Risk, Uncertainty, Psychology and Judgement

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Keywords

Risk. People (p). Risk of mortality and morbidity (q). Transmission (T). Reproduction Rate (R_0). D.O.T.S & Attack Rate. Uncertainty. Fat Tails. Unknown Unknowns. Societal Responses. Fear & Madness of Crowds. Suppression & Risk Mitigation. Judgement. Personality Types and Risk Preferences. Culture and Governance Systems. Top Down and Bottom Up. Self-Awareness and Reflection. The Longer Term.

Introduction

We are confronted with a crisis which is unparalleled in a generation. We could not have conceived of this unprecedented event at the beginning of this year, how the threat of contagion could shut down the world, have such enormous impact on our daily lives and psychological well-being.

Since January, we have been inundated with wall-to-wall coverage of COVID-19, ranging from the latest alarming statistics and political debates to practical medical (and lay) advice. In this narrative, I have drawn on my background as a student of actuarial science, risk, psychology, judgement and biases to create my own interpretation and narrative of these events.

The perspective which I want to present to you is not about telling you what right or wrong information is especially in a period of great uncertainty, but how we process information and decide on what information to take in and how we make good judgments. Judgement is invoked when we do not and cannot know what to do, when we do not have the data or the logic to make largely objective choices. Instead we rely on personal qualities, knowledge and experience, to make decision and opinions – very often they are a combination of intuition, discernment, common sense, perceptiveness et.al.

I would like to stress that these are my personal observations and views, and do not represent those of the IFoA or professional experts in the healthcare sector.

Background – a personal timeline

Whilst news surrounding the outbreak started earlier this year, the grave severity of the situation dawned on me around 7-10 February. There was panic buying and massive food (and toiletry) related hysteria, leading to long queues at grocery stores and shelves being emptied within hours. This was followed by the raising of Disease Outbreak Response System Condition (Dorscon) alert in Singapore from Yellow to Orange, following the increasing number of emerging new cases from unknown sources on 7 February. What drove the people to panic buying? Were they rational? I was also due to travel to the UK for the IFoA's Management Board and Council meetings, but these trips were cancelled due to the resulting travel restrictions.

Within the span of a few weeks, economic and travel activities slowed down sharply across East Asia with the epidemic starting to show signs of spreading across Europe. On 7 March, Italy locked down Lombardy, oil prices plummeted, and stock markets worldwide were plunged into a downward spiral. This was my "Northern Rock" moment. [Northern Building Society had to close down in the summer of 2007 , one year before the Global Financial Crisis of 2008, as it was unable to liquidate its

securities. Economic historians have identify this as one of the early signals of the GFC] This was followed by President Trump shutting down inbound flights from 26 European countries. Since then, an increasing number of countries worldwide started imposing various degrees of national movement control and event and travel restrictions.

It was in this weekend, that I started contacting longevity specialists and epidemiologists in my LinkedIn network, which led to the formation of the COVID19- Actuaries Response Group. The primary aim of this informal group of senior IFoA actuaries, is to learn, share, educate and influence actuaries in matters of relevance in a speed manner. So far, the ARG has produced more than a dozen bulletins which are of relevance to actuaries.

Risk

I now address the crisis by analysing it from an actuarial and risk modelling perspective.

Albert Einstein once declared that "compound interest is the most powerful force in the universe", and this is precisely why we have to control the magnitude of the reproductive rate (R_0), one of the key parameters driving the COVID-19 spread.

Broadly speaking, the R_0, which is a measure for the average number of people infected by a single infected person, may be represented as a function of Duration (D), Opportunity to Infect (O), Probability of Transmission (T) and Susceptibility (S) – D.O.T.S in short. If R_0 has a value of 2, then the 3rd generation of a single infected person will have 8 infected people (2^3), and the 4th generation will have 16 infected people (2^4), and so forth. The WHO estimated on 23 January that the R_0 for COVID-19 globally was between 1.4 and 2.5, while in comparison, the R_0 for the common flu and SARS were 1.3 and 2.0 respectively.

Another key variable is the serial interval – the mean length of the generation. Various studies suggest that the current estimate for COVID-19 is in the range between 4.4 and 7.5 days. Taking 6 days as the assumed serial interval, and a R_0 value of 2, we can estimate that COVID-19 infections would grow tenfold between the 3rd and 4th interval, i.e. 18 and 24 days.

Using these simple methods and applying these figures on the number of cases as at 7 March, I estimated that the number of cases worldwide would reach 1 million within one month. The 1 million figures were reached on 2 April. [My figures were sent to two epidemiologists to verify. Using more sophisticated modelling they thought the figures would be reached within six weeks.

The symptoms are fairly consistent throughout the world. Around 81% of infections are mild (full recovery at home with self-quarantine), 14% are severe (shortness of breath/pneumonia) and 5% are critical (respiratory and multiple organ failures), with approximately 2% of reported cases leading to fatality. However, fatality rates vary by country – very often a function of the amount of testing. Those above age 65 and with serious pre-existing conditions are the most at risk. And the number of hospital beds required to meet peak demand of those needing care will be exceeded even in the most developed countries unless we can "flatten" the curve of infections. It is no surprise that many countries around the world are currently ramping up on social distancing enforcements and emphasising the importance and effectiveness of it in an effort to keep R_0 as low as possible.

There are debates around strategies of suppressions (bringing R_0 to less than 1) and one of mitigation (allowing R_0 to be above 1), and the economic, social and mortality price that has to be

paid. There is now an emerging debate across the world, frame around when "exit strategy" from the lock down should be implemented.

Uncertainty

Whilst risks can be measured, quantified and managed, uncertainty cannot be. It is difficult to accurately predict the "unknown unknowns", popularised as Black Swans by Nassim Taleb.

However, this crisis is not really a black swan. It is a major disaster waiting to happen. Back in March 2015, Bill Gates presented a TED talk to highlight that mankind was not prepared for the next pandemic outbreak – this talk seems prescient just five short years later. For years, insurers have held capital in respect of future pandemics – but they were considered abstract possibilities, not events lurking around the corner.

Although researchers are discovering new things about COVID-19 almost daily, many questions remain unanswered, such as the actual case fatality rate and how the virus survives outside the human body and in different climates – one key question now is, will it be less prolific or fatal in the warmer summer months?. Meanwhile, concerns over asymptomatic carriers and uncertainty around the timeline for vaccines continue to loom worldwide.

It is apparent that we are dealing with fat-tailed event owing to increased societal interdependence – in lay terms, every walk of life has been massively affected by the pandemic; in actuarial terms, there are very high dependencies between pandemic risk, market risk and operational risk. As such, conventional risk management approaches have not been appropriate, and – as is often the case – too much of our thinking about risk identification, risk quantification and risk management has consisted of refighting (hypothetically) the last war, not fully imagining how widespread and multifaceted this new war could be.

Psychology and Culture

Invariably, the never-ending stream of COVID-19 news articles and the exponential growth in positive cases have led to detrimental impacts on our mental wellbeing. Fear surrounding the unknown aspects of this virus (of which there are still many) has led to anxiety, and in some instances awakened a more primal human instinct, manifesting itself in uncommon behaviour such as food and toilet-paper hoarding. What appear to be seemingly irrational, may indeed not be irrational at all – when viewed from evolutionary psychological perspectives.

 Increased xenophobia and racism towards the Chinese community and to those from similar ethnic origins were also observed in some quarters, many swayed by the media and politicians' reports and statements.

It is also notable, that risk preferences of individuals are tied to their personality profiles, personal contexts and experience. At the earlier stages of the epidemic, attitudes towards decisions like travelling or congregating for meetings vary widely reflecting different appetites for risks. Mothers of young children displayed understandably strong maternal instincts to protect their children from social contact even though they are relatively insusceptible to this virus.

In a wider context, different personality types will react to prolonged lockdowns differently – anxiety, worry, fear, avoidance, depression, paranoia, denial, detachment, neglect and sense of

loneliness – this will vary with the underlying state of psychological health and circumstances. However, it is possible to frame the lockdown positively, be more mindful and take opportunity to do things we ordinarily would not do.

As governments worldwide continue to try and suppress R0 with testing, contact tracing, home quarantine, closure of schools and universities and population lockdowns, the impact on vulnerable groups need to be assessed. Gig workers, low income groups, contractors and the unemployed will struggle financially over the course of the next few months at least, and important steps need to be taken to support these groups financially. This is in addition to the huge social, psychological and economic cost of shutdowns.

Until the middle of March, the four Asian Tigers of the 1980s – Singapore, South Korea, Hong Kong SAR and Taiwan SAR – as well as China have far demonstrated that they can handle the COVID-19 crisis competently, largely learning from their SARS experience of 2003. Also, they have a generally co-operative populace, strong (in some cases authoritarian) government and leadership. Some commentators have drawn attention to differences in leadership style and governance between these countries and the West.

However, recent weeks have shown that the problem of second and third wave infections occurring still remains especially for "naïve" populations for these Asian countries. Naïve populations are populations like that of Singapore – where the bulk of the people have been protected or not immunised. So, the challenges are indeed far from over.

The impact of COVID-19 will no doubt be felt over the next few years. Looking forward to when the crisis ends, it is likely that COVID-19 will have a transformative impact on our lives, and potentially lives of our future generations. Significantly, there has been an acceleration in the use of technology in education and work, and this pandemic may redefine our attitudes towards travel, wildlife and the planet. Beyond any doubt, COVID-19 gives us much to reflect on; on how we can prevent such a crisis from recurring, the trade-offs we need to make, and the kind of society we want to live in.

Judgement

An important element of our self-journey is our "capability" as it unfolds over time. Capability is how we use our judgement when we do not and cannot know what to do in the usual 'data-driven' ways. The prerequisite for sound judgement is being able to get one's head around the complexities and volatilities of the challenges.

A match between capability and challenge gives individuals a sense of being 'in-flow', confident, competent and enthusiastic. The importance of presence of mind, self-awareness and reflexivity is key to extracting relevant signals from noises.

In times such as this, organisations would benefit from the power of thoughtful, far sighted and resilient decisions. There is a lot of literature on uncertainty and judgement.

A recent one was by Professor Andrew Likierman from the London Business School. He summarised into six questions to ask yourself in the midst of these uncertain and strange times:

1. Listening and reading – Have I understood?
2. Can I trust the information and people?

3. Do I have the relevant experience and knowledge?
4. How do my beliefs and feelings, including risk, affect my choice?
5. Are these the right options for my choice?
6. Delivery (including timing) – Is this practical?

As uncertainty increases in society, we have to continue to learn and appreciate the importance of judgment. We have to get familiar with the notion of uncertainty, in particular radical uncertainty. Computations and models in themselves are clearly insufficient in a world where there are many unknown unknowns, where risks cannot be anticipated let alone modelled.

Whilst judgment cannot be explicitly taught, it can learnt and be acquired over time.

As we navigate our way through this challenging period, it may be wise for us to reflect on the limits of the efficacy of risk models with its implied and known probabilistic distributions, and reflect on the nature of uncertainty and how we can bring good judgement to bear in making decisions.

Zoom Presentations

27 March 2020 Actuarial Society Malaysia and IFoA Malaysia 100 participants
3 April 2020 Actuarial Society Malaysia and IFoA Malaysia 240 participants
8 April 2020 IFoA Singapore& Singapore Actuarial Society 8 April 200 participants
10 April 2020 IFoA Indochina, Indonesia, Thailand and Philippines 60 participants