The Revolutionary Actuary

By Ashwag Alzahrani

In July of this year, Elon Musk, the chief executive officer of Tesla and Space-X, called for actuaries who are not satisfied by the slow changes in the insurance industry to join his insurance company.[1] The controversial CEO who is working to revolutionize transportation on Earth through electric cars and in space via rocket production, also promised to revolutionize the insurance industry by building Tesla insurance.[2]

Similarly, in 2016 a transformation started in Saudi Arabia—not only in the insurance industry but across all sectors: health, education, finance, manufacturing. ... This revolution started when the Saudi government released Vision 2030, for which the chairman of the Council of Economic and Development Affairs stated:

> Vision 2030 is a bold yet achievable blueprint for an ambitious nation. It expresses our long-term goals and expectations and it is built upon our country's unique strengths and capabilities. It guides our aspirations towards a new phase of development—to create a vibrant society in which all citizens can fulfill their dreams, hopes and ambitions to succeed in a thriving economy.[3]

I believe that with this vision in place, the actuarial profession can grow significantly across all industries, not only traditionally but also progressively.

For instance, the health sector is undergoing a massive transformation that aimed to deliver substantial improvements in health care quality, efficiency and safety. This includes the restructuring of health care delivery in the public sector into accountable care organizations (ACOs), which will be funded through a capitated budget by an independent entity, and the Ministry of Health (MoH) will have a regulator role.

Currently, the health system is split into a two-tier system: the public system, which is operated, supervised and funded by the MoH and other governmental services; and the private system. The MoH provides 75 percent of funding for the total public health care, using a payment mechanism called "global budget." The private sector is supervised by the MoH but is self-funded.

Saudi residents can access public health care services freely with no health insurance required, but if a resident visits a private health care facility, then they will either need private health insurance or pay out of pocket.

The urgent need for qualified health actuaries can be found across the sector. For instance, under the payer entity, actuaries can contribute to the following areas:

- design and build payment models, such as a risk-adjusted capitation model,

- design and implement efficiency metrics,
- design and build shared saving/losses models,
- design and cost the health benefits packages,
- assist in the coding and costing operation and diagnoses,
- assist in the enterprise risk management function,
- assist in the population health management through underwriting and
- develop other areas such as data analysis, data science, telehealth and so on.

In addition, actuaries participated this year in building one of the COVID-19 models that were presented to the top official leaders in the kingdom.

The need for revolutionary health actuaries will be significant in the coming years; this is one of the reasons I have decided to choose the health path of the Society of Actuaries. I am sure this path will equip me with the analytical and strategic skills that are in need in the kingdom. ■

Ashwag Alzahrani, ASA, ACIA, is an actuarial specialist at the Ministry of Health in Saudi Arabia. She can be reached at *alzahranias@moh.gov.sa.*

ENDNOTES

1 Sonnemaker, Tyler, and Graham Rapier. Elon Musk Says Tesla Is Creating a "Major Insurance Company" After Its Botched Rollout in California Last Year. *Business Insider*, July 23, 2020, *https://www.businessinsider.in/tech/news/elon-musk-says-tesla-is-creating-a-major-insurance-company-after-its-botched-rollout-in-california-last-year/articleshow/77132492.cms* (accessed September 10, 2020).

2 Simpson, Andrew. 2020. Tesla Invites Actuaries to Help It Create a "Revolutionary" Insurance Company. *Insurance Journal News*, July 24, 2020, *https://www.insurancejournal.com/news/national/2020/07/24/576871.htm* (accessed September 10, 2020).

3 Vision 2030. *https://vision2030.gov.sa/en.*

The Relevance of Actuaries in Insurance: A Colombian Perspective

From the original in Spanish by Oscar E. Velandia, translated by Carlos Arocha

Editor's note: The original article was published in Revista Fasecolda, *no. 178 (2020):68–72. Fasecolda is the Colombian Federation of Insurance Companies.*

The importance of actuaries in the insurance sector is a topic seldom discussed; however, given an overhauling regulation environment, standards of practice and trends, it is necessary to strengthen the role of the actuaries in insurance companies.

If we already have the role of the "appointed actuary"[1] and the supervisory framework of the actuarial function,[2] then what is missing? First, we need to clarify that the actuarial function[3] is not a person[4] per se, and it is neither the risk management function nor exclusively a supervision tool as enunciated in Article 48 of the Solvency II Directive. Finally, the actuarial function is not optional.

It should be evident that as the actuarial function does not refer to an individual, it is not the same as the appointed actuary, who by having to comply with strict requirements, he or she may find limitations as to the information to be provided for strategic purposes.[5] Insurance companies seek that the appointed actuary can provide independent and neutral advice, and that he or she becomes the spokesperson between insurer and regulator.

The actuarial function applies only to insurance companies, and it provides an independent assessment of the risk management embedded in the insurance entity. The actuarial function has the responsibility of assessing, designing, reviewing, analyzing, informing, monitoring and approving activities concerning pricing, reserve adequacy, data quality, reinsurance arrangements, capital adequacy, underwriting policies, risk models, to name a few.

The aspects guaranteed by the actuarial function are prescribed by regulation and are not far away from those included in Article 48 of the Solvency II Directive. On the other hand, in the directive there is an emphasis regarding who may be able to assume the actuarial function: "The actuarial function shall be carried out by persons who have knowledge of actuarial and financial mathematics, commensurate with the nature, scale and complexity of the risks inherent in the business of the insurance or reinsurance undertaking, and who are able to demonstrate their relevant experience with applicable professional and other standards."[6]

On the preceding issue, the Spanish guide to the actuarial function indicates that "for the particular case of the persons performing the actuarial function, the Spanish regulation[7] goes beyond the European regulation, by recognizing[8] the actuary as the most qualified and ideal candidate to perform the actuarial function."

To define the scope of the actuarial function, it is necessary to adopt measures that are consistent with the proportionality principle, to reflect the nature, volume and complexity of the business activity.[9] Analogously, it should be borne in mind that the outsourcing of critical or important operational functions or activities shall not be undertaken in such a way as to lead to (1) materially impairing the quality of the system of governance; (2) unduly increasing the operational risk; (3) impairing the ability of the supervisory authorities to monitor the compliance of the company with its obligations; (4) undermining continuous and satisfactory service to policyholders.

In addition, insurance and reinsurance companies shall, in a timely manner, notify the supervisory authorities prior to the outsourcing of critical functions as well as of any subsequent material developments with respect to those functions or activities.

The above considerations are well understood by companies with a European parent company, but what happens to local companies in Colombia? A few have been preparing, but some others have not understood the scope of the regulatory and technological challenge, neither the governance nor the human talent aspects. This is not the future; this is now.

Other standards for which actuaries have much to offer are the International Financial Reporting Standards (IFRS), especially IFRS 17, "Insurance Contracts." Although the standards deal with accounting, the challenges posed by IFRS 17 include the use of an economic balance sheet, the calculation of probability-weighted and risk-adjusted cash flows, and the calculation of a contractual service margin. These concepts that were typically foreign to the accounting profession will now be routinely calculated.

The International Accounting Standards Board (IASB) has reconsidered the most burdensome aspects of IFRS, namely the establishment of robust reporting, processes, IT systems, governance and data management required to guarantee the high quality of financial reporting.[10] It is expected that an actuary knowledgeable in IFRS 17 will be responsible in preparing internal reports for company management, including at the least the applied methodology, assumptions and data used, judgmental assessments, results and sensitivity analyses.[11]

We can also discuss data analytics. Despite the fact that it is not a standard, it is a well-known market trend by which companies attempt to derive value from large amounts of data. Some companies already have analytics and actuarial teams in place, where algorithms are used to gain insight about results and develop forecasts. This has really been an actuarial activity for centuries. The recent popularity of machine learning simplifies tasks that otherwise were not routinely actuarial, but that create business value for insurers—for example, fraud detection models, claims assessment, marketing, budgeting and data governance, among others. Additionally, alternative models to the classical claim triangle methodologies have been introduced.

There is a wide variety of tasks that can be carried out by insurance companies, and many of them are in the actuarial realm. Therefore, it is important to strengthen actuarial teams so that soon, these professionals may transfer knowledge to other departments within the company.

We are at a critical time in the transformation of the insurance industry. It is now that companies should assess their future needs, comply with law and regulation, transform the organization to a risk-based entity and heed the global trends. In any of these activities, the actuarial perspective is fundamental. The time is ripe to strengthen actuarial teams in order to face the challenges posed by local and global insurance markets. ■

Oscar E. Velandia, CSPA, MACA, is actuarial director at Fasecolda, the Colombian Federation of Insurance Companies, in Bogotá, Colombia. He can be reached at *ovelandia@fasecolda.com.*

Carlos Arocha, FSA, is managing partner of Arocha & Associates, an actuarial consulting firm based in Zurich, Switzerland. He can be reached at *ca@ArochaAndAssociates.ch.*

ENDNOTES

1 The Decree 2255 (2010) prescribes that insurance companies shall have an actuary, and Circular 022 (2015) established the functions of the appointed actuary.

2 See *https://www.superfinanciera.gov.co/inicio/nuestra-entidad/marco-integral-de-supervision-10085454.*

3 According to the Solvency II Directive, "function" as defined in a governance framework is the ability to carry out operational tasks.

4 See *https://www.actuaries.org.uk/system/files/documents/pdf/k-morgan.pdf.*

5 *https://www.apra.gov.au/sites/default/files/160621-role-of-the-appointed-actuary-discussion-paper1_0.pdf.*

6 Article 48 of Directive 2009/138/EC of the European Parliament and of the Council, of November 25, 2009, on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II).

7 Guide to self-regulation for the practical application of the actuarial function under the Solvency II framework.

8 According to the International Actuarial Association (IAA), the actuary is defined as a member of a member association of the IAA. See *https://www.actuaries.org/IAA/Documents/CTTEES_ASC/ISAPs_Glossary_Terms/Actuary.html.*

9 Article 48 of Directive 2009/138/EC of the European Parliament and of the Council, of November 25, 2009, on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II).

10 See "IFRS 17 is another challenge to insurers, auditors and actuaries" by Kristoffer Bork, *The European Actuary* no. 19.

11 *http://theeuropeanactuary.org/downloads/TEA%2019-4.pdf.*

Heroes of Noble Purpose

By Rich Junker

Editor's note: This article originally appeared, with minor differences, in the November 2018 issue of Actuary of the Future.

In "Gearing up for Designing Your Future," published in the May 2017 issue of *Actuary of the Future*, the author cited four heroes as his personal inspiration. This article is the successor, showing the glory of these heroes and how they can inspire us actuaries today, as we strive to live our best lives.

Identifying your own Noble Purpose as an actuary and in your life makes creating a five-year plan for personal growth meaningful and motivating.

What will you gain from reading biographies of famous people and the classics? To aspire, to approach eloquence, to emulate the poetry of how they put their ideas across to mobilize their publics, to elevate our own characters by their examples, to be fully equipped to make moral and ethical judgments, to master the primary tool, verbal communication.

You may ask "Why do we need heroes?" The most compelling reasons include

- heroes reveal qualities we are missing,
- heroes save us when we are in trouble,
- heroes pick us up when we are down,
- heroes light a dark world, giving us hope,
- heroes give us great stories of who we are,
- heroes give us wisdom and
- heroes deliver justice.[1]

By now, you have acquired your own heroes, be they scientists or artists, maybe even athletes or comic book heroes. Learning of their lives, we learn how they found the passion that drove them to extraordinary accomplishment, to overcoming intimidating hurdles. They found their personal Noble Purpose, the guidepost to where they aimed to be in five years, where they aimed to be in 30 years…

I invite you to consider four of my heroes, inspiring for the traits they possess that actuaries treasure: their intellect, vision, artistry, interpersonal versatility and courage.

JOHANNES KEPLER

I encountered this man in all his glory when I visited the Galileo Museum in Florence. Surfeited on art museums, I switched to science museums. The Max Caspar biography of Kepler presented itself to me in the bookstore. I spent over half my time at the museum reading the book—and bought it on arriving home.

Kepler was a trained seminarian. In his early 20s, he realized that his superior mathematics skills directed him to serve his god otherwise than as a priest. **His Noble Purpose was to worship his god for the wondrous creation, and to point humanity to peace through contemplating the beauty of the firmament as revealed through mathematics.** His fondest dream was that his revelations would introduce all to the geometric perfection of the world God gave humanity, that they might focus on its beauty and order. Thus would he divert the people and nations of the world from fighting and feuding:

> Astronomy, his chief sphere, is for him the delight of the human race. Heavenly speculations, he is convinced, quench the thirst of minds and impress on custom a certain similarity to the divine works. Secretly they bend the wills of mankind, tame his disorderly cupidity so that, because he is accustomed to the lovely order in geometrical and astronomical things, thereafter he also "gains a love for justice, moderation, decency and graciousness."[2]

He allied with Tycho Brahe, the Danish telescope maker, the first human to see the marvels of the heavens past the inconstant moon. Kepler was devoted to Copernicus, who astounded the world of the 1400s with the conclusion that the planets rotate around the sun, not the Earth. Applying mathematics to all of Tycho Brahe's disjointed planetary measurements in space, Kepler concluded that the planets orbited the sun not in perfect circles, but in ellipses, with the sun as a focal point for every planet. He teased out the mathematics of gravitational attractions between two planetary bodies of differing masses.

He fretted a full decade against publishing results, measuring and measuring again. He knew he faced the sure wrath of the Catholic Church, which would be affronted to think that God's perfect creation could possibly admit anything but perfect, circular orbits. Given Kepler's large family, he dreaded the same excommunication that had greeted his contemporary Galileo, with his scientific heresies and penchant for self-promotion of his genius.

Kepler wrote three timeless treatises on astronomy over 30-plus years, struggling against penury, undependable benefactors, illnesses, isolation, scarcity of printing presses for disseminating his books, religious persecution and wars, all while raising his family.

His biographer Max Caspar died in 1956, having devoted his entire life to curating all of Kepler's works and artifacts and contacts, mastering every element of his scientific writings. His book devotes a full chapter in the appendix to the character of Johannes Kepler. Kepler was a person of great charisma, a consummate networker in an intensely disconnected world. How blessed we are today, with our extraordinary velocity of knowledge sharing!

ALEXANDER VON HUMBOLDT

My son Brian attended Humboldt University in Berlin, Germany, or I would never have learned of Alexander von Humboldt, German aristocrat and naturalist extraordinaire. **His Noble Purpose was to understand in all dimensions the integrated organism that is planet Earth, from plants to vulcanism to the social institutions of humans.** Not nearly so renowned today, he was for decades the most famous scientist in the world. In 1869, just 10 years after his death, the centenary of his birth was celebrated worldwide, including every large city in the U.S.

More places in the world are named for him than any other person. Humboldt was Charles Darwin's inspiration. Humboldt traveled in his early 20s over a five-year period, up the Orinoco River from Venezuela, proving the existence of connection to the Amazon in deep jungle. He invented the concept of thermoclines. He proposed the notion of Pangea, that all continents were once connected, based on similarities of mountains he climbed in the Andes, the Alps and the Far East. Flora at increasing elevations bore remarkably similar patterns worldwide. His wanderlust and physical vitality even into old age were remarkable.

For actuaries, I feel his foremost contribution is his masterful use of language. His best-selling nature travel books, also the marathon lectures all over Europe without need of notes, inspired countless young scientists to dedicate their lives to growing mankind's knowledge of nature. He invented the word *scientist*. Darwin's *The Origin of Species* is treasured for its clear, beautiful and poetic writing style. Darwin modeled his writing on his hero Humboldt's books. Humboldt lived much of his life in Paris, the world's center of scientific pursuits. His constant goal was winning sponsors for world explorations, such as India and the Himalayas. In his writings on South America and throughout his life, he decried the institution of slavery. Simon Bolivar was a contemporary in Humboldt's circle of intellectuals in Paris, and he drew inspiration from Humboldt's writings and lectures for liberating all the countries of South America from the oppressive rule of Spain.

Humboldt advocated not just empirical study for understanding nature, but adding imagination in interpreting why phenomena occur. He was the lifelong friend of his countrymen Friedrich Schiller and Johannes Goethe. All shared a love of literature, their native tongue and science. They were polymaths.

ADA LOVELACE

I chanced on the existence of Ada Lovelace soon after watching the movie about Facebook, "The Social Network." Walter Isaacson wrote that book, which I inhaled immediately. Given also his past duties as editor in chief at *Time* magazine and technology editor for the *Wall Street Journal*, I pounced on his next book, published in 2014, *The Innovators*, the history of the invention of the computer and the internet.

Ada Lovelace's story is engagingly told in *The Innovators*, yet another triumph of Isaacson, author also of biographies of Steve Jobs, Benjamin Franklin, Albert Einstein and more recently, Leonardo DaVinci. Ada is his own preeminent hero among the legends of computing history—he opened with her in the first chapter and closed with her in the final chapter.

Ada Lovelace was the daughter of the British poet Lord Byron. He was an impetuous man who ran off to fight the Turks for the Greeks in 1821, and he died when Ada was only eight years old. Ada acquired ample other reasons in her tender years to be inclined to melancholy. Accordingly, with her mother's strong concurrence (none of that Byronic poetical nonsense for her daughter!), she concluded while a teen to take up a difficult subject to keep her personal demons at bay. She chose mathematics. Her mother remarried well, to Lord Lovelace. Ada's precocious talent and fortunate connections led her to Charles Babbage, known as the "father of computers." She was his assistant. Unfortunately, despite heavy investment support from

the British government, Babbage's analytical engine never performed to exalted expectations. Yet Ada's association with him made her immortal.

Ada found her Noble Purpose when she was asked to supplement a manual on the working of Babbage's analytical engine. Her *Notes*, an elaborate 19-page addendum, gained her immortality. The supplement contained what is regarded as the first computer program, an "algorithm to be carried out by a machine." She defined the subroutine concept and the if-then statement, which were first implemented over 100 years later with the invention of the first computing machines.

Like Humboldt, she likewise had a mind-set of "poetical science," which she directed at considering how society could relate to the technology of computing by collaborating. She had in mind much more than processing numbers. She was the visionary who inspired our current world that has digitalized every aspect of modern living from pictures to words.

WILLIAM SHAKESPEARE

The Bard is recognized as the most profound master of human psychology up to the era of Freud. His characters are unique in growing in character throughout every play. He is a master storyteller, the skill ever more recognized as essential to powerful business communications. His works are recognized as the foremost achievement in the English language. It would seem a tautology that members of a learned profession such as ours would be conversant with the 38 plays of Shakespeare, as were master communicators and leaders Lincoln and Churchill. And yet, not so.

MBA programs frequently apply Shakespeare's plays to teach essential interpersonal effectiveness business skills, the same skills our Competency Framework seeks to address.

Acknowledged, making Shakespeare's treasures accessible is not immediately rewarding. The intricate and ancient vocabulary is daunting. That said, it's not nearly so daunting as taking on learning a foreign language. Or numerical analysis. As with learning any skill, momentum grows. Attacking a play from many angles is the solution:

- Read the play.
- Speak the words aloud—Shakespeare never meant his plays to be books!
- Listen to a recording.
- Attend a live performance.
- Read a compact review of the play:
  - » Great Courses lectures by university professors, or
  - » Harold Bloom's and Isaac Asimov's books.
- Attend a workshop for professional development that uses Shakespeare.

Now you have considered this actuary's slant on what one might learn from studying the lives of their personal heroes. Ideally my words have sparked you to contemplate your own heroes as well, to identify their unique virtues, the ones that matter to you.

Inspired with your own Noble Purpose, you are ready to turn next to the Personal Planning Workbook, addressed in "The Competency Framework: Design Your Future, Part 3."[3]

The essence of professionalism is expressed in Precept 1 of the Code of Conduct:

> An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession.

The Competency Framework is a powerful tool for helping all actuaries achieve their core duty as professionals—to act with integrity and competence.

The editors and I welcome your feedback. The goal of this series has been to address your questions and needs and to help all actuaries design the future they will find meaningful and rewarding. ■

Rich Junker, FSA, MAAA, CLU, is an actuarial consultant at Greenwood Consultants in Tampa Bay, Florida, and can be contacted at *richardjunker41@gmail.com.*

SUGGESTED READING

Asimov, Isaac. 1970. *Isaac Asimov's Guide to Shakespeare*. New York: Doubleday.

Bloom, Harold. 1998. *Shakespeare: The Invention of the Human.* New York: Riverhead Books.

Caspar, Max. 1993. *Kepler*. London: Dover Books.

Connor, James A. 2004. *Kepler's Witch: An Astronomer's Discovery of Cosmic Order Amid Religious War, Political Intrigue, and the Heresy Trial of His Mother*. New York: Harper Collins.

Humboldt, Alexander. 2004. *Personal Narrative of a Journey to the Equinoctial Regions of the New Continent.* Toronto: Penguin Random House Canada.

Isaacson, Walter. 2014. Chapter 1: Ada, Countess of Lovelace, pages 7–35. In *The Innovators*. New York: Simon and Schuster.

Kinney, Clare. 2007. *Shakespeare's Tragedies*. The Great Courses *https://www.thegreatcourses.com/courses/shakespeare-s-tragedies.html*.

Saccio, Peter. 1999. *Shakespeare: Comedies, Histories, and Tragedies*. The Great Courses *https://www.thegreatcourses.com/courses/shakespeare-comedies-histories-and-tragedies.html*.

Sparknotes. 2003. *No Fear Shakespeare*. New York: Barnes & Noble. This resource puts Shakespeare's language side by side with a translation into modern English.

Wulf, Andrea. 2015. *The Invention of Nature: Alexander von Humboldt's New World*. New York: Vintage Books.

ENDNOTES

1 Allison, Scott T., and George R. Goethals. 10 Reasons Why We Need Heroes. *Heroes: What They Do and Why We Need Them.* May 17, 2013, *https://blog.richmond.edu/heroes/2013/05/17/10-reasons-why-we-need-heroes/* (accessed September 11, 2020).

2 Caspar, Max. 1993. *Kepler*. London: Dover Books.

3 Junker, Richard, and Curtis Robbins. 2017. The Competency Framework: Design Your Future (Part 2). *Actuary of the Future*, no. 41:16–18. *https://www.soa.org/globalassets/assets/library/newsletters/actuary-of-the-future/2017/may/aof-2017-iss40.pdf* (accessed September 11, 2020).