Social Media-Risk Management in a Web-Enabled World

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ABSTRACT

The answer for managing risk in a web-enabled world lies in the emergent and collective problem solving by creating social machines which integrate humans, machines, and data at a large scale. The known case of Galaxy Zoo wherein the researchers built the world's most powerful pattern-recognition super-computer. One of the co-founders responded by saying that the integration of all the factors led to the linked intelligence of all the people who had logged on to their website and this is what is termed as global brain which was amazingly fast and extremely accurate.

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INTRODUCTION

When professional scientists, insurers and risk assessors consider risks, they typically weigh up the impact of an event against the probability of it occurring over a given timeframe. Car insurers, for example, think about how likely it is that your car will be stolen given its usage and location, and what the cost of replacing or repairing it might be. The UK's National Security Strategy considers what the consequences of numerous plausible worst-case scenario events might be (an attack on UK overseas territories, for example, or severe coastal flooding), and then considers the likelihood that these events might occur.

However, this is not the way that most people assess or calculate risk most of the time. Indeed, experiments have shown that it's not even how most experts assess risk most of the time. Human beings instead generally use rules of thumb (heuristics) that help them take quick, instinctive decisions. The vast majority of the time, these mental heuristics serves us remarkably well. But there are also occasions when these same heuristics result in us (in the language of economists) failing to maximize our utility.

The systematic study of how people actually estimate probabilities and risks have had major impacts on psychology, economics, and more recently, in policy. From the early 1970s, the psychologists Amos Tversky and Daniel Kahneman began publishing a series of detailed studies
on how people — from the 'man on the street' to trained professionals — estimated everyday examples of probabilities, frequencies, and associations. Tversky and Kahneman were especially interested in those situations in which people fail to behave like professional risk assessors, and they gradually uncovered the nature of the mental shortcuts that people were using and documented the circumstances under which these would lead to error.

For example, Tversky and Kahneman found that people often estimate the probability of an event occurring by how easily that they can recall or generate examples of occurring. Are there more English words that start with the letter 'r' or those have 'r' as the third letter? What is the probability that almost immediately; people start thinking about examples of words that started with the letter 'r', which we will find quite easily. We will have to try to think of words that have 'r' as a third letter and surprisingly discover that this is rather harder. On this basis, most people instinctively conclude that there are probably more words that begin with 'r', whereas in fact there are around three times more words that have 'r' as the third letter. Tversky and Kahneman called this as an 'availability heuristic' phenomenon.
The availability heuristic helps to explain why in the aftermath of an earthquake, Californians are more likely to purchase insurance. It leads us to overweight the probability of high-impact, low-probability events in which many people die at one time. Paul Slovic coined the term 'dread risks' to refer to this phenomenon. For example, the aftermath of the 9/11 terrorist attacks, miles driven on roads jumped by as much as 5% as individuals avoided travelling by plane. It has been estimated that as many as 1,600 (sixteen hundred) US (United States) citizens lost their lives as a result of the road traffic accidents associated with this increase in car travel — six times higher than the total number of passengers who died on the planes themselves.

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Another example is the tendency to overweight positive outcomes that are certain relative to those that are very likely (the 'certainty effect'), and we seek to avoid losses to a far greater extent than we prefer equivalent gains ('loss aversion').Tversky and Kahneman used pairs of gambles (or 'prospects') to illustrate these phenomena. Consider one such pair, which illustrates the certainty effect and loss aversion in combination (the percentage of people selecting each option is shown in square brackets):

1. Would you prefer an 80% chance of winning INR 4,000 [20%], or the certainty of INR 3,000 [80%]?
2. Would you prefer an 80% chance of losing INR 4,000 [92%], or the certainty of losing INR 3,000 [8%]?

The preference for each of these gambles is the mirror image of one another, depending on whether they are framed as losses or gains. In the positive domain (prospect 1), the certainty effect contributes to a risk-averse preference for a sure gain over a larger gain that is not certain — most choose the certain INR 3000. Even though in the negative perspective, prospect 2, the same effect leads to a preference of risk seeking for a loss which is very much probable over a small loss that is certain-Mostly the uncertain Rs. 14000 is chosen. This example illustrates the significance of how risks are framed.

The case study on the communication of medical risks uses another example from Tversky and Kahneman, which demonstrates that framing quantitative information in the negative ('400 people will die') or positive ('saves 200 lives') can lead to dramatic differences in people's perceptions. Understanding how people estimate risks has important implications for public policymakers and regulators. The above finding, for example, has potentially profound implications for financial regulators trying to understand why investment bankers might respond to the prospect of losing a large sum of money by becoming more risk-seeking in order to avoid the loss. Alongside some of the other lessons in relation to the banking crisis documented in the above case study, the UK's Financial Conduct Authority has now established a team devoted to the understanding of behavior.

There are many of these rules of thumb or heuristics that shape how human beings estimate risk. Another important issue, though, is how emotions impact our decision-making and estimates of risk. This is rarely considered by those who manage risk professionally. The classic study where George Loewenstein and colleagues developed the 'risks as feeling' hypothesis, pointing out that there are numerous emotionally-driven factors that help to explain how human beings react to risky situations, which cannot be explained by accounts that seek to weigh up coolly the probabilities and outcomes of a given situation.

One such factor is the vividness with which these outcomes can be described or represented mentally. Loewenstein observed that in the United States, people tend to be underinsured for hazards that evoke relatively pallid mental images (such as flooding), which are less capable of causing worry or concern than events that have the ability to evoke more vivid images (such as an act of terrorism). For example, studies have shown that people are more willing to pay for airline travel insurance covering death from 'terrorist acts' (a vivid event) than death from 'all possible causes' (which of course includes terrorist acts).

Emotions do not just affect how we think about the outcome of an event, but also influence how we weight the probabilities of those outcomes occurring. When an outcome is relatively pallid (losing INR 20 (twenty) , say), participants in a study were relatively sensitive to probability variations: they were prepared to pay INR1(one) to insure against a 1% chance of losing INR 20, and this rose to INR18 (eighteen) to insure against a 99 (ninety-nine) % chance of loss – an 18-fold difference. Wherein when the outcome has awakened emotion (for example, receiving an electric shock), participants were extremely insensitive to the variations of probability. They were prepared to pay a hefty INR 7 (seven) to avoid a 1% chance of being shocked, but this rose to just INR 10 (ten) to avoid a 99% chance of shock — less than 1.5 times as much.

The Case

The Kenyan election on 27th December 2007 was followed by a wave of riots, killings, and turmoil. Erik Herdsman, an African blogger, read a blog posted by Or Okolloh, exploring for a Web application that tracks incidents of violence and areas of need. Within a few days, Hersman had organized Okolloh and two like-minded developers in the United States and Kenya to make the idea a reality. The result was Ushahidi, which allowed local observers to submit reports using the Web or SMS messages from mobile phones, and simultaneously created a temporal and geospatial archive of these events. It has subsequently been extended, adapted and used around the world in events from Washington DC's 'Snowmageddon' in 2010, to the Tohoku earthquake and tsunami in Japan in 2011.

On 12th January 2010, a 7.0 magnitude earthquake devastated the capital of Haiti. As the world rushed to help, relief agencies realized that they had a problem: there were no detailed maps of Port-au-Prince. Too poor to afford a mapping agency, the country had never built this vital piece of digital infrastructure. Two weeks later, using tools such as WikiProject and OpenStreetMaps together with data from widely available GPS devices, relief workers, government officials and ordinary citizens had access to detailed maps of the entire capital.

As of July 2014, seven projects had contributed hundreds of millions of classifications to the citizen science astronomy website Galaxy Zoo. Beginning in 2007, astronomers at the University of Oxford had built a site that

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enabled people to quickly learn the task of classifying images of galaxies. The first project comprised a data set made up of a million galaxies imaged by the Sloan Digital Sky Survey — far more images than the handful of professional astronomers could deal with. Within 24 hours of launch, the site was achieving 70,000 classifications an hour. In first year the project received more than 50 million classifications contributed by more than 150,000 people resulting in various scientific insights. The answer very much lies in collective and emergent problem solving — the creation of 'social machines', integrating humans, machines, and a large scale data. The Galaxy Zoo's case where the researchers had built the world's most powerful pattern-recognition super-computer. As one of the co-founders noted: "it existed in the linked intelligence of all the people who had logged on to our website: and this global brain was incredibly fast and incredibly accurate".

The essential characteristics of all of these examples are:

- Problems are solved by the scale of human participation and open innovation on the World Wide Web.
- They rely on access to (or else the ability to generate) large amounts of relevant open data.
- Confidence in the quality of the data and the processes that underpin the systems is crucial.
- They use intuitive interfaces.

The examples above are dramatic demonstrations of an approach to risk management that the Web can engender and enable. It is an approach that supports the timely mobilization of people, technology, and information. It is an approach in which the incentive to participate increases as more people participate. It is an approach that is efficient, effective and equitable.

One challenge to this approach includes maintaining confidence and trust in the quality of data and processes. The very scale of participation means that some will supply bad, wrong or indifferent data. Fortunately, methods have evolved to evaluate and calibrate the results of the crowd. Another is to maintain the Web infrastructure in the face of the problems tackled. However, in an age of satellites, wireless communications and mesh networks the ability to maintain a Web infrastructure has never been greater. Using the Web, we can build social machines that demonstrate open innovation, managing risks through transparency and wide engagement. The Web enables previously unimagined solutions to some of the world's greatest challenges.

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