Q&A on Quantitative Risk Analysis (QRA)

Interviewer:  
Gareth Byatt – Principal Consultant, Risk Insight Consulting

Interviewee:  
Rishi Prabhakar – Senior Consultant, Palisade

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Rishi,

Thank you for making the time to discuss Quantitative Risk Analysis (QRA) with me. When we last caught up, in June 2018, we talked about the Palisade NeuralTools IT application which is a particular part of the Palisade Decision Tools Suite to help people to undertake predictive modelling. I’d like to “broaden our discussion” in this Q&A to talk more generally about Quantitative Risk.

I’d like to start by asking you a broad question. Are you seeing an “uptick” in the good use of Quantitative Risk Analysis (which I’ll refer to as “QRA” from this point on in the interview) to help people to make effective decisions, or is it pretty static, from your viewpoint? If you are seeing an increase in use, is it in particular industries / sectors, or is it pretty much across the board?

Rishi: There is definitely an ongoing increase in the use of QRA across all sectors, especially in projects (resources, infrastructure etc.). However, with that popularity we have seen an increase in the misuse of QRA as well! The technology is readily available, but the knowledge needed to make sense of the process and assumptions takes longer to become inherent in practitioners.

Gareth: What are some examples of how you are seeing QRA being put to good use nowadays?

Rishi: There is no limit to the number of examples around! Some recent examples include modelling litigation outcomes in the US with decision trees, sustainable supply chain management in India, product development decisions for the U.S. Army Corps of Engineers, food safety modelling in China, and project cost contingency and escalation modelling in Canada.

Gareth: As a related question, I’ve seen how QRA can be used in Cybersecurity and understanding the Cyber risk threat. Have you done anything in this field?

Rishi: I’ve had a few customers with Cyber risks as either part of or the focus of their modelling. Fundamentally they are similar to modelling any other risk types that have potentially catastrophic outcomes but limited data with which to do parameter estimation.
**Gareth:** You work a lot with different teams to help them get the most out of using QRA. What are some of the key factors that people must always bear in mind to ensure they get the most out of using QRA?

**Rishi:** I think the absolute key is to be aware of the assumptions in your model. These determine what you can reasonably say—and not say—about your results. It’s of critical importance to have the correct caveats somewhere below every chart and table of results. Secondly, it’s very important to know the correct interpretations of these results once you do get them!

**Gareth:** Where can the use of QRA “go wrong” (and perhaps lead to disappointment in the outcomes)? Are there situations that QRA is not suited to?

**Rishi:** QRA is suitable to any situation where the potential outcomes are meaningfully impactful, and would affect business decisions if understood well enough. The biggest abuse of QRA occurs when an organisation does it to ‘tick that box’ rather than get any value out of the process. Directly related to this lack of practical knowledge is the misunderstanding of modelling in general and probabilistic modelling specifically. These problems conspire to produce relatively meaningless results, and thus could give misleading information to a decision maker.

**Gareth:** In today’s fast-paced world, where things can change quickly, can QRA help people to review scenarios and to ensure they undertake informed decision-making?

**Rishi:** QRA, when set up properly, is essentially designed to do exactly that! The technology can be updated as quickly as the data can be downloaded.

**Gareth:** Building on this point, with the increasing focus on capturing and using data and AI to help improve business / organisational performance, will our use of QRA change as we capture and analyse more data?

**Rishi:** Indeed QRA will change, not so much in form but in the proportion of work that will be data-driven. Currently there is a lot of expert estimation, but this will reduce over time. This ‘big data’-type scenario also leads to an increased use of neural networks and other predictive modelling analyses to assist in the estimation and modelling process.

**Gareth:** Palisade has been in the QRA space for decades. Some of the Palisade tools such as @RISK are very widely known. Are there other tools in the Palisade suite that those of us who are familiar with @RISK should consider using?

**Rishi:** Obviously I think you should all look at all of the tools! Some specific applications that are related to the use of @RISK include combining PrecisionTree with probability distributions for probabilistic decision trees, and including NeuralTools as a predictive component to an @RISK model.
You may also be able to perform some simpler analysis with TopRank, or use it to focus the use of @RISK in the next stage of modelling.

**Gareth:** I have seen some great examples of applying QRA in high-risk industries, from construction and engineering to mining to space exploration. Indeed, there’s a great case study on the Palisade website about how NASA and Lockheed use QRA for the project for the first manned mission to Mars (just one of many examples provided on your website). Does QRA also suit simple situations and risks?

**Rishi:** Certainly @RISK, the rest of the DecisionTools Suite and QRA in general are completely ambivalent to the application. The software doesn’t understand the words around the numbers! A great example is cost modelling—a very straightforward structure and not always on the mega project scale. Despite the simplicity, true insights can only be gained by using QRA techniques.

**Gareth:** Where do you see QRA heading in the next few years?

**Rishi:** The use of smarter tech will continue unabated, such as the AI understanding of big data, but we are trying to make the short to medium term future of QRA an informed one. Usage is increasing, but the uptake of the tech is quicker than the necessary education.

**Gareth:** Lastly, I’d like to talk about people skills in making good use of QRA. You and I have often discussed the importance of risk practitioners having good “soft skills” to know how to ask people good questions that lead to an understanding of assumptions, and to ensure good quality thinking is developed to create a quantitative model to use for QRA. I presume this is still as important as ever.

**Rishi:** This is one thing I can’t see changing, and only becoming more important as the software continues to evolve. It will still take a person, a decision maker, to determine the actual purpose of any model, and just how much risk they are willing to accept (and what to do when it’s unacceptable). Explaining the final results in a simple—but absolutely correct—way, is essential to the appropriate application of QRA.

Thank you very much for your time, Rishi.