

Newton's third law of technology and change

Last year we explored a couple of potential and actual technologies going pear shaped'. Our focus was on the opportunities and risks these technologies present for the insurance industry. To quote myself: "As an auditor, I am in the job of risk management. The insurance industry itself is a risk management tool. So, pondering just how things can go wrong is part of our job description." I had so much fun writing last year's article that I have decided to continue the theme. This year's article ponders a couple of other near-future and existing technologies, with the focus expanded to include related social trends, and the risks and opportunities for insurers.

Identity crisis

"Unfortunately for you, Mr. Insurer, when you priced me ten years ago, I was a man. I have subsequently become a woman and would therefore like a refund!"

I think it is fair to say the first world is going through something of an identity crisis. As the old definitions and stereotypes of masculinity and femininity are replaced, notions of biological sex are being revisited and sexuality is no longer the state's mandate. Positive social change often requires revisiting existing business practices. This is as true for insurance as for any other industry.

In South Africa a significant amount of our pricing for both life and non-life insurance is predicated on certain historic evidence related to the behavioural patterns of men and women. As these notions become obsolete, we run the risk of making outdated assumptions about risk behaviours and characteristics.

Differences in life expectancy between men and women are well documented and have been thoroughly explored. It is currently a fact that women (on average) live longer than men. However, the exact reasons and causes remain a mystery. There appears to be some consensus that women are genetically predisposed to live longer than men but, there is also evidence that this can largely be outweighed by social, cultural, and behavioural factors ². I say largely because in every country in the world this difference exists, indicating that there is probably some genetic trait, playing a significant role. Current theories related to the other drivers of women's longevity focus on the healing power of oestrogen, the killing power of testosterone and the way men and women carry fat ³ – these are not cliches at all! Many of these are also linked to behavioural and lifestyle choices of "typical" men and women – such as that men drink, smoke and fight more (something clearly predicated on traditional male identity stereotypes).

The extent of this difference is quite varied, "in Russia women live 10 years longer than men; in Bhutan the difference is less than half a year"⁴. There are even indications that women did not live longer than men in the 19th century⁵. This number has fluctuated significantly in the last 100 years as shown in the table below:

Difference between female and male life expectancy in years			
Country	Early 1920's ⁶	1970-1980 Peak ⁷	Recent ⁸
France	2.74	6.77 (1982)	5.9
Sweden	1.27	5.13 (1980)	3.4
United Kingdom	2.55	5.45 (1971)	3.7
United States	0.91	6.23 (1977)	5.1
South Africa	Not available	6.21 (1991) ⁹	3.7 ¹⁰

¹ <https://home.kpmg/content/dam/kpmg/za/pdf/pdf2020/south-african-insurance-survey-2020.pdf>
² Why is life expectancy longer for women than it is for men? - Scientific American <https://www.scientificamerican.com/article/4-reasons-why-women-live-longer-than-men-iol.co.za>
³ [4-reasons why women live longer than men \(iol.co.za\)](https://www.scientificamerican.com/article/4-reasons-why-women-live-longer-than-men-iol.co.za)
⁴⁻⁷ Why do women live longer than men? - Our World in Data <https://ourworldindata.org/why-do-women-live-longer-than-men>
⁸ Average life expectancy by country (worlddata.info) <https://www.worlddata.info/>
⁹ [Female and male life expectancy at birth \(ourworldindata.org\)](https://www.worlddata.info/)
¹⁰ [South Africans are living longer | Statistics South Africa \(statssa.gov.za\)](https://www.worlddata.info/)



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There does not seem to be a good explanation and understanding of the exact drivers of these differences. As the first world's identity crisis changes our cultural, social, and behavioural practices we could see massive changes in the differences between men and women's life expectancy and risk. Notably, if groups or sub-groups of men adopt those behavioural patterns which are driving some of these differences, these groups will have different risk profiles. A clearer understanding of drivers of these differences is required to improve the quality of risk identification and underwriting. Watch this space!

Another aspect of this cultural shift is the recognition and activism of transgender and non-binary individuals. Current estimates of population prevalence are questionable due to cultural and social barriers but have placed the prevalence somewhere between 0.5% and 1% of the first world populations¹¹. Whilst that might not translate directly in South Africa this could mean a market of up to 600,000 individuals with specific health and life insurance needs. Conversely, failing to accommodate such identity diversity could lead to significant reputational harm when a call centre agent or claims handler mis-identifies a customer.

Anti-aging treatments

"And the Lord God said, behold, the man is become as one of us, to know good and evil: and now, lest he put forth his hand, and take also of the tree of life, and eat, and live for ever. Therefore, the Lord God sent him forth from the garden of Eden, to till the ground from whence he was taken. So, he drove out the man; and he placed at the east of the garden of Eden Cherubim, and a flaming sword which turned every way, to keep the way of the tree of life." Genesis 3.22-24

It seems that for as long as people have died, they have obsessed about eternal life and yet the path to immortality has been blocked by forces beyond our understanding. In recent years we have come a long way to understanding these barriers and, in other ways, no closer. I will leave spiritual immortality to the religious and focus on the mundane, physical world.

One of the primary causes of death is aging. Whilst aging per se does not kill people, age is a good predictor of death. "Biologically, ageing results from the impact of the accumulation of a wide range of molecular and cellular damage over time. Thus, this leads to a gradual decline in physical and mental capacity, a growing risk of diseases,

and ultimately, death"¹². Basically, we slowly breakdown more and more often as we get older until something serious breaks and cannot be repaired. So why can't we just replace the broken parts? Replaceable parts was one of the topics we explored last year, however aging seems to present a unique problem in that the extent and frequency of problems gets worse as we get older. Eventually you would reach a point at which you are breaking faster than you can be fixed. Two key factors drive this: programmed factors; and damage-related factors. The former implies that basically cells are designed to breakdown eventually. The latter implies that chaos wins, and things break. Not everything ages - hydra have a regenerative ability by which they avoid dying. Unless a hydra is eaten or killed, it would technically live for ever¹³. Other things achieve alternate forms of immortality, such as bacteria, which simply split in two and continue going; or some plants which send out runners to create clones of themselves.

One of the most frequently cited means to actually combat aging¹⁴ (as opposed to fighting the impact) is the enzyme Telomerase, which overcomes one of the key hurdles in the anti-aging game – that cells can only divide a limited number of times. Unfortunately, this is exactly the problem with cancer – it has no hard stop and just continues dividing. So, whilst this has been shown to increase the life expectancy of mice, it has also been shown to increase the incidence of cancer in those same mice¹⁵.

Consequently, whilst various vendors and certain pharmaceuticals might punt a particular product or method to stop aging, there seems to be limited genuine science backing our ability to currently halt the aging process itself. Whilst replaceable parts, prosthetics, gene therapies and lifestyle might all increase life span – there does seem to be a hard stop somewhere around 125¹⁶ years of age, due to our internal aging process. This itself is disputed. So, for now, therefore it looks like mortality risk will be around for a while and longevity still has an end.

¹¹ Demographic and temporal trends in transgender identities and gender confirming surgery (nih.gov) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6626314/>

¹² Ageing - Wikipedia <https://en.wikipedia.org/wiki/Ageing>

¹³ For fans of the Greek classics, this little organism is indeed named after the mythological Hydra which is known for being able to regenerate its head. It also looks remarkably like the mythological beast.

¹⁴ In more reputable sources than tabloids...

¹⁵ Telomerase - Wikipedia <https://en.wikipedia.org/wiki/Telomerase>

¹⁶ Weon BM, Je JH (February 2009). "Theoretical estimation of maximum human lifespan". Biogerontology.

The neural lace

"In fact, I may never have been able to stop you from remembering, or at least from passing on what you have learned. Hmm. That's irksome."

"Please explain?"

"The distributed device within your brain and central nervous system, which I have, annoyingly, only recently become aware of, will have recorded its own memories of this encounter and would be able to transmit them to your own biological brain. I strongly suspect it has already transmitted our conversation so far... else where. Perhaps to the drone you arrived with and the ship you arrived on. That is very unusual. Unique, even. Also, most irritating."

"What are you talking about? Do you mean a neural lace?"¹⁷

The idea of a neural lace has excited me for as long as I have had an inkling of the idea. In essence a neural lace¹⁸ is a form of brain computer interface; a net of tiny wires that resides under the bone of your skull and interacts directly with your brain and other parts of the nervous system. When this idea was first kicked around in sci-fi novels (long before the quote above), it was exactly that, sci-fi.

This is however no longer science fiction, "in 2016, the US military's Defense Advanced Research Projects Agency (DARPA) had introduced a research program called Neural Engineering System Design (NESD) which is focused toward developing an implantable neural interface, connecting human minds directly to computers."¹⁹ Furthermore, entrepreneur and businessman Elon Musk has launched a business venture exploring this exact space - Neuralink²⁰.

Currently our interaction with technology is largely limited to the cumbersome physical realm. We need to poke things, wave our hands, hit buttons etc. Although this is advancing – for example glasses using eye movements and actions as a trigger²¹ – this all pales in comparison to the possibilities of interfacing directly from the brain. Not only would the processing time be significantly reduced (thought is faster than speech and fingers) – the implications are awesome.

Neuralink states that "the initial goal of our technology will be to help people with paralysis to regain independence through the control of computers and mobile devices."²² The near-future impacts could expand to include direct interfacing between human brains (i.e. telepathy) and full recall of life experiences, amongst other remarkable impacts.

The social implications of this kind of interface have been explored in various forms of speculative media – Black Mirror's episode "The Entire History of You", Brainstorm (1983 Film), Rememory (2017 film), Robin Williams' 2004 film "The Final Cut", etc. but what does it mean for insurers? The growing market of medical devices such as prosthetics etc. for the aged and disabled creates a clear opportunity for high value asset insurance – the neural net would be no different. In twenty years, an individual's most valuable assets could well be their house and their neural lace.

The implications on morbidity claims are profound. Whilst recovering motor function after an accident might take extensive time, with the rapid strides we have already taken in remote working, being able to access your computer directly from your brain would allow many injured individuals to return to work much quicker and potentially long before being physically able to do so.

Linking back to anti-aging treatments, one of the alternative forms of immortality is the brain upload, whereby the human brain is perfectly scanned and then digitised on an electronic platform. Theoretically this would allow a backup of the brain to be taken and then downloaded at a later stage. Alternatively, one could continue to live on in the machine. This would probably require something like a neural lace to activate and achieve the upload. Luckily, if the neural lace is a while away, the brain upload is years away and the complexities of simple things like who is the policyholder can be pushed out.

¹⁷ From Surface Detail, by Iain M Banks. Published by Orbit in 2010

¹⁸ Also referred to as a neural net, neural link, an implantable neural interface etc.

¹⁹ <https://www.cuelogic.com/blog/neural-lace-technology-next-boom-in-artificial-intelligence>

²⁰ <https://neuralink.com/>

²¹ [HUD Glasses: The Future of Wearable Tech Is Right in Front of Your Eyes \(thedigitalrenewal.com\)](https://www.thedigitalrenewal.com/news/2019/05/21/ HUD-Glasses-The-Future-of-Wearable-Tech-Is-Right-in-Front-of-Your-Eyes)

²² <https://neuralink.com/>

VR lives

“I don’t know what to do,” father said, “he just lies on his bed for hours, eyes wide open staring into space!”

“It’s nothing to worry about,” mother responded, leaning back and tapping the lace-activator on her ear, “he is just playing with his friends online.” Mother leaned back in the couch and her eyes glazed over as she disappeared into the other world.

Whilst it might be some time before our brains are uploaded into machines, there are many people who already live virtual lives on a day to day basis. The amount of time some people spend online gaming can be excessive, as in the case of Ong Haw, a 23-year-old who died after gaming for 15 hours straight²³. The Gamer published an article in 2017 reporting on *15 People Who Have Died Playing Video Games*²⁴, most of which were caused by heart failure or deep vein thrombosis after binge playing for periods often well in excess of 15 hours. Whilst 15 hours seems like a lot, they report on one individual recorded as playing for 40 hours and another playing for 50 consecutive hours²⁵.

The American Psychiatric Association is considering including gaming disorder as a recognised mental illness. It is already recognised as such in South Korea and China²⁶. It has also been recognised by the World Health Organisation as a disorder²⁷. Whilst prevalence rates range significantly (because the definition is loose) the range is somewhere between 0.5% and 3%²⁸. Clearly this is also biased to more advanced economies than less advanced ones.

There is clearly a problem here, which can easily translate into a public health problem due to the sedentary but high adrenaline nature of gaming. This problem is likely to become significantly worse with the advances in virtual reality technology. It is one thing to get addicted to clicking keys and tapping screens, quite a lot easier when the experience is fully immersive and multi-sensory. Add to this a neural lace and it is easy to imagine kids just lying on their beds lost in a digital world for hours on end.

So what for insurers? Well clearly excessive gaming is a risk indicator and one which could become more prominent in the future. Whilst there could be personal information challenges, knowing that your policyholder is spending fifteen hours a day gaming would clearly indicate a higher mortality risk. This information is often linked through gaming accounts to other social media making it more readily available. Furthermore, if your

policyholder has insured R300,000 of gaming equipment it might also be a flag for the life underwriting team when it comes to pricing.

Virtual property

“Hello Mr. X, I understand you would like to submit a claim?”

“Yes, it is most horrific.” The voice is shaky and nervous. “When I woke up this morning, I checked in on my castle storage and noticed that the level 63, flaming blade of Lord Boom was missing. Upon further investigation I also found that my level 31, helm of Goat Power was also gone.” There is an expectant pause, which is not filled. “I don’t know what to do?” he screeches, “I used all my gems powering up the castle to protect them. I’m not sure I can carry on.” It sounds like he is crying.

“Mr. X, have you been drinking? Should I call an ambulance?”

The Gamer also includes a story of two gamers (Chengwei and Coayuan) who jointly won a virtual sword, only for Coayuan to sell it – in the real world – for \$870. The ensuing feud led ultimately to Chengwei murdering Coayuan^{29 30}.

This is however pocket change when compared to some of the price tags associated with virtual assets. David Storey, for example, a University of Sydney graduate bought a virtual island for \$26,500 - “The island consists of 6 000 acres and includes a castle, a mine and fantastic beasts to hunt. The owner has complete mining and hunting taxation rights and can also allocate parcels of land to sell to other players.”³¹

²³ 23-Year-Old Penangite Dies After Playing Computer Games Non-Stop For 15 Hours (says.com) <https://says.com/my/news/23-year-old-computer-game-addict-dies-after-playing-non-stop-for-15-hours>

²⁴ <https://www.thegamer.com/15-people-who-have-died-playing-video-games/>

²⁵ Whilst playing Diablo 3 and StarCraft respectively for those in the know.

²⁶ [Internet Gaming \(psychiatry.org\)](#)

²⁷ [Addictive behaviours: Gaming disorder \(who.int\)](#)

²⁸ [Gaming Disorder - Prevalence, Symptoms, Research - INTENTA](#)

²⁹ <https://www.thegamer.com/15-people-who-have-died-playing-video-games/>

³⁰ To be clear, he killed the real person, not his avatar.

³¹ [Virtual island sells for \\$26,500 in cyber assets | New Scientist](#)

The island itself is housed in a virtual world called Entropia, which has been the site of some mind boggling sales: the planet Calypso sold for \$6 million; Club Neverdie sold for \$635 thousand; the Crystal Palace sold for \$335 thousand; and the Nest Egg sold for \$70 thousand. I’ll admit I don’t even understand what some of the descriptions of these items mean³².

Other virtual assets which have sold for staggering amounts include:

Item	Game	Price tag in real world money ³³
Ethereal Flames Pink War Dog	Dota 2	\$38,000
Age of Wulin Sword	Age of Wulin	\$16,000
Echoing Fury Mace	Diablo 3	\$14,000
Revenant Super Carrier	Eve Online	\$9,000

The implications for insurers are obvious. Gaming assets can hold real world value. It is conceivable that soon these could account for a sizeable portion of policyholders’ owned assets. Understanding the security associated with these and their ability to get damaged, lost or stolen would require a whole new world of underwriting skills. Seems like a great idea for a specialist UMA – but maybe not in South Africa – right now.

IoT ABC XYZ

It is 2am and I can’t sleep. I head through to the kitchen for some midnight munchies. “How you doin’?” I hear the fridge, hitting on the microwave again. There is a shrill giggle from the washing machine. It’s a classic love triangle and one that will never end... whose stupid idea was it to give these machines brains and connect all these devices to my neural lace. No wonder I can’t sleep!

Some mad people think it is a clever idea to connect all our devices to our other devices. Already, sometimes when I turn on my work-from-home headphones I hear my son’s tank battles over Bluetooth rather than my colleagues. Not to mention the “smart” speakers which regularly play my wife’s conversations for the whole household. And we want to connect more of these devices? Because all I want on Sunday night is to be reprimanded by my fridge for the low milk supply and get told off on Monday morning by the exercise ball for not doing my morning routine. People already can’t put down their devices and now we want to connect more devices to our

devices and have them sharing data in real time. Madness!

The most cited example of the internet of things (IoT) is the smart home - the idea that we can connect to our house and our house is connected to us. Whether it is using your phone to start the oven as you drive home, your heater sensing that nobody is around and powering off or the fridge and the shopping list app getting chummy – all of these things are actually pretty cool. Simple things to make our lives easier. It would be useful if my garage door knew it was me pulling into the driveway and simply opened and the household doors unlocked as I approached. Of course, that leaves it incredibly open to some criminal syndicate also conveniently having the garage door open for them and the front door unlocked³⁴. Furthermore as my fridge is adding things to my shopping list, which is sending instructions to my online delivery company, which makes payment using my banking details – the thugs who gained access to my house could use the fridge to gain access to my bank account, as well as dodgy personal information such as my preferences for 85% cocoa chocolate over the traditional sweeter milk chocolate.

The often-cited insurance application of the IoT is geyser sensors which immediately notify the insurer and designated plumber when there is a leak or a burst. Another obvious application is that once the devices are all connected, when one is stolen and disappears off the network it is obvious it is gone. No sooner will we have tagged all our assets in a wireless network – than there will be crooks figuring out ways to utilise this to profit unduly. What is fairly obvious is that insurers will need a strong handle on the relative security and privacy merits of various IoT connectors or providers in the near future to ensure their underwriting captures the actual risks associated with smart homes and offices.

Conclusion

Newton’s third law seems to apply to technology and change: every positive advance in technology and culture is met by an equal and opposite advance in criminality and/or risk. For insurers, who are in the business of risk, this is a good thing. Whilst the world appears to be getting more complicated, it also allows for a more customer centric and targeted approach to insurance, which will need to consider the various interconnections to remain relevant.

³² [10 Most expensive virtual items in Video Games | SuccessStory](#)

³³ [10 Most expensive virtual items in Video Games | SuccessStory](#)

³⁴ [Internet of things - Wikipedia](#)