

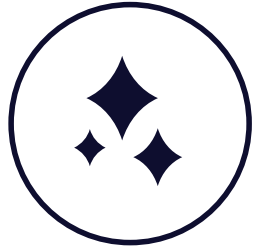


SCAF / ICEAA INTERNATIONAL TRAINING SYMPOSIUM LONDON QEII CENTRE 2024

The Risks of Misinterpreting Risk Analyses



Company Overview



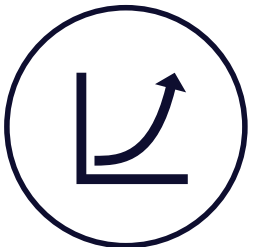
Established in 2020



80 employees, growing to
95 by the end of 2024



Sirius Analysis Inc incorporated in
Virginia, USA September 2024



Turnover more than trebled
in the past 2 years





Dave Hedley – bio extra

Before joining the consulting community, I worked developing underwater transducers for sonobouys and capturing the ARM 'agreed characteristics' for a submarine weapon system.

From 1984, with Rex, Thompson and Partners I conducted ARM studies on diverse systems such as submarine sonar suites, safety studies for the first flight of EFA, now know as Typhoon, and train fire barrier doors and ship radars.

My first major involvement with costing was to support the MoD Pricing and Forecasting Group, now the Cost Assurance and Analysis Service (CAAS), model the Public Sector Comparator for the Army's C Vehicle PFI. Since then, I've changed companies a few times until I joined Sirius Analysis in April 2021 and conducted studies across land, sea, air and space for clients in defence, health, energy and transport, as far afield as Australia and as exotic as Royal Leamington Spa.

My original degree is in Physics and Electronic Engineering. I'm a licensed radio amateur, dabble in photography and electronic music and am currently the SCAF Treasurer.

Agenda

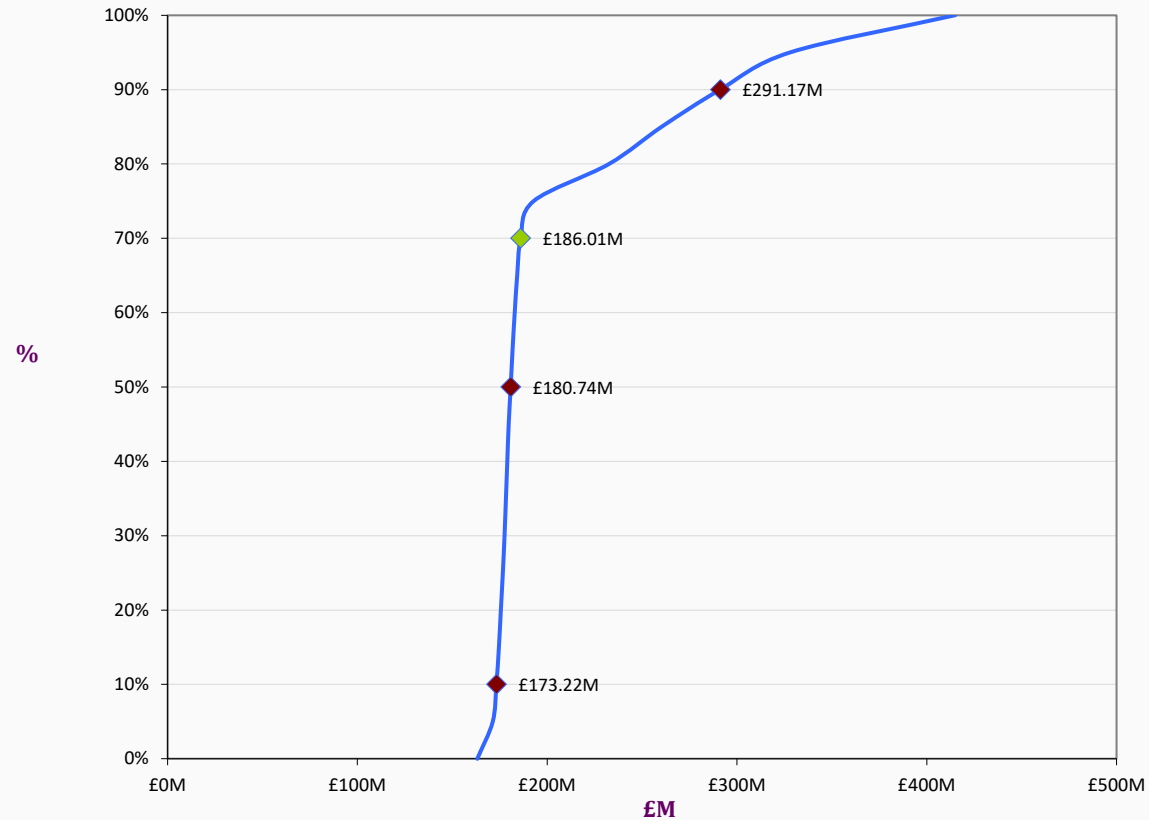
- Background
- The original – the potential problem
- Risk Modelling Approaches
 - The Minimum
 - Better
 - Even Better
- Discussion of different scenarios
- Types of risks
- How to spot a potential problem
- Typical modelling results
- Recommendations - Manage Proactively

Background

- The origins of this presentation may be found in a project I supported almost 10 years ago, providing cost modelling and forecasting for a government business case submission. The business case inevitably included an analysis of the time and cost risks to which the delivery of the project, if approved, was exposed.
- The classical risk analysis undertaken by the project team had identified several tens of normal project risks, but had also included a couple of Low Probability, High Impact (LPHI) events. The interpretation and incorporation of these risks into the proposed business case was itself a risk to the successful approval of the case.
- Today I wish to explore this scenario, how the organisation in question has developed strategies and standards to address the issue and to consider pre-emptive methods to reduce the analysis load and enable projects to focus on the risks which they own and over which they have influence.

The original

10-Year S-Curve:

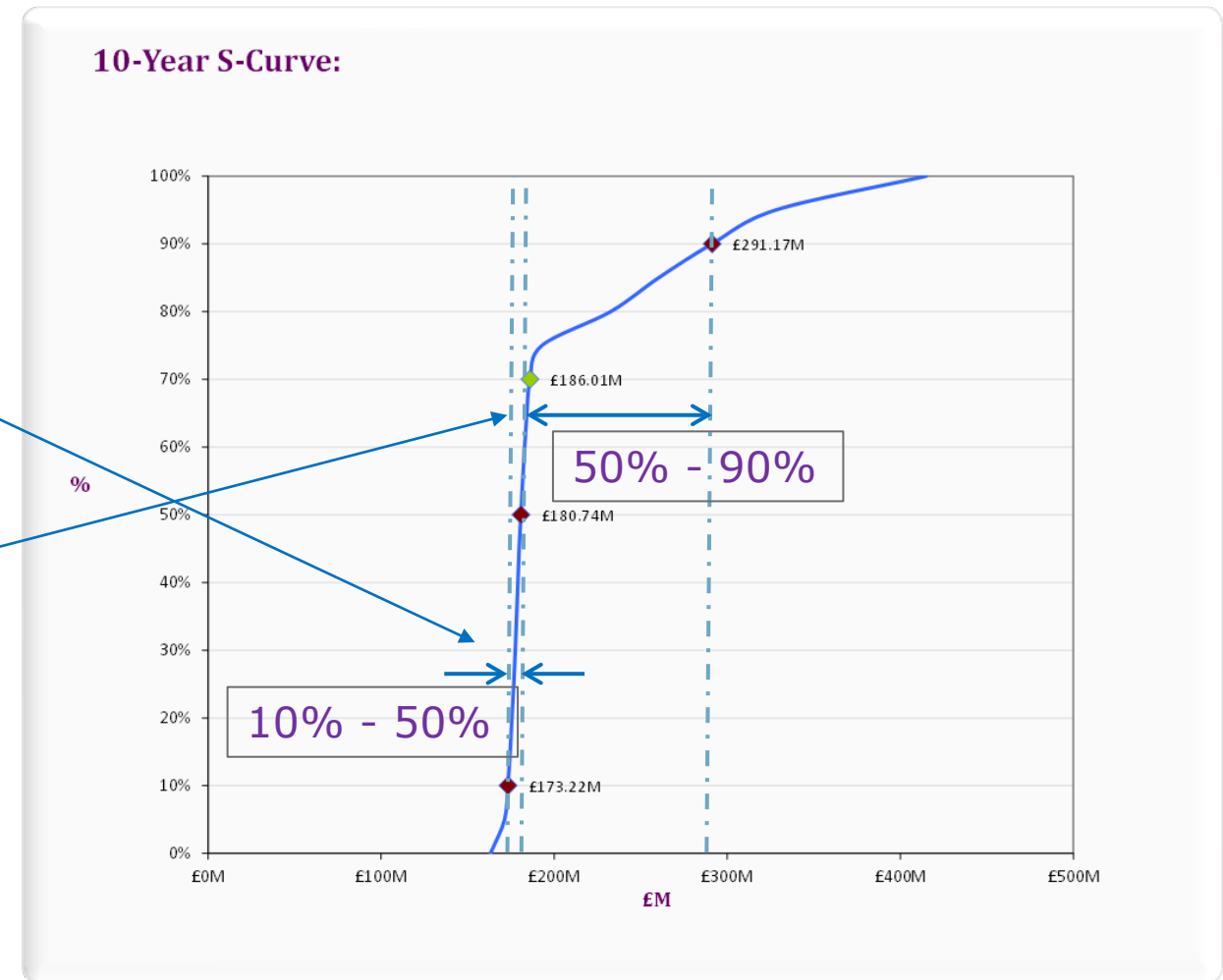


What's wrong with this picture?

Nothing – per se,
it's all in the risks

What's odd?

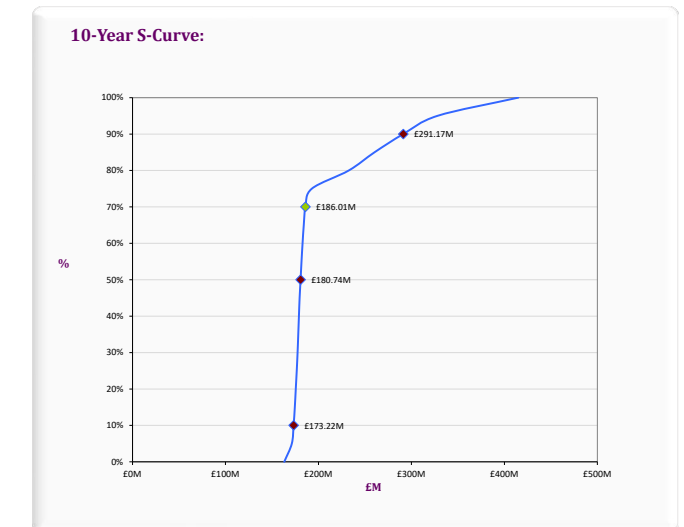
- This is not a classical 'S Curve', but reflects the anomalous risks included...
- The 10% - 50% interval = £8.5M
 \equiv 4.71% of the 50% value
- The 50% - 90% interval = £110.4M
 \equiv 61.10% of the 50% value



Discussion

When the project I supported modelled their costs and the Monte Carlo modelling produced this chart the project team were:

- Short of time;
- Convinced that their system solution was adequately costed and, most important;
-
- That they'd adequately captured, analysed and understood the risks to which the project was exposed.



This *may* have been true, but the project team failed to take the next step in the process.

Risk Modelling Approaches - The Minimum

A key function in the successful delivery of a project is the **Management of Risk**.

In simple terms this requires the

1. Identification, characterisation and capture of the risks to which a project is exposed. This data is normally collated in the project Risk Register.
2. Proactive review and management of the project risks.
3. Repeat steps 1 and 2....

A project management plan will be expected to define the Risk Management Stakeholders and the management processes and schedule by which risk will be managed.

Risk Modelling Approaches - The Minimum

- The simplest risk capture process addresses the 'There is a risk that...' prompt by considering the probability of the risk occurring and
- The impact on the project of the risk occurring
- At its simplest the probability and impact can be qualitatively assessed against 'low', 'medium' or 'high' criteria. Such an approach has only limited value for, as an example, ordering risks by attributing numeric values to each category.

Thus:-

Each Risk classification is given by the product of Probability and Impact.

Probability				
High	0.75	0.08	0.38	0.68
Medium	0.35	0.04	0.18	0.32
Low	0.1	0.01	0.05	0.09
		Low	Medium	High
		0.1	0.5	0.9
		Impact		

Risk Modelling Approaches – Better

The next step is to employ a more sophisticated method that enhances the two basic attributes just discussed with additional characteristics e.g.

- A distribution that describes the impact e.g. a 3 Point Estimate – Minimum / Most Likely / Maximum if a Triangular distribution is assumed or a mean and standard deviation if a normal distribution is employed.
- A mitigating activity that is intended to reduce either the impact of the risk or its likelihood, or both. This mitigation then enable a pre- and post-mitigating risk attributes to be defined.
- A description of the earliest date when the risk could occur a time when the risk expires and, if appropriate, a time profile of the impact.

There are Risk Management tools e.g. Active Risk Manager (ARM), which support the capture and management of these characteristics.

Risk Modelling Approaches – Even Better

I was privileged to attend a presentation at this year's SCAF event in Preston, titled **'Why quantification is key to collaborative risk management'** by the late David Vose.

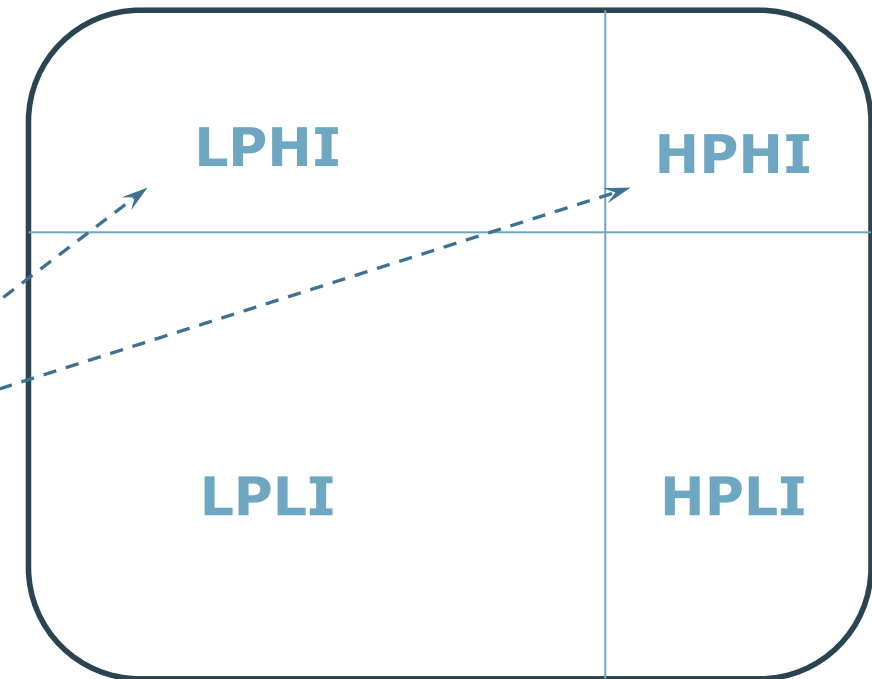
David's talk included a section on 'Introducing bowtie risk analysis', a technique which takes the better approach outlined above, a step further.

Discussion of different scenarios

Most projects have a range of risk types that can be broadly categorised by their;

- Probability of occurring – Low or High - and the
- Impact on the project – Low or High.

Projects have difficulties when the post-mitigated risk probabilities or impacts are high i.e. a significant proportion of the project duration, cost or outcomes performance.



Types of Risk

There are known knowns. These are things we know we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know.

Donald Rumsfeld

Unknown Known	Unknown Unknown
Known Known	Known Unknown



Black Swan Events

The black swan theory or theory of black swan events is a metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight. The term is based on a Latin expression which presumed that black swans did not exist. The expression was used until around 1697 when Dutch mariners saw them in Australia. After this, the term was reinterpreted to mean an unforeseen and consequential event.



Nassim Taleb asserts:

A Black Swan is an event with the following three attributes.

1. it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility.
2. it carries an extreme 'impact'.
3. in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.

Summarizing the triplet: rarity, extreme 'impact', and retrospective (though not prospective) predictability. A small number of Black Swans explains almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, to elements of our own personal lives.

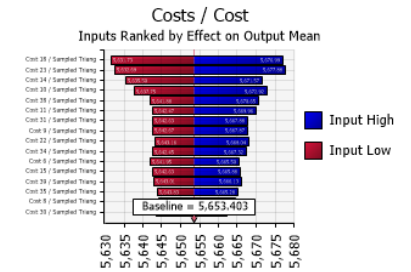
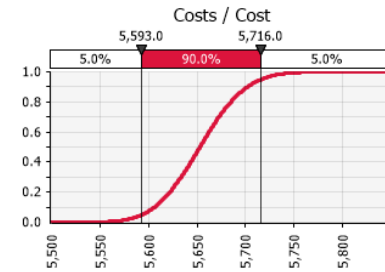
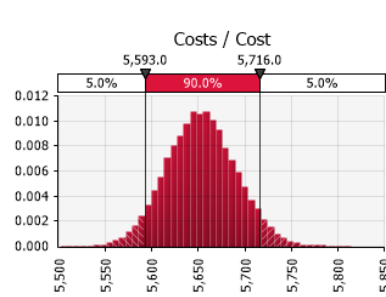
How to spot a potential problem

- There is no hard and fast rule that will identify an anomaly or a problem.
- If something looks odd, then maybe there's an error in the analysis or there's an anomalous risk.
- Include sanity checks in the process. Introduce diverse methods and independent reviews.
- Avoid optimism – sometimes everybody makes mistakes and things can be a bad as they look.
- However – comparing two sets of results can indicate where to look for clues and how to avoid difficult questions....

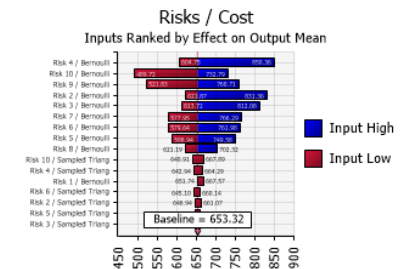


Typical Modelling Results – LPLI and HPLI

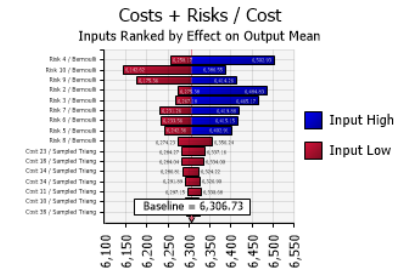
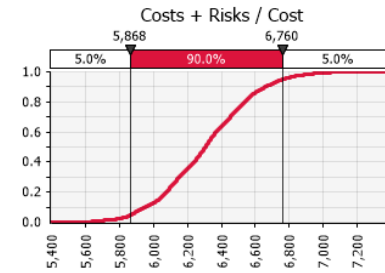
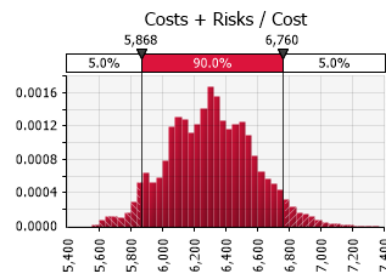
- Costs



- Risks



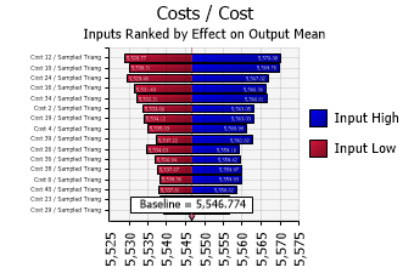
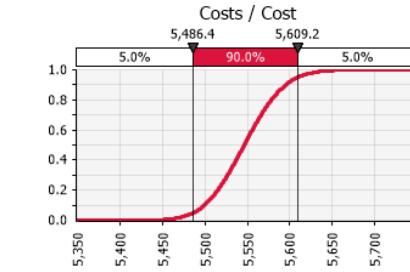
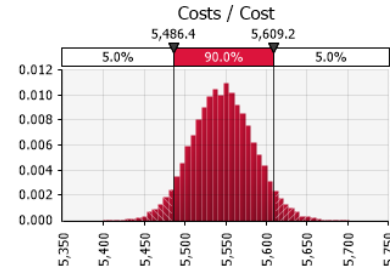
- Costs and Risks



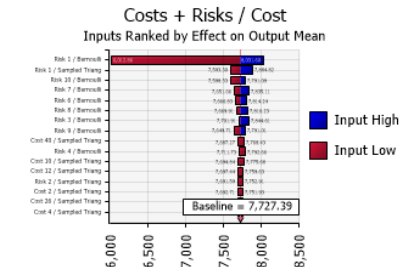
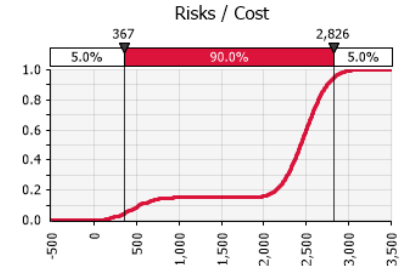
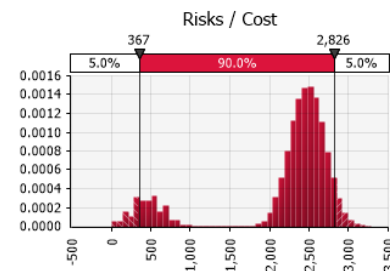


Typical Modelling Results – LPHI and HPHI

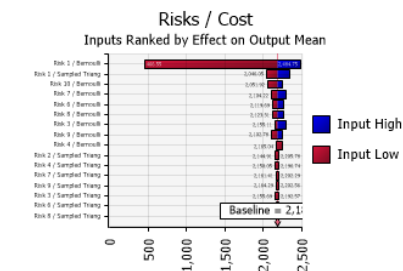
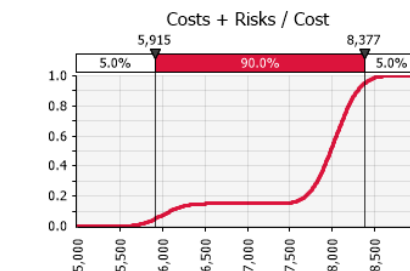
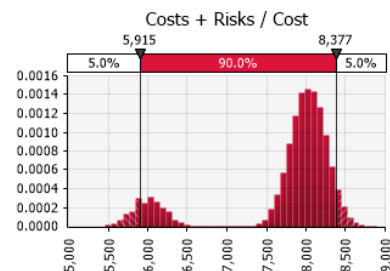
- Costs



- Risks



- Costs and Risks



Recommendations - Manage Proactively

- Woe betide those projects that fail to manage their risks....
- Risks exist and are not self-healing.
- Develop mitigation strategies.
- Examine the project risk register and identify the risks that may be a future problem. Early mitigation is preferable to panic!
- Where practical pass ownership of High Impact risks to a high management level i.e. to a Programme, which may have a more accommodating risk budget. An opportunity to divest the project of HI risks does not avoid the responsibility to analyse and reduce the risk probability or impact.

Thank you

Questions?

