

Governing Energy

Known, Unknown, Unknowable

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These three categories of risk are pretty straightforward; on the surface. Known risks are those sets that are identified to risk management. Slightly more complicated, Unknown risks are discoverable given inquisition and information. The third class, Unknowable are beyond the scope of the *current* risk identification and mitigation model.ⁱ

This Risk Taxonomy is useful for complex adaptive systems found in critical sector infrastructure structures and integrated processes aka, Ecosystems. Systems of this nature are comprised of “multiple interacting scales.”ⁱⁱ

The four statistical “scales of measurement”, nominal, ordinal, interval and ratio are the way variables are defined and categorized.ⁱⁱⁱ This is an important consideration when using stochastic risk mitigation models as opposed to simple linear thinking.

The mathematician Alan Turing, most famous for breaking the World War II German Enigma code also put forth the hypothesis that, “*there cannot exist any universal algorithmic method of determining truth in mathematics, and that mathematics will always contain undecidable propositions.*”^{iv} This is important because it suggests that any quantitative decision support system by definition will always have Unknowables!

He goes on to posit that catalytic agents in a multifaceted system acting locally can diffuse randomly throughout it and ultimately cause it to evolve into a new stable set of process patterns across the Ecosystem.^v This statement is overly simplifying complex mathematics but the reader will get the point.

Often significant incidents are the result of more than one (sometimes relatively) minor (catalytic) events that cascade into major disasters.^{vi} The Swiss Cheese Barrier model recognizes this likelihood as well if multiple barriers are breached simultaneously due to human and/or system fallibilities.^{vii}

Very Interesting, However?

Some may wonder that this is all very interesting, a bit academic and even theoretical but so what? What’s in this construct for me in my everyday job?

Whether using a spreadsheet, ERP financials, engineering, statistics or other math driven analysis software solutions, we assume the arithmetic performed by these programs is correct. A myriad of crucial decisions are made under these assumptions.

What if these critical software programs do not always correctly calculate the answer correctly?^{viii} Usually, these anomalies are minor and perhaps not even noticed as they may occur outside of

significant numerical digits.^{ix} However, would you want the instrumentation your surgeon is using during the operations to be in error?

The health of a risk management system depends on its proper construction! If the theoretical construct of your surgeon's data systems or science and engineering is not sound, then all decisions flowing from these systems increase exposure, not reducing it.

It is important that users understand the limitations of decision support systems and that includes the data component of the Ecosystem. Poor data quality is a very real problem that manifest may itself daily.^x

Circular Loops Do Compute

A typical definition of taxonomy refers to either a relatively static technique for classifying members of a group, i.e., biological organisms, or the nomenclature of the members.^{xi} The relationship among members of one class to other classes is often either inferred or not addressed.

A Risk Taxonomy is dynamic. Risks assigned to one group such as Unknown can become Known. When Unknowables manifest themselves they likely become Known. This is unique.

Known risks can become Unknown if the management systems used are "feed" poor or incorrect data. In this complex adaptive system, Unknown risks can morph into Unknowable if catalytic agents cause the effect of a new stable component to the Ecosystem.



A Resilient organization will not have identified every possible combination of Ecosystem interaction and evolution, but it is prepared to rapidly address any risks migrating as the Unknowable/Unknown

becomes Known. Risk managers must recognize these dynamics from a multifaceted system. Simple risk management models *currently* used are no longer applicable.

Does your Organization's Risk Taxonomy Reflect these Three Groups?

About the Author

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End Notes

ⁱ <http://www.sei.cmu.edu/reports/93tr006.pdf>

ⁱⁱ <http://www.ams.org/journals/bull/2003-40-01/S0273-0979-02-00965-5/S0273-0979-02-00965-5.pdf>

ⁱⁱⁱ <http://faculty.webster.edu/woolfm/statwhatis.html>

^{iv} <http://www.biography.com/people/alan-turing-9512017>

^v <http://www.ams.org/journals/bull/2003-40-01/S0273-0979-02-00965-5/S0273-0979-02-00965-5.pdf>

^{vi}

<http://www.preventionweb.net/english/hyogo/gar/2015/en/bgdocs/inputs/Liu%20and%20Huang,%202014.%20Compound%20disasters%20and%20compounding%20processes%20Implications%20for%20Disaster%20Risk%20Management.pdf>

^{vii} <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1117770/>

^{viii} <http://www.journalofaccountancy.com/issues/2014/mar/excel-calculation-errors.html>

^{ix} https://www.physics.uoguelph.ca/tutorials/sig_fig/SIG_dig.htm

^x https://www.sas.com/content/dam/SAS/en_us/doc/whitepaper1/bad-data-good-companies-106465.pdf

^{xi} <http://www.dictionary.com/browse/taxonomy>