure is fairly simple—question, supporting data, proposed solution, metrics to track progress—the real trick is connecting these sections with a compelling and simple narrative.

A powerful and compelling story is needed to manage competing stories that could lead to a less-than-optimal decision. In a large organization, people are keen to create stories—with clear narratives between an action and an outcome—that are advantageous to them. As suggested in behavioral economics literature, these stories will often ascribe far too much importance to an individual's actions and recent events than to simple randomness. As frustrating as this could be for someone with an analytic orientation, we have little choice. Stories compete with each other and, in many cases, a compelling story with little analysis can win over a decision-maker more effectively than a well-developed analysis.

Beyond creating an effective story, several other techniques can be used to ensure cognitive ease and acceptance of your broader narrative. Repetition, particularly in informal discussions that precede a more formal presentation, can be effective at enhancing a technical discussion and protect against your audience becoming suspicious of a new concept. These informal discussions also have the added benefit of identifying weak spots in a story and will allow you to address those problem areas before the formal presentation.

When having these informal discussions, always engage the final decision-maker in

the process early. Early engagement will likely result in the decision-maker having a much more sympathetic perspective toward the final work product. Behavioral economics literature calls this the "Ikea effect" for the high value we put on objects that we have assembled.

In terms of an actual PowerPoint presentation, a strong focus on clarity should be paramount. Use pictures or graphs (called the "picture superiority effect"), limit the number of words on each page, and keep the presentation short. These techniques contribute to clarity and to the ultimate acceptance of your position.

Finally, the presenter should lead with a simple story before beginning the presentation and conclude with one as well. A simple story that connects disparate ideas and facts is most likely to produce the best measure of success—the ability for the audience to succinctly articulate your position in a few minutes.

Statistical Blind Spots Among Nontechnical Managers

While the starting point for any presentation is a compelling story, we also need to manage the statistical blind spots that nontechnical managers have. This vigilance helps ensure that competing storylines based on faulty analysis do not impact the decision-making process. By discussing these technical problems early on before conclusions are developed, we can also make nonrigorous analysis out-of-bounds in the decision-making process.

The list of potential blind spots is long (see sidebar at right). As one communicates and works with nontechnical leaders, it is important to consider these biases and others that could form the foundation of their thinking.

Understanding Blind Spots Among Technical Experts

As technical experts, we see the blind spots among nontechnicians as frustrating limitations that must be overcome

POTENTIAL BLIND SPOTS FOR NONTECHNICAL INDIVIDUALS

Nontechnical leaders and managers can have a number of blind spots when it comes to making statistical decisions. Here are some I have experienced in my actuarial career.

- **Mistaking correlation with causation.** A large data set can reveal many interesting observations that could appear to be causal, but in reality they are only correlated with one another. The mistaken view of causation versus correlation could lead to a poor decision if a proposed action is only correlated to an action rather than being causal. While this mistake could be acceptable in an ancient environment where mistakes are not as costly, it could be very costly in an environment where an unsound statistical decision could lead to a significant financial loss.
- **Insensitivity to sample size.** Many people have remarkably little concern about drawing conclusions from small sample sizes. While this approach can occasionally be appropriate if no other data is available, it is our job to ensure conclusions are not drawn on a small number of observations where the results could be subject to wide variability.
- **The Black Swan problem.** Nassim Taleb has discussed the problem of people putting too much importance on recent historical events without accounting for the likelihood of a low probability event—a so-called black swan that could have a profoundly positive or negative impact.[1]
- **Narrative bias.** People love stories that highlight their preferred version of events. A story that links a successful outcome with their skills or the actions of their team is attractive and likely to be believed. The problem, of course, is that this version of events may be inaccurate and the decision-makers could overstate their skills in producing an outcome.
- **Outcome bias.** While few would argue that results do not matter, an outcome could be favorable even if the decision-making process was deeply flawed. If only the results of the outcome are judged, one could inadvertently believe that a flawed process produced a favorable outcome.
- **Availability bias.** People can be influenced to increase their perceived likelihood of an event if it can be easily recalled or if the information is readily available.
- **Focusing too much on the trivial (Parkinson's law).** With the advent of big data, the opportunity to analyze more information has expanded exponentially. With more information, people are much more likely to focus on trivial information that is unlikely to improve decision-making.

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[1] Taleb, Nassim Nicholas. 2007. *The Black Swan: The Impact of the Highly Improbable.* New York: Random House.

in order to improve decision-making. Although we may believe we are immune to the problems of statistical thinking, technical professionals can also have blind spots, and we need to recognize the most common pitfalls.

There are biases that are more likely to be found among technical experts. Like the biases that managers outside of our profession have, it is important to keep these in mind when doing analytic work and making big decisions.

- **Confirmation bias.** In an effort to prove previously held beliefs correct, one may comb through data to find information that supports a position and put less weight on information that does not support that same position. While this bias could be completely unconscious, the end result is a less-than-optimal decision that confirms a previously held belief.
- **Pro-innovation bias.** Most people like new concepts and inventions. In the excitement of an innovation, many people may overlook its shortcomings and the usefulness of its application. Technically oriented people, in particular, may find an application of a complex statistical formula useful even when it may add little to improve the decision-making process.
- **Information bias.** Actuaries and other technical experts love additional data. While this data has the potential to better inform decision-makers, in many cases it will simply add complexity and not positively affect the decision-making process.
- **Empathy gap.** Data is power, and we may understate its importance in relation to others. Statistical observations could impact an individual's livelihood and self-worth, and this needs to be considered as part of any presentation.
- **Automation bias.** Many technical experts love automation. Automation can make a process more streamlined and reduce the number of resources required to accomplish a task. The goal to achieve ever more automation, however, could introduce the potential for significant errors that technical people may fail to fully consider. For example, a more automated system may have fewer checks and balances and may be more likely to produce a major error than a manual system.
- **The law of the instrument.** Many analysts prefer to employ the techniques they use in their disciplines. Economists

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Behavioral economics assumes people will make decisions based on survival strategies rather than well-reasoned and statistically sound decisions based on data.

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will employ linear regressions. Accountants will require a final true-up of assumptions. Marketing professionals will relate a question to a generational cohort that references millennials or Generation X. Most people have this inherent bias, and we need to account for this as we consider the best technique to answer a business question.

Managing Teams: Creating an Environment to Avoid Bias

This article has focused on techniques to avoid bias and ensure an optimal decision-making process. Whether one is a technical expert or a nontechnical leader, most people have individual biases that need to be managed. Some people might be susceptible to easy-to-understand stories, confirmation bias, models that are too complex, an incentive structure that produces a biased conclusion or many other biases.

Other than making every attempt to understand your own biases and the biases of others, it is important to create an environment where a team can limit the biases of any one individual. The best approach is to create a team that feels empowered to question the conclusions of any one individual in the group. This competitive tension among team members with firm positions has the potential to improve the collective decisions of the entire team.

While team members have the potential to reduce bias of any one team member, they can also create a social environment that could lead to less than optimal decision-making if not properly managed. For example, if a particularly strong-willed individual aggressively takes a position, other people may agree with this person because of his or her conviction rather than a thoughtful consideration of the argument. This is known as the "bandwagon effect." Similarly, a team many not want to aggressively question someone out of simple courtesy (known as "courtesy bias"). In both cases, the social dynamic should be managed to ensure everyone has a meaningful voice in the process.

Solutions could include requiring people to provide an opinion in written form before the discussion begins, or rigorously enforcing an inclusive discussion and decision-making process. The creation of competing teams required to take opposing positions—even one that is different than what they believe—could also benefit the discussion and the decision-making process.

As actuaries, it is important for us to take the world as it is, rather than what we want it to be. While we may think the world should be completely rational and free of the statistical blind spots, it is not, and we need to guide our own work toward this reality rather than the ideal. We need to create compelling and easy-to-understand stories that can compete with less statistically sound ones that lead to suboptimal decisions. We need to anticipate and manage the statistical blind spots made by less technical managers. At the same time, we also need to manage our own blind spots and look for well-run teams to help manage the biases of any one individual. This process is much less concrete than a traditional actuarial analysis, but it's also necessary to make better decisions and become a more effective actuary. ■

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Dream Big

Q&A with Albert Moore, ASA, MAAA, second vice president of Illustration Architecture & Development at Ohio National Life Insurance

How does technology growth affect actuaries and the profession?
Technology growth affects actuaries in several basic ways. Technological advances change what we are able to accomplish and determine the expectations others have of us. Without advances in technology, many of the approaches to stochastic analysis would not be practical. Technology has changed the expectation of the depth and speed of our analysis, and the latest advances are changing how we communicate. I often ask actuaries when the last time they used a "heat map" to communicate a result was. As actuaries, we tend to provide "the" answer. We have the most powerful tool—a smartphone—in our pockets. We have information at our fingertips via the internet. So we are being conditioned to process information differently. We do not want the answer—we want the information to make our own informed decisions.

There is a growing body of research on the way technology is changing how we process information. Processing power changes what we can accomplish and what is expected of actuaries. I recall when it took several days to perform various cash flow scenarios. These same calculations now can be performed in hours and, by utilizing distributed processing, one can accomplish tasks in minutes. Expectations of regulators, executives and other stakeholders have changed with increasing processing power.

Technology determines the skills actuaries need. Because information is readily available, the actuary is increasingly required to "make sense" of the results rather than spending significant effort compiling results. This change requires actuaries to be able to think and communicate differently. I find this confluence to be fairly unique to the actuarial profession. Namely, actuaries must understand the technical details and communicate the meaning and implications of those details to nontechnical colleagues. Our examination and continuing education requirements do an excellent job of leading actuaries down this path.

As actuaries, we tend to provide "the" answer. ... We do not want the answer—we want the information to make our own informed decisions.

PHOTO: JOEL MAISONET

Albert Moore can be reached at ***albert_moore@ohionational.com***.

Understanding which aspects of life insurance are predictive by nature will help individuals think of applications of predictive analytics.

PHOTO: JOEL MAISONET

What about technology inspires and interests you?
I have always been interested in technology. I subscribed to *Popular Mechanics* magazine as a young child. I graduated to *Scientific American* magazine when in middle school. At the same time, my older brother introduced me to programming. He was an engineering student at Cornell University. Somehow he got his hands on an Apple II Plus that came with three computer compilers: one for Basic, Fortran and Pascal. During that summer, I pretty much replicated the projects he was assigned during the previous semester. By the time I was in the tenth grade, I was very proficient. I landed a job at the Environmental Protection Agency through a program for inner-city youth. Once they learned of my programming proficiency, I began working with their co-op students, designing programs to monitor the various experiments of my research group. Because of my utility, they had me working part time during the rest of my high school years. While attending college at the Massachusetts Institute of Technology (MIT), I was introduced to the hacker community. I am very social, so I enjoyed learning about the various interests of the group members. From robotics to cognitive research, each individual sparked a desire in me to have a basic understanding of his or her particular interest.

What skills positioned you for work in technology and predictive analytics?
When most people think of "skills," they are referring to one's ability to do something. While I accept that definition, I actually understand the question differently. My ability to accomplish a task depends upon my aptitude (not knowledge), disposition/temperament and character.

I think the most important skills seem to be universal among us technocrats:

- We tend to question *everything*. "Why" is by far my favorite word.
- Simple things fascinate us.
- We love to take on "impossible" challenges.
- We see problems from as many perspectives as possible.

I naturally assimilate—I take in information, ideas and concepts, and seek to fully understand them. I love to learn, but I live to understand.

I spend much of my time reviewing research on technology, invention and innovation. I also read biographies of the great thinkers and inventors. There are definite patterns. I believe there are skills that have a direct correlation with the way in which innovators think and operate. The five basic skills are:

1. Being curious with a desire to gain understanding
2. The ability to associate and assimilate information and concepts
3. A keen power of observation
4. A desire to experiment to refine understanding
5. Ability to communicate, coach or teach

These are all skills that will never become obsolete or irrelevant, but are vital for understanding how predictive and data analytics can be applied to answer specific challenges. These skills allowed me to find meaningful insights in the data analysis projects I undertook. From my first assignment in outcome-based education, to analyzing political data and market research, to a more recent advisory role in analyzing mortgage delinquency data, my ability to ask the right questions and communicate meaningful insights from the analysis continues to earn referrals.

Why did you become an actuary?

I became an actuary by accident. I planned to be a physicist specializing in traffic flow. After graduating from MIT with a bachelor's degree in math, I intended to take three years off before pursuing a graduate degree in physics. I applied for jobs as a statistician and programmer. One of the companies at which I applied was an insurance company. The hiring manager suggested that someone with my background could be an actuary and the programming positions would not be available for a few months. I took a basic test and was hired. However, because the actuaries knew of my programming interest, many assignments that involved working with our IT department or programming came my way. The company also had a tremendous actuarial rotation program.

By the time my wife completed law school and passed the bar, I loved actuarial work too much to do anything else. But most important, I found meaning in what I did. My mother passed away in the fall of 1991. I remember my father, after making final arrangements at the funeral home, commenting how he had always expected to go first, that losing my mother was very difficult, but at least he did not need to worry about the finances. I saw firsthand the tremendous value of life insurance. From that moment, being an actuary changed from being a job to being my career and profession.

Do you have any advice for younger actuaries?
I have been privileged to work with numerous actuarial interns and to speak to many college students. I always give the same advice.

- Practice great customer service.
- Tackle the exams when you are young and most likely have fewer family and job responsibilities.
- Learn the disciplines of programming. Structured languages, such as Pascal or C, or even Basic, are best. Gain a working knowledge of R.
- Learn to communicate complex issues in simple terms. Being a technician has limited career potential.

How are you using predictive analytics in your job?
My current role does not lend itself to employing predictive analytics. Most of my experience has been as a consultant or in an advisory role not related to insurance. In addition, there is a subtle difference between predictive analytics and data analytics. I try to help individuals determine whether "prediction" or "insight" is desired. Market research is primarily "insight" driven. The effectiveness of various marketing campaigns can be "predictive." I have worked on both types of challenges. The questions you answer are vastly different depending upon which of the two approaches you use.

My very first project analyzed data from four different public school systems. The objective was to recommend the best uses of limited dollars to reduce the number of students that ultimately enter juvenile courts or experience incidents with the police. We followed students' experiences over 10 years. Based on the data, the recommendation was to spend additional dollars targeting students who were in danger of failing a grade prior to fourth grade. Of all the measures and instruments we utilized, this by far was the greatest predictor. When testing this recommendation, there was an observable difference in outcomes when comparing the general student population against students participating in a particular program.

Property and casualty and health insurance have made the best inroads in gaining insight through predictive analytics. I think there is great potential for life, disability and annuity products. Understanding the two types of analytics will clarify the promise of analytics. For example, understanding which aspects of life insurance are predictive by nature will help individuals think of applications of predictive analytics. Underwriting is predictive. Although not as obvious, morbidity, policyholder behavior, sales results and persistency also can be predictive.

From my perspective, data analytics has more potential. For example, I spoke to a particular agent who was able to define what he called his "sweet spot" for sales. He gave a particular age, income range and reason for purchasing life insurance (namely, someone wanting to increase net worth). The questions raised in my mind were how many different categories of "sweet spots" do our most successful agents employ, and are we designing products to maximize sales and profit? Do we want this business? Do we have monitors in place to alert us to changes in policyholder behavior? Do we track the perceived needs of our policyholders or the marketing concept that led to the sale? How are we reporting utilization of various calculators and reports, or monitoring web traffic?

What is your dream job?
My dream job would be to be given a city and challenged to recommend and implement interventions to improve the health of the various communities and neighborhoods. I spend much of my time developing concepts and theories around the challenge of urban renewal. I spent more than nine years volunteering and serving on the board of a local ministry. On a small scale, I observed successful and failed programs and projects. I drew upon my own childhood experiences, research studies and discussions with various community leaders. I developed a theory that there are seven basic pillars to a healthy society:

1. Education
2. Family
3. Religion
4. Labor
5. Entrepreneurship
6. Government/civics
7. Community investment/homeownership

My dream job would be to lead a collaborative effort to demonstrate how to rebuild the foundations of one of our many failing urban centers. In the meantime, I am content to play my small part. ■

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SOCIETY OF ACTUARIES®

Show Your Support

The Society of Actuaries (SOA) best fulfills its mission when it is diverse and inclusive of all individuals. Openness to and acceptance of diverse perspectives, cultures and backgrounds helps to attract the best talent and ensures the overall inclusivity of the actuarial profession.

Diversity matters to the SOA. Here are a few examples of how the Society is building a strong, diverse and inclusive environment.

2018 SOA Annual Meeting & Exhibit Events

Women's Leadership Forum & Luncheon—Session 030IF

An interactive panel of female executives will discuss their various career paths and the decisions that led them to where they are today.

LGBTQ Actuaries and Allies Meeting and Reception—Session 141

The SOA Inclusion and Diversity Committee will host an event to network and socialize with LGBTQ members and allies in the actuarial profession. It is a great opportunity to show support for and learn more about a new resource group for LGBTQ and allied actuaries.

Where Bottom-line Meets Pipeline: Diversifying Your Team Portfolio—Session 064

What do you do when you know diversity improves the performance of your teams but your access to supply doesn't meet your demands? Actuaries and industry experts will discuss best practices to attract and retain qualified, diverse resources.

#MeToo: Lessons Learned—Session 136

2017 saw *#MeToo* become a social movement and part of a global dialogue. Learn how to promote a culture allowing women and men to thrive together in a mutually respectful environment; avoid the trap of excluding anyone from professional opportunities; and advocate, mentor and guide change to grow opportunities for everyone.

There's Even More at Annual!

So much to learn. So much to do. So many ways to bring inclusion and diversity to life. The Organization of Latino Actuaries is hosting a meet-and-greet event. Network with Latino actuaries from around the world.

Diversity Matters

Diversity improves performance and decision-making. Share your demographic information with the SOA to help us determine benchmarks and areas for improvement involving diversity and inclusion. Your information will be kept confidential. Visit *bit.ly/SOADemographics* to get started.

Diversity Scholarships

Several actuarial organizations collaborate to offer scholarship opportunities to underrepresented minorities. Visit *bit.ly/Actuarial-Scholarships* to learn more.

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Adapt. Evolve. Be the Master of Your Fate.

BY KEN GUTHRIE

From time to time, the Society of Actuaries (SOA) receives queries, mostly from candidates, about why we make such frequent changes to the education system. Although we understand some of the frustration, our response to why we make changes is simple: because we must.

Broadly, the role of professional education is to develop and deliver a credential that provides a demonstration of mastery of the core knowledge necessary for that profession. This is true for the SOA, but also for any other professional educator—this kind of credentialing is the underpinning of any profession.

The core knowledge changes in subtle—and not so subtle—ways over time, and as a result our curriculum must always remain current and relevant to the needs of the profession's main stakeholders: candidates, members, employers, regulators and the public. When regulations change or new techniques are introduced, the credentialing process must reflect those modifications to maintain its relevancy.

Most curriculum changes are incremental and are done in the annual curriculum reviews. Some are more substantial and may require specialized, standalone exams to assess mastery. As an example, the SOA recently added content to the curriculum to introduce and assess predictive analytics techniques. Prior to that, the last substantive change was the addition of a comprehensive set of content related to oral and written communication skills, and before that, financial economics. The tricky part is often deciding what content should be retired to accommodate the new material.

Staying Current and Relevant

Consider also the realms in which the SOA credential must remain current and relevant—from within the traditional practice areas of life, health, general insurance and pensions to areas such as finance, enterprise risk management and investments. Plus, with rapid growth in markets outside of North America, in dozens of countries around the world, the credential must have worldwide applicability.

Due to our deep U.S. and Canadian roots, we have U.S.- and Canada-specific curricula for all four traditional practice areas, but candidates who live or work outside of those jurisdictions have always had to either choose a non-nation-specific track (Finance/ERM or Quantitative Finance and Investment) to fellowship

or learn the intricacies of the regulatory environments for the traditional practice areas in either Canada or the United States in order to complete their FSA within their chosen track. If a candidate works in life insurance in Singapore, for example, he or she will receive educational materials and assessments that are current but are not necessarily fully relevant to his or her work context. As the SOA's membership has expanded globally, the need to develop and maintain relevancy in a wider array of work environments has created real challenges for the SOA.

To determine the best way of addressing these challenges for the long term, the SOA formed an Adapting Education to International Markets Task Force and asked it to conduct research and make recommendations to the SOA Board of Directors. The task force first investigated the steps the SOA had taken in the past to address the question of relevancy. They investigated the recent development of a Canada-specific health curriculum and the creation of bespoke taxation and regulation modules in the life track for Taiwan and Hong Kong as examples of adapting SOA education to international markets.

They commissioned research into the kinds of adaptations that other global professional educators have adopted and paid close attention to where educational institutions used other languages. The task force also conducted a survey of candidates, members and employers on their attitudes to adapting SOA education to different environments, and they conducted a series of interviews with stakeholders from China, Hong Kong, South Korea, Thailand, Colombia and Mexico.

Some of the findings from the studies, surveys and interviews surprised many on the task force. Most task force members had assumed the research would confirm the SOA should offer its exams in a range of languages. Instead, the vast majority of those interviewed in all of the countries listed stressed the importance of only offering exams in English to maintain the prestige and high market value of the SOA's credentials. This view was reinforced by market research where providers of the CFA and FRM credentials had made conscious decisions to maintain their world-class credentials in English.

Other findings supported the task force's early assumptions. For example, there was clear and consistent feedback from international stakeholders of the importance of adding material on the International Financial Reporting Standards (IFRS) and solvency standards. Interestingly, those interviewed and surveyed felt strongly that the U.S. content should not be removed to accommodate this new material, and they recommended the SOA present the different financial reporting and solvency standard systems in a manner that would enable candidates to compare and contrast different approaches.

Reaching a Consensus

Once the task force had synthesized all of this feedback and agreed on a recommendation, it interviewed 16 of the top 20 actuarial employers, representing insurance and consulting companies with global and domestic business from four different countries, to assess their level of agreement with the recommendations. The task force found overwhelming support for their recommended approach, including the addition of international content for all candidates.

A thoroughly researched and stakeholder-supported set of recommendations was presented to the SOA Board in March 2018. These recommendations included:

- Proposed changes to the SOA's Principles for Prequalification Education, which emphasized providing globally relevant education that allows for mobility in the global workplace and the ability to practice in specific jurisdictions, particularly in the United States and Canada.
- A commitment that the SOA will provide prequalification exams only in English, except where required by law and sufficient demand exists. (This commitment allows for delivery of certain types of local content in local languages in FSA track-specific e-Learning modules, but only as additional material to the core that all candidates receive.)
- A commitment to offer professional development in local languages, where possible, in conjunction with the local actuarial association.
- The addition of international content on topics like IFRS and solvency standards in the prequalification curriculum, particularly in the Fundamentals of Actuarial Practice (FAP) course and within FSA tracks (largely through the use of e-Learning modules as opposed to exams).

The Board approved the recommendations, and SOA staff and volunteers are already planning their implementation. The first milestone of these changes will be the launch of an overhauled FAP course in 2020, and changes to all the FSA tracks will quickly follow.

The evolution of the SOA's education continues, as it must. ■

ABOUT THE WRITER

KEN GUTHRIE is managing director of Education at the Society of Actuaries. He can be reached at ***kguthrie@soa.org***.

Research on Actuarial Models

Q&A with R. Dale Hall

Managing director of research at the Society of Actuaries (SOA), R. Dale Hall, provides research insights on technology and new practices.

Tell us about the latest flood insurance research.

Hall: The Casualty Actuarial Society (CAS), the Canadian Institute of Actuaries (CIA) and the SOA jointly developed a report examining how flood and other catastrophe model results have been incorporated into pricing and underwriting. Across the United States and Canada in recent years, hurricanes, storms and inland floods have caused some large catastrophic losses. The report focuses on a variety of examples in Canada, and the findings can also be broadly applied to other markets.

What are some of the key areas of the report?

Hall: This research explored a variety of areas involving catastrophe models, as it is a more complete representation of risk. We looked at the basics of catastrophe models, which are used to create a set of building exposures and potential events. We specifically focused on flood models, so this meant understanding the different types of events. Model validation is another important component—actuaries should ensure the model is generating appropriate output. We were also able to draw out problem areas and make adjustments with the modeling of flood risk. For example, there may be a lack of historical data, difficulty in capturing the tail risk and challenges with pricing new areas.

Earlier this year, you spoke at the "Bernard Harris Memorial Symposium: Risk in the 21st Century" on analytics used for accelerated underwriting. What were the key points discussed?

Hall: We discussed the basis for actuarial risk analysis and how predictive analytics is increasingly being used across various business lines within insurance. We also covered relative risk mortality assessments and mortality statistics. Stay tuned for further updates on research projects involving models and related topics. ■

RELATED LINKS

Flood and Other Catastrophe Model Results
bit.ly/Catastrophe-Model

Actuarial Risk Analysis
bit.ly/Act-Risk-Analysis

Strategic Research
bit.ly/SOA-Strategic-Research

RESEARCH READS

Risks and Process of Retirement Survey Findings
The SOA Committee on Post-retirement Needs and Risks released its biennial survey comparing the attitudes of retirees and pre-retirees in managing retirement risks. Access the findings from the different reports available.
bit.ly/SOA-Risks-Process

Spotlight on Asia Retirement
Draw insights from this Asia-wide research project on retirement planning. The reports include an overview of the Asia market and specific findings for Hong Kong and South Korea.
bit.ly/Asia-Retire

Understanding Canadian Pension Plan Enhancements
Read about the impact of Canadian Pension Plan (CPP) enhancements on Canadian workers and retirees.
bit.ly/CPP-Enhance

Visit *SOA.org/Research* for the latest updates on new research opportunities, data requests, experience studies and completed research projects.

ABOUT THE WRITER

R. DALE HALL, FSA, CERA, CFA, MAAA, is managing director of Research at the Society of Actuaries. He can be reached at ***dhall@soa.org***.

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Dec. 12–14, Chicago
This interactive, hands-on seminar will impart practical working knowledge of statistical and machine learning techniques that are relevant in actuarial work. It is limited to 35 registrants, so sign up today at ***bit.ly/SOA-ABA-Seminar***.

Case Study

Optimizing Business Results

Predictive analytics enables actuaries to dig deeper into discovering why things happen, and to use those insights to predict future outcomes. Steve Fredlund, FSA, MAAA, talks about how predictive analytics will soon embed itself in many major industries to optimize business results.
bit.ly/Fredlund-Case-Study

Article

Working with Regulators

Dorothy Andrews, ASA, MAAA, shares her perspective on predictive models and regulations as part of a panel from the Casualty Actuarial Society (CAS). She discusses model variables and transparency in working with regulators in the *Actuarial Review*.
bit.ly/PA-Challenge

Report

Financing Long-term Care

Read the SOA's report on ways to finance long-term care (LTC). Tapping into insights from the Long-term Care Think Tank, the report focuses on two specific product concepts:

- **LifeStage Protection.** An insurance policy that starts as term life insurance during prime income-earning years and then switches to LTC insurance during later years.
- **Retirement Plus.** A flexible retirement plan like a 401(k) or IRA, but with LTC insurance built into it.

bit.ly/LTC-MiddleMarket

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Timeless

THE PAST, PRESENT AND FUTURE OF THE SOA

1949

What is an actuary?

The first president of the Society of Actuaries (SOA), Edmund M. McConney, FSA, put it this way in 1949:

The actuary in reality is a sound, practical—rather a too theoretical—mathematician applying simple principles of probabilities to human affairs in the unknown future. He applies what facts he has to such unknowns as future mortality and morbidity rates, constantly changing for better and for worse in a scientific world of rapid development in medical research … and of atomic bombs; future interest earnings under government controls and what is left of free enterprise; future expenses under ever-changing money values; and future human emotions in regard to security, savings and family needs in a civilization that is meeting, with some difficulty, the challenges so well described by [Arnold] Toynbee.

It is the unfamiliarity with the rather simple principles involved in these calculations, rather than inherent difficulties in the mathematics, that has led even intellectually competent people to invest the process with some magical quality.

Meanwhile, the actuary "enjoys" a high reputation as a mysterious authority on the complexities of mathematics, living in an intellectual atmosphere beyond ordinary reach. He gains, therefore, some glory reflected from those "Einstein-ian" realms—but, as he surveys his roughly sculptured approximate formulae, he may wonder if they are not rather "Epstein-ian," and as he reiterates over and over again his theme of mortality, morbidity, interest, expenses and emotions, he may become somewhat "Gertrude Stein-ian."[1]

The SOA is rich in history. "TIMELESS" is intended to reveal some of that history and offer the past as a lens for the present. McConney's description of an actuary is nearly 70 years old—the use of male pronouns was a sign of the times in 1949. Today, the SOA best fulfills its mission when it is diverse and inclusive of all individuals (and pronouns). Read more about SOA diversity and inclusion efforts at *SOA.org/diversity-inclusion/default*.

About Edmund M. McConney, FSA

"Mac" McConney was born on Nov. 11, 1891, on the island of St. Kitts in the West Indies, where his father was a minister in the Anglican church. McConney's father tutored him until he went to Harrison College in Barbados, where he graduated with honors.

In 1911, McConney emigrated to Toronto, Canada, and went to work for the Manufacturers Life Insurance Company. His insurance career was interrupted in 1914 when he enlisted in the Second Canadian Division and served in France for four years. Upon returning to civilian life, he joined the Bankers Life Company in Des Moines, Iowa. He began his career there as assistant actuary in 1920, rising to president in 1946 until his retirement in 1956. He continued to serve as director until 1967.

Active in Des Moines civic affairs, McConney was chairman of the board of trustees of Drake University, president of the Edmundson Art Foundation and president of the Greater Des Moines Chamber of Commerce. He received an honorary Doctor of Laws degree from Drake University in 1952.

Oh, how times have changed! Tweet your definition of today's actuary to *@SOActuaries*, or email your definition to *theactuary@soa.org*. We'll share the different viewpoints on our social media channels.

Reference

[1] Greb, Richard. 1999. *The First 50 Years: Society of Actuaries 1949–1999*, 9–10. Schaumburg, IL: Society of Actuaries.

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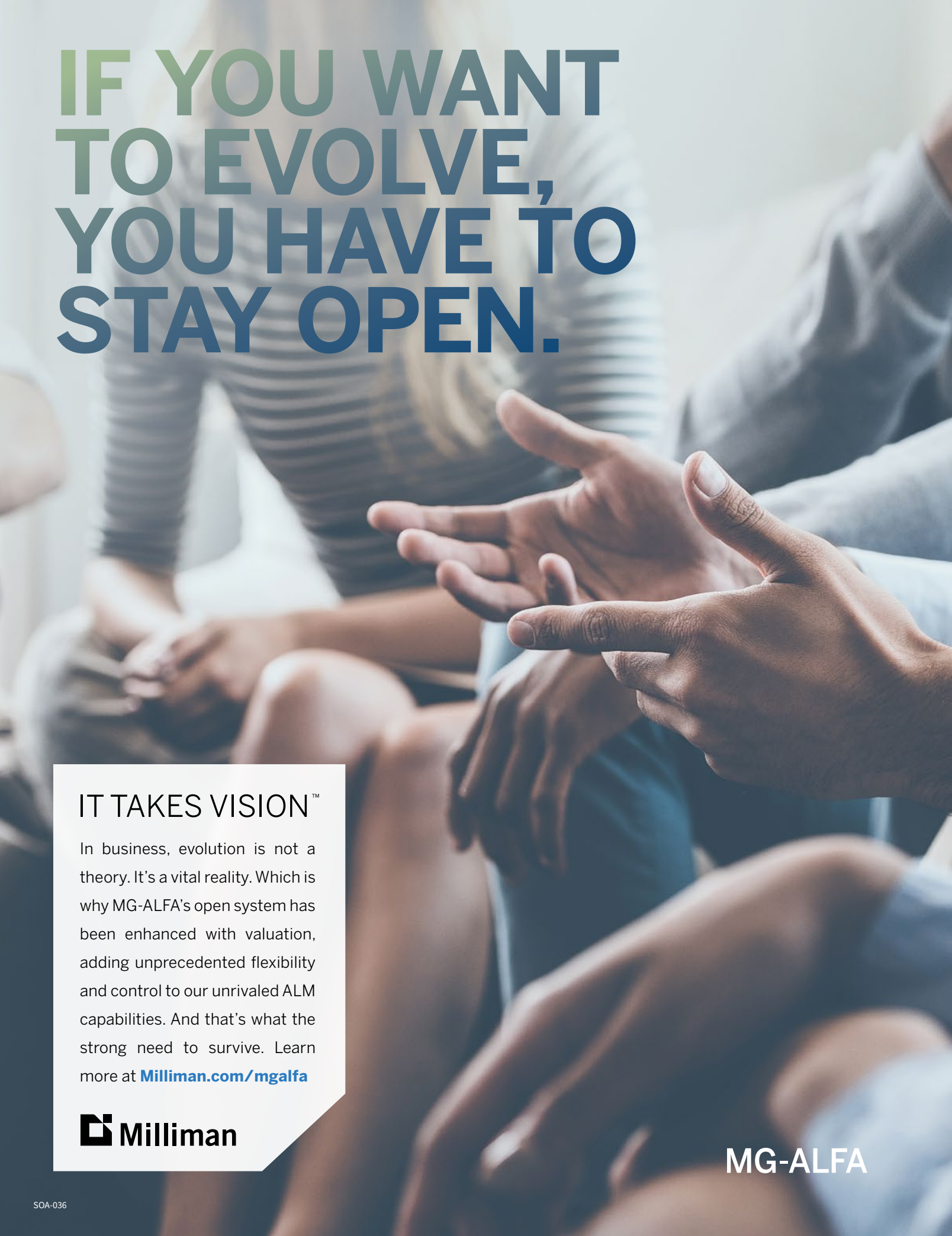
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