It's All About the People: Change and Human Capital in the Insurance Industry

March 2020

Major changes are affecting the insurance and reinsurance industries, resulting from the confluence of new technologies, more data than has ever before been available, increasing complexity and interconnectedness of risk, changing demographics, and the ongoing globalization of business. While many programs and discussions have focused on how these changes will affect insurance products and the industry as a whole, their implications for the industry's human capital requirements – the people who operate our businesses – have been less examined.

I'm here to talk about those issues from the perspective of an organization that develops professional human capital for a key segment of the industry's work. I'll cover how the changes we're seeing are likely to be felt in the nature of work, employee education, and professional development in the insurance industry. Finally, I'll share some thoughts on what insurers and organizations like ours must do to develop the talent needed in the future.

The Society of Actuaries spends a lot of time trying to identify the skills needed by those who use actuarial talent, but the trends we're seeing apply broadly to the insurance industry's workforce and many other industries, too.

I'll focus on three key issues: (1) the rise of data science, artificial intelligence, and machine learning and their impact on professional work; (2) the changing nature of risk and its implications for professional work; and (3) the impact of these changes

Copyright © 2020 by the Society of Actuaries. All rights reserved.

on the way professionals in the industry will be educated and credentialed in the future.

Data Science, AI and Machine Learning

First, a brief overview of data science, AI, and machine learning. According to Wikipedia, data science is:

> ". . . A multi-disciplinary field using scientific methods, processes, algorithms, and systems to extract knowledge and insights from structured and unstructured data . . . unifying statistics, data analysis, machine learning, and related methods."

Put another way, data science is a discipline that teaches people to structure data and pull information from very large data sets using sophisticated analytical techniques. At this level, this is very similar to the work members of the actuarial profession and many of you have always done to price financial risk. The primary difference between what we've always done and what's new appears to lie in the size of the data sets involved, the availability of substantial new computing power, and the development of powerful new statistical techniques.

So what about Artificial Intelligence? AI is the ability of a machine to perform cognitive functions we commonly associate with the human mind. Functions such as perceiving, reasoning, and problem solving are all being done today by non-

Copyright © 2020 by the Society of Actuaries. All rights reserved.

human agents or tools such as robots, computer vision, natural language processing, or others. AI is probably best thought of as augmented intelligence, giving it superior ability in some circumstances to make predictions, based on superior access to data and superior ability to see patterns in data.

If you attended the SOA Annual Meeting in November, you had the pleasure of hearing Ajay Agarwal, an economist at the University of Toronto and author of this book, Prediction Machines: The Simple Economics of Artificial Intelligence.

Ajay pointed out that perhaps *the* most important feature of artificial intelligence is that it significantly cuts the cost of prediction. Economic theory tells us that when the price of a "good" falls, more of it will be consumed. Because AI is driving down the cost of prediction by a lot, many more predictions will be made and consumed. Whole industries will grow up to convert a lot of problems we haven't previously seen as "prediction problems" into just that.

Professionals in the insurance industry (or any other industry) who base their value on making predictions about the future face a problem. They will either adapt and convert the prediction machines to their advantage or (if they fight the machines) they will lose.

Copyright © 2020 by the Society of Actuaries. All rights reserved.

We're seeing this already in a number of professions. In their seminal work, The Future of the Professions, Richard and Daniel Susskind at Oxford University have documented these patterns in many professions, including health care, education, divinity, law, journalism, management consulting, tax and audit services, and architecture. The same pattern exists in virtually every profession today.

One other effect, however, also arises from classical economic theory. In any situation where the price of a good drops significantly, competitors to that good are harmed, but *complementary goods and activities* are made more valuable. Those professionals who complement the work of prediction machines, who can apply the *judgment* necessary to use those predictions, will succeed dramatically. If you're the person who can find a sensible path through a jungle of equally plausible predictions, you'll be very valuable.

Judgment in these situations can be defined in two ways. First, what to do when you have very strong predictions – lots of data, strong algorithms – and the problem is how to choose among a variety of ways to respond. This might be the case, for example, with a firm and unambiguous diagnosis of cancer. The question becomes not whether the person has cancer, but how best to fight it. A second realm of judgment is what to do when data are thin, ambiguous, or give conflicting signals. Even in a world of big data, there are many activities that don't create enough data, often enough, to allow for strong, AI-driven predictions. In these cases, the cost of prediction really hasn't come down much and the role of judgment is to discern a good prediction from weak signals. That work is very familiar to most professionals

Copyright © 2020 by the Society of Actuaries. All rights reserved.

in the insurance industry, and while it's clearly declining, it will continue to exist at some level in many areas and for many roles.

Finally, a few comments on Machine Learning. Machine learning is the process by which computers learn, using a feedback cycle of input – prediction – action – outcome – and reassessment. This process is made possible by vast amounts of data, rapidly refreshed with new outcomes. Machines learn by using data to make predictions, observe the outcome, and revise their predictions.

Feed a computer enough pictures of cats and skunks, and the computer will eventually be able to tell the difference. A human child would get to the same recognition faster, but once there, the computer will have a lot more power (not to mention a lack of boredom with the exercise) to spot and display millions more cat videos than any human could stand!

With enough repeating data to learn from, the machine will be as good as, and often better than, a human at many prediction tasks. It just has more data to build pattern recognition. As Richard Susskind noted in a talk to the SOA Board, a typical ophthalmologist might see cancer of the eye a hundred times in a career; a computer can observe an unlimited number of examples and ultimately do a better job of recognizing the patterns and giving a correct diagnosis.

Copyright © 2020 by the Society of Actuaries. All rights reserved.

The Growing Inter-Connectedness of Risk

The SOA Board has been looking at many of these issues with the help of the McKinsey consulting firm and one of the areas we've looked at is the changing nature of risk itself. A number of factors are driving this today, including more people in the world; more concentrated assets given the rise of megacities and urban centers; and new types of risks including changes in climate, population demographics, patterns of social interaction, expectations for institutions and governance, cyber risk, political risk including reemerging nationalism, and much more.

These risks are connected and increasingly so. As McKinsey has noted to us, "Interdependency will probably be the defining element of risk in the 21st century, but much of the world (including the professional world) still approaches risk in silos leading to surprises again and again when significant events begin to unfold around us."

A world where new risks are constantly appearing and all risks are more interconnected is a world in which the judgment and discernment of risk professionals are going to be much more important, even as we use new tools and new analytic techniques to better understand the nature of those risks.

Copyright © 2020 by the Society of Actuaries. All rights reserved.

What Does This Have to Do with Human Capital?

So what does this have to do with human capital? The first thing it means is that the nature of the work people will do in our enterprises will change. Some skills will be more in demand and others will be in less demand. For organizations like mine that train and credential people for jobs in the insurance industry, understanding how these changes are likely to occur is a major issue. For everyone who hires or depends on specialized talent, it's a major issue too.

As part of our efforts to understand these changes, we have looked at work reported recently by the McKinsey Global Institute. Here's some of what they found:

- We can expect to see a big decline in the demand for physical labor and manual skills, since many activities relying on these skills are being rapidly automated.
- The value of basic cognitive skills will also decline as machines take over data input and process management tasks.
- The demand for workers with creativity and complex information processing skills will grow significantly. AI is creating huge amounts of new information and new complexity and we'll need people who know what to do with it.
- The demand for social, emotional, and adaptive skills will grow strongly across all disciplines, including those that are highly technical.
- And, the demand for technology skills will see substantial growth given a much higher need for digital literacy in almost all professions and fields.

Copyright © 2020 by the Society of Actuaries. All rights reserved.

Looking deeper in several areas:

- The demand for advanced literacy and writing skills will likely decline as well. Natural language processing will replace a lot of the report writing professionals do today.
- The demand for quantitative and basic statistical skills that many insurance professionals use will continue to be strong, but we'll see an even greater increase in the need for advanced IT skills and programming. Essentially, we'll see big future demand for the full range of technology skills.
- But, what also becomes much more valuable are a whole range of social, emotional, and adaptability skills applied across all disciplines, technical and non-technical. We'll need more creativity, advanced communication and negotiation skills, entrepreneurship, empathy, and leadership skills.

One way to look at this in the language of IQ, EQ, and AQ. IQ is defined as the specific technical skills and knowledge needed to do the jobs we need (but it will decline in value as AI and data science take over more of those tasks). EQ is defined as the social and emotional skills that help you make good judgments, a prized skill of the near future. Finally, AQ is the ability to adapt, self-learn, and continue growing and adapting in a time of rapid change. Also, very valuable in the future.

Copyright © 2020 by the Society of Actuaries. All rights reserved.

What Are the Big Trends?

So what are the major trends facing human capital development in the insurance industry and the technical training that supports it?

- This industry isn't going to run itself – it still needs people – and there's going to be strong competition for talent, regardless of what part of the industry you're in. In virtually every country where you do business today, the number of 15-19 year-old people is declining, in many places quite rapidly. Those are your new employees over the next ten years and there are simply going to be fewer of them. That means you're going to be in competition with everyone else who wants to hire smart young people.

- The skills you're going to want and need are changing – you're going to require – as the price of admission – basic analytical and statistical skills, but you're also going to be looking for much more advanced IT and programming skills, as well as the ability to understand and work with sophisticated technical models and statistical algorithms. You're going to demand high levels of emotional intelligence, communication skills, and leadership ability, as well as the ability to lead change and be highly adaptive to change.

That sounds exactly like what would come to mind when you think of an actuary or an underwriter today, doesn't it?

Copyright © 2020 by the Society of Actuaries. All rights reserved.

Skills Development

Let me turn now to one final area for discussion, the question of how you're going to ensure the people you hire have these skills because that too is changing rapidly.

I am not talking here about the changes colleges and universities are making, but there are likely to be many. I'm talking here about the changes facing those of us who provide professional credentials and skill assessments (like my organization) or those who consume them (like many of you).

We see four major trends:

- There is a rapidly increasing pace of change for the development of new skills and knowledge. By some estimates, up to 1/3 of the US workforce will need to learn new skills and find work in new occupations over the next decade. AI and other forms of automation and the disruption of current occupations will require people to change their skills at an unprecedented pace over the next ten years.

- The technology for delivering learning and skills development is shifting rapidly to online learning and new ways to demonstrate learning. The delivery of education at all levels is characterized increasingly by online tools, including full degree programs, but also highly technical learning that we used to think required in-person training, discussion, and explanation. The

Copyright © 2020 by the Society of Actuaries. All rights reserved.

acquisition of skills is increasingly characterized by online demonstrations of skills gained, signified by digital badges. Employers are increasingly sourcing employees by seeking out those with certain digital badges, by which they can demonstrate they have the skills the employer needs.

- There is a rapid rise in data-driven and alternative skills assessment methods. This means there is a move away from the traditional examinations many of us went through in our own professional credentialing, especially multiple-choice exams that rely heavily on memory. The education and credentialing community is moving rapidly to find new ways to test for mental agility, creativity, adaptability, and the ability to communicate knowledge.

  One of the most exciting recent innovations my organization has made is the creation of our Predictive Analytics Assessment. Beginning in 2018, we require all students to complete our Predictive Analytics course and exam. The course is delivered online, requires about six months of study, and is followed by a 5-hour assessment delivered on computers in test centers around the world. Students are given a data set, a case-study problem, and a set of tools. Their assignment is to assess the case, analyze the dataset using tools such as the R programming language, get results, and write a report that provides their analysis and recommendations. The report they write is the exam paper they turn in at the end of the test. With this exam, we're testing their ability to understand a business problem, use a sophisticated computer language, analyze a dataset, and write a report, all under the

Copyright © 2020 by the Society of Actuaries. All rights reserved.

pressure of having to turn in their report within five hours of beginning. That isn't easy to do, but we think it delivers exactly the kind of assessment employers and students need. And, since 2018, we have taken nearly 4,000 students through this exam.

- Finally, there is now and will continue to be a very rapid rise in what we call micro-credentials and non-degree certificates. Skill seekers are increasingly using short-term training programs to develop skills through bootcamps, immersion experiences, and rapid-certification programs. Employers and students increasingly want the skills they need, when they need them, and want ways to prove they have the skills they've gained, at the time they've gained them.

  Two anecdotes from our research may help me communicate this point:

  - A major health insurer in the US is, like many of you, is rapidly building their data analytics team, now numbering in the hundreds. The head of that team tells us that he doesn't care what degrees or credentials applicants for his team have. "I have a test I give – it requires the programming and statistical skills we need. If you pass the test, we'll interview you. If you don't, we won't."

Copyright © 2020 by the Society of Actuaries. All rights reserved.

- The head of a major US consulting practice recently told us, "I don't really care what degrees or credentials my team has. I care whether they have the skills to do work my clients value and will pay for. If your training gives them those skills, great. If not, I'm not interested."

Where Does This Lead Us?

This is the world we're entering and it has major implications for organizations that deliver credentials, but also for employers. The Society of Actuaries Board of Directors has been studying these issues closely for much of the past year, with help from our members, the academic community, leaders of other professional societies, and insurance industry employers. For an organization like ours, these are the critical strategic issues of the future.

There are several clear implications:

- The amount of education we deliver or require in data science, AI, machine learning, and programming languages – and its proportion relative to other knowledge – will have to increase significantly. We're proud of the predictive analytics education we're delivering now, but we have to do much more.

- We have to find new ways of offering education and testing students' skills in communication, judgment, and adaptability. In other words, we have to put

Copyright © 2020 by the Society of Actuaries. All rights reserved.

more EQ and AQ into our curriculum. That chuckle I got from you earlier, when I said "this is what you think of when you think of an underwriter or an actuary….?" Well, we have to turn that "chuckle" into nodding heads of agreement. It has to become, "of course that's what I think of when I think of an actuary!"

- We'll need to adapt our continuing education and basic education systems to emphasize skills development and demonstration of skills at all stages in the education process. Employers and students will demand ways to demonstrate that they've gained skills when they need them, whether at the beginning of their careers, or 10 years on when they take on a new assignment. It may mean more micro-credentials, certificates, and badges backed up by courses that deliver the education needed.

- Finally, we're going to need to partner more widely and intensively with other providers of education and employers. We'll need partnerships with testing organizations to provide technology for new forms of assessment; with employers to design custom training programs for their teams; with providers of unique short-form training; or with professionals in related fields who have knowledge our students and members need. We need to build an educational ecosystem that includes all of these players in partnership with us.

In all of this, we will build on the strengths and history of more than a century of service to the insurance industry. We will seek to work with many of you, and we

Copyright © 2020 by the Society of Actuaries. All rights reserved.

hope to be a partner to all as we help this industry and, of course, our profession, succeed and thrive in the future.

Copyright © 2020 by the Society of Actuaries. All rights reserved.