



University of  
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The **National**  
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# Creating Value from Uncertainty and Flexibility

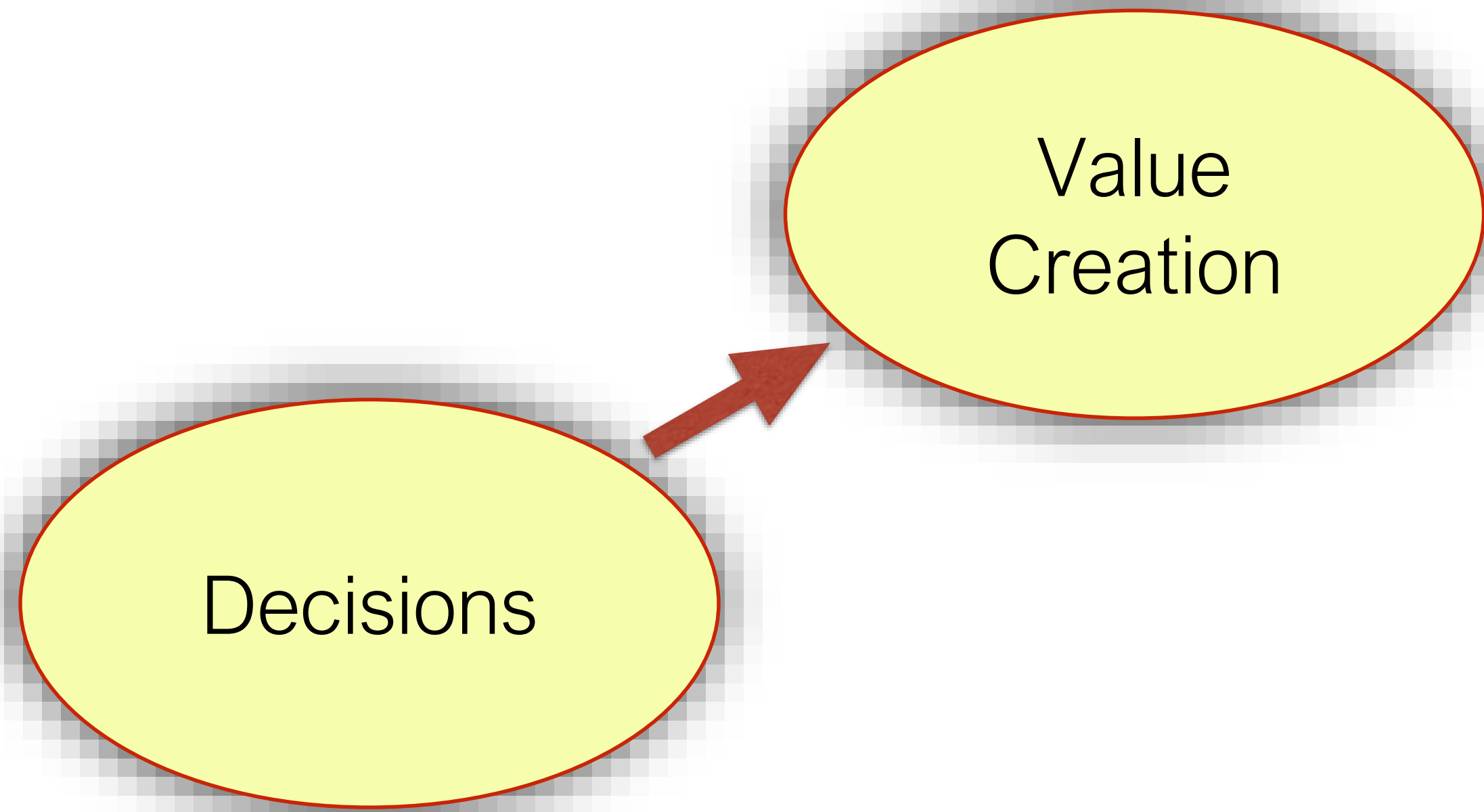
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# It's All About Decision Making

The only way you can purposefully influence your life, your family, your organization, your country, or your world is through the decisions you make.



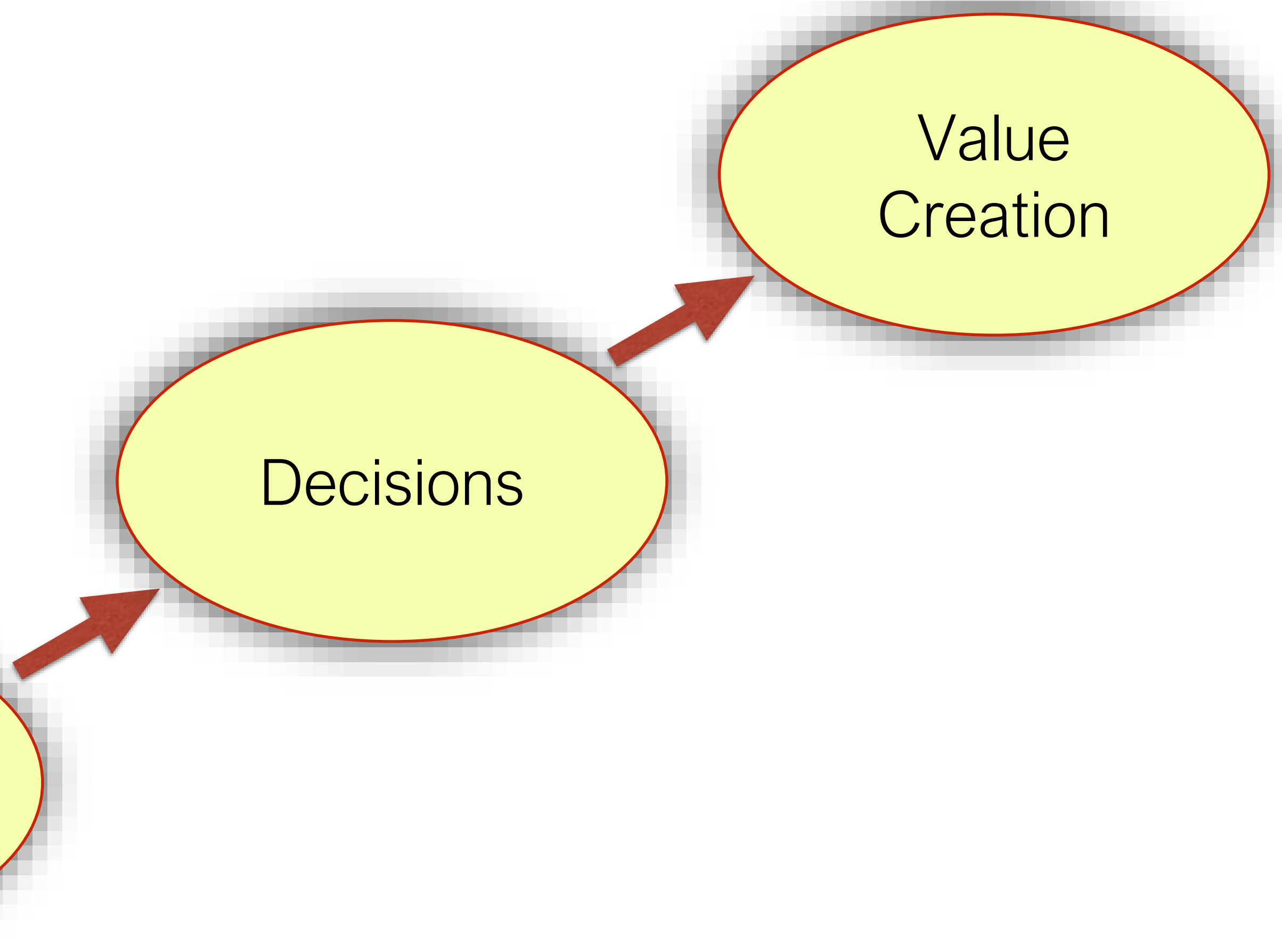
# Uncertainty is inseparable from all significant decisions

You can't make good  
decisions without  
embracing uncertainty.

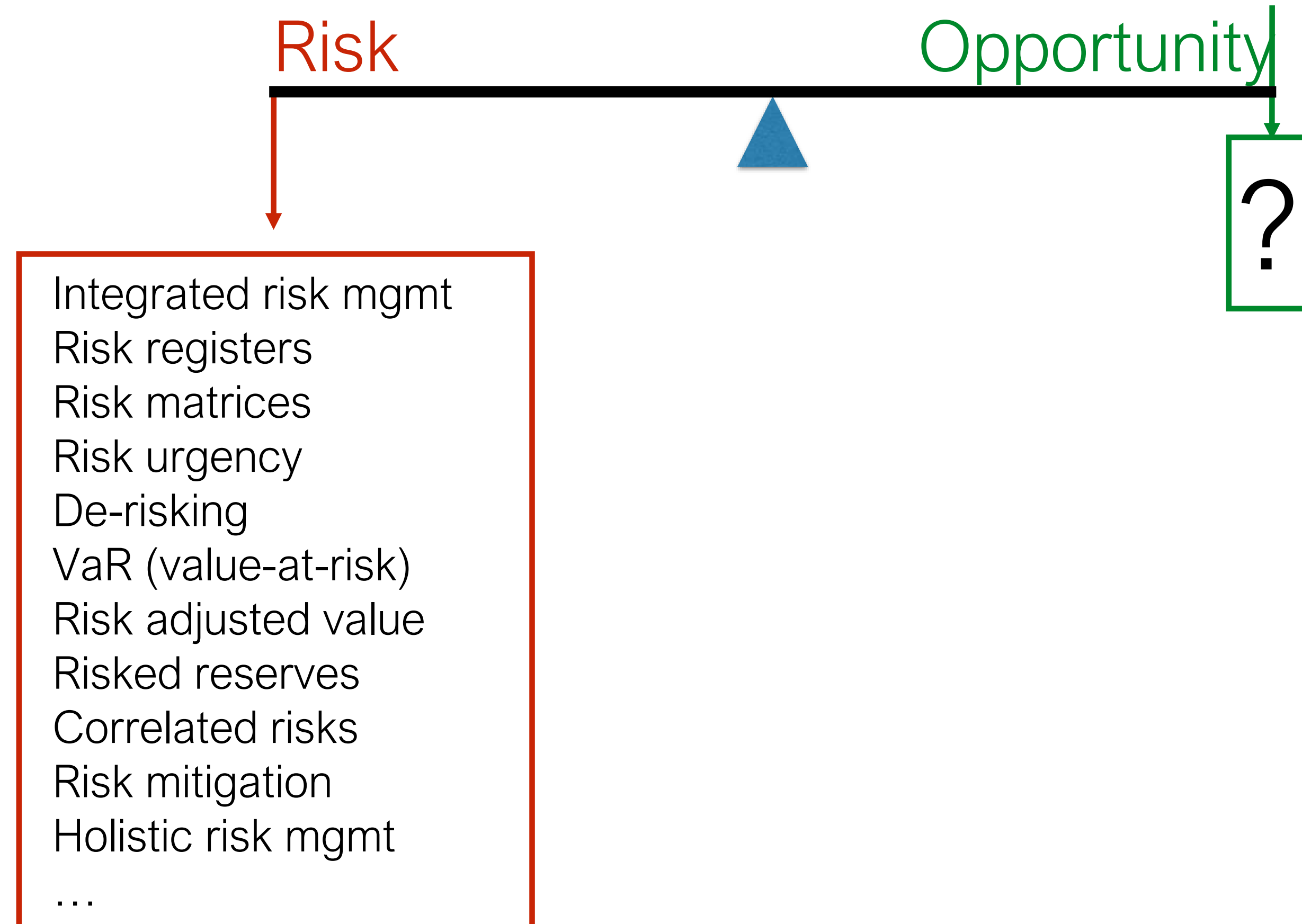
Uncertainty  
Competence

Decisions

Value  
Creation

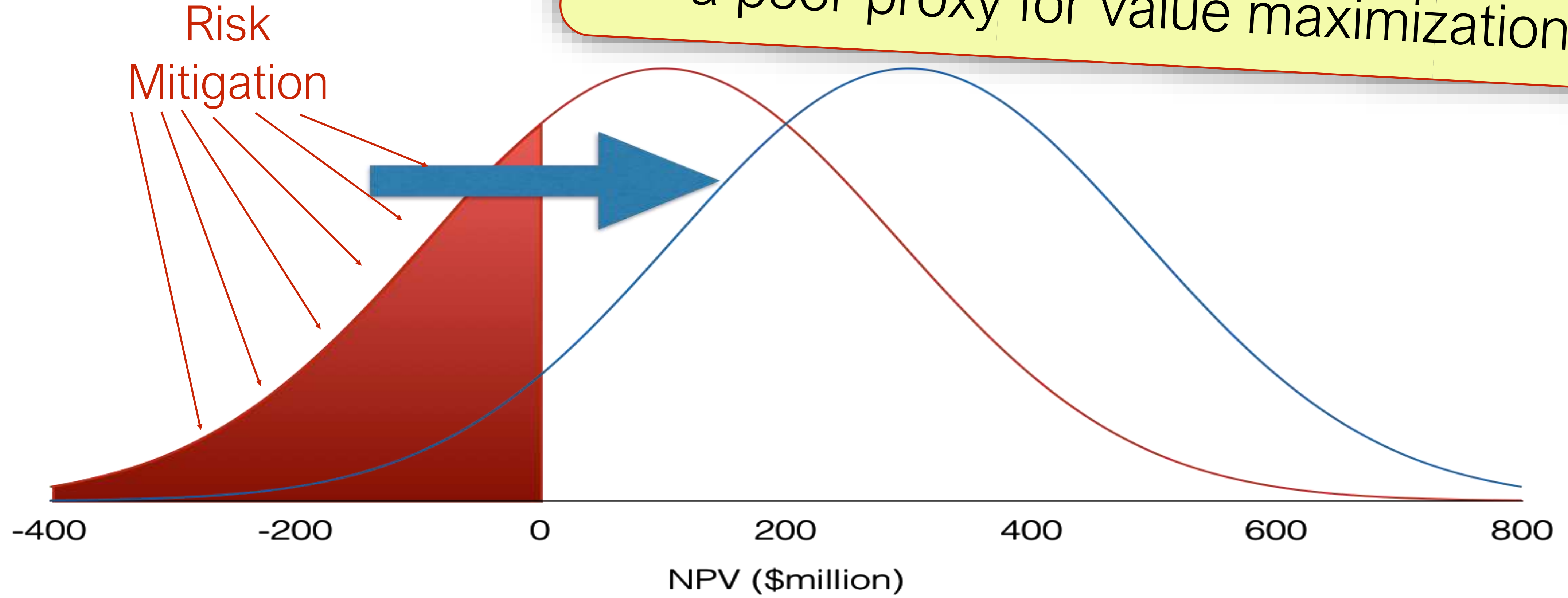


Consider the potential benefits from a technology implementation.

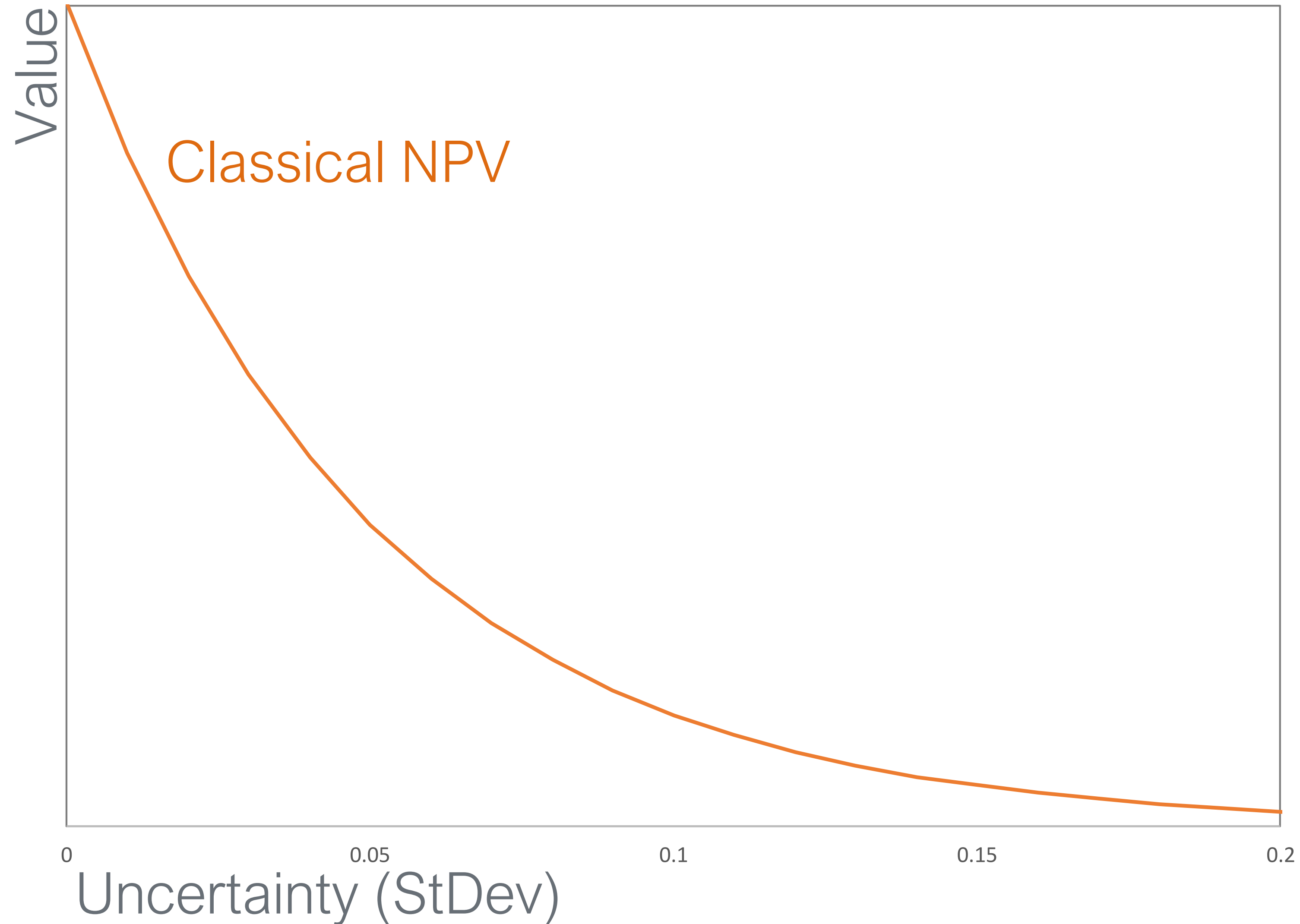


# Flexibility Should be Used to Manage the Impacts of Uncertainty

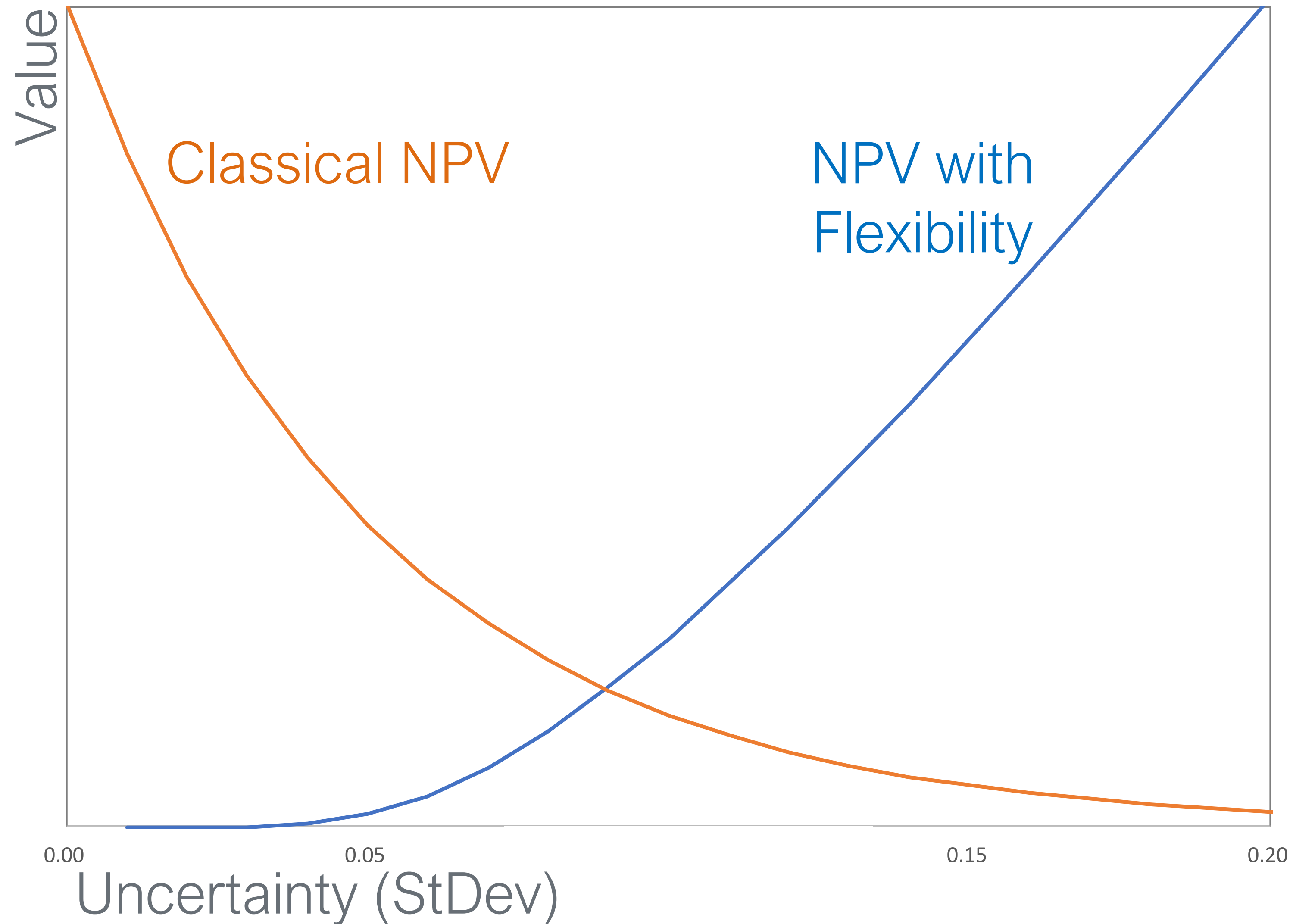
While risk management is important, it is a poor proxy for value maximization.



# Classical NPV Valuation Focuses on the Downside and UNCERTAINTY IS VIEWED AS VALUE DESTROYING ...



... However, Uncertainty, Combined with Flexibility, Holds the Potential for Significant Value Creation



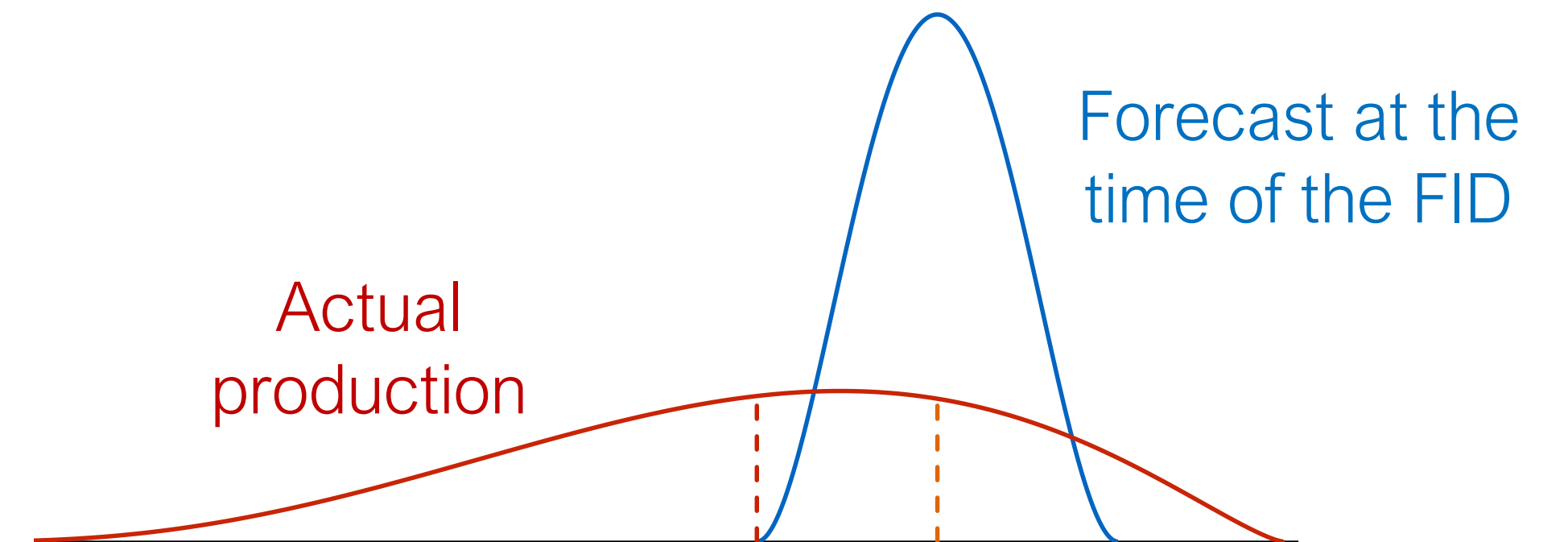


# Optimistic and Overconfident – Over and Over Again

Empirical evidence from the NCS demonstrates that we are both optimistic and overconfident in our assessment of uncertainties.

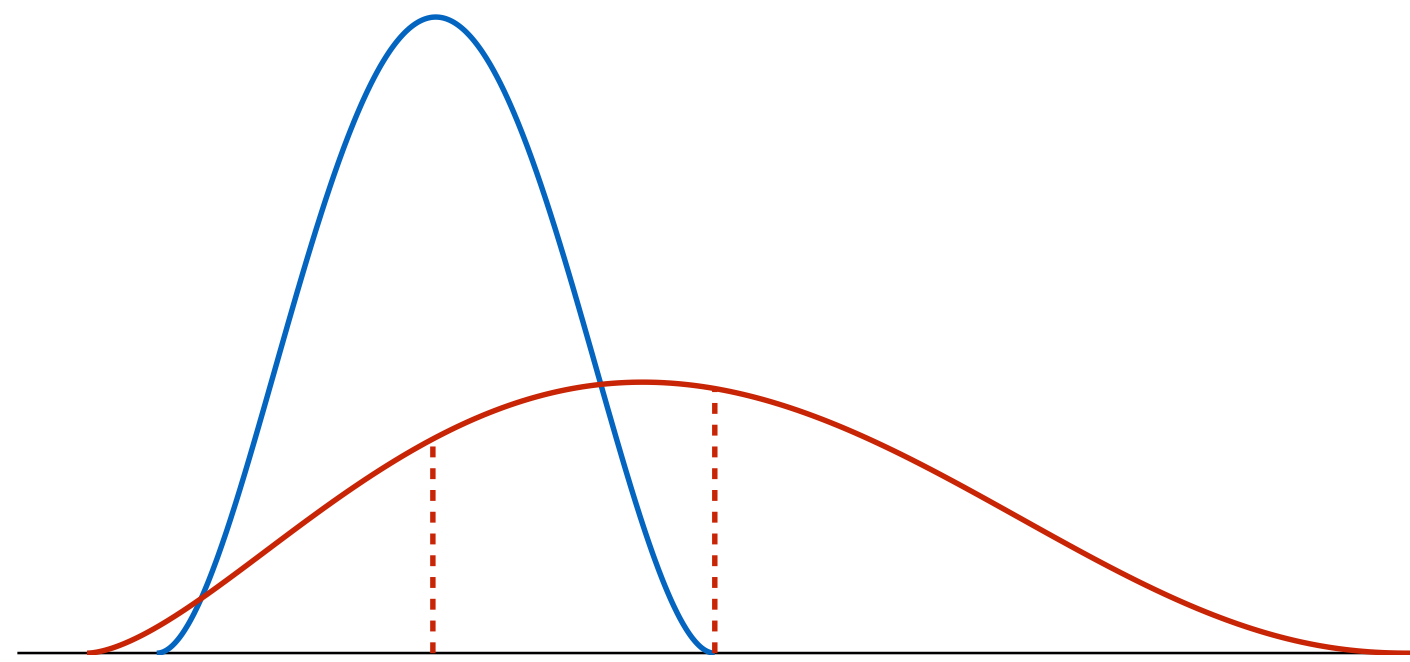
Even worse, there have been **NO IMPROVEMENTS** (bias reductions) over the past two decades.

Production (first four years) from 56 fields on the NCS from 1995 - 2017

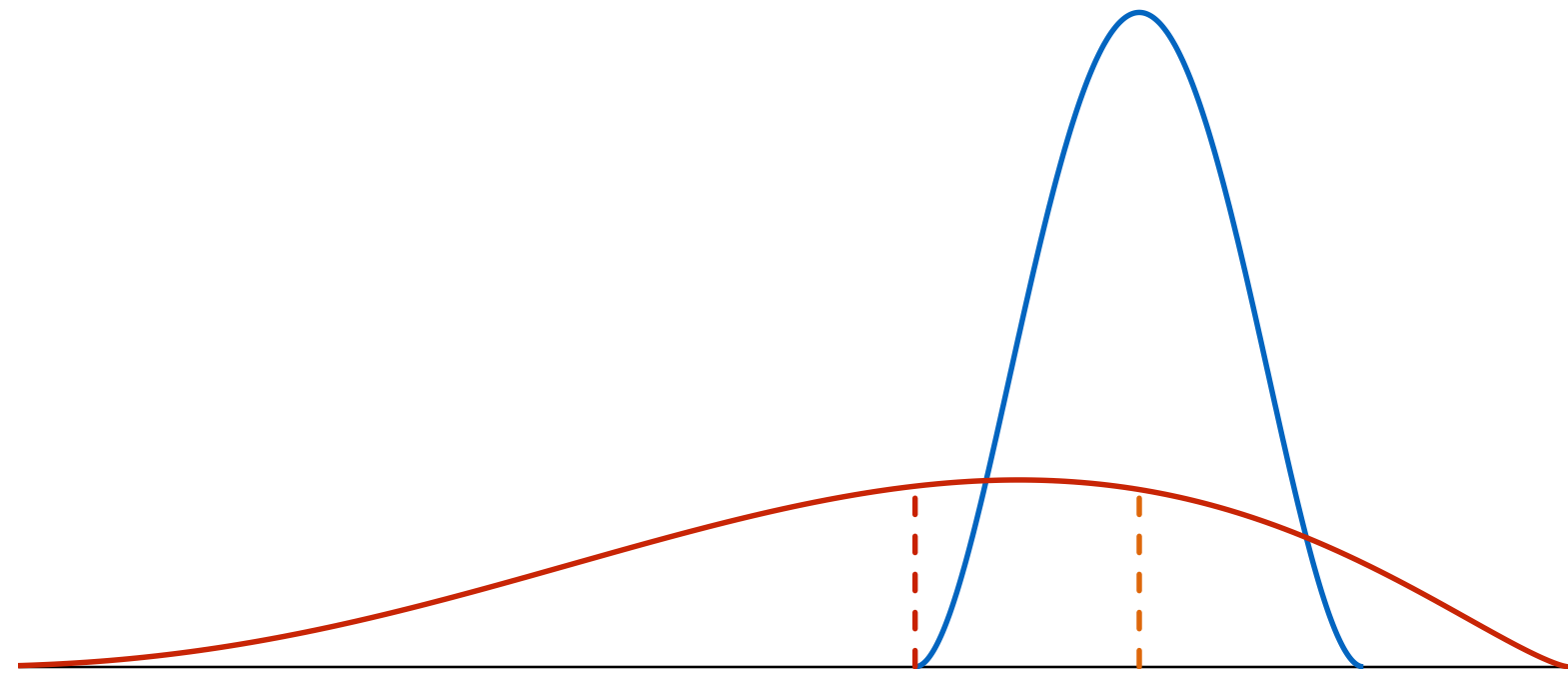




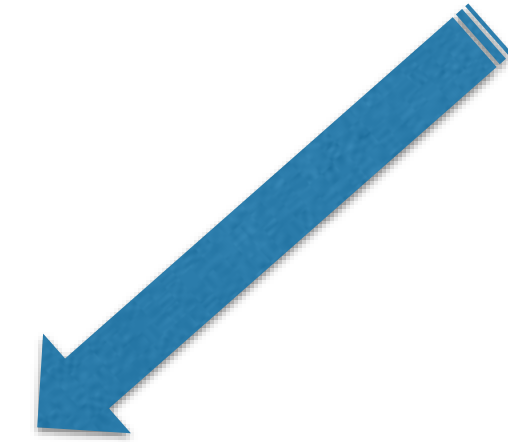
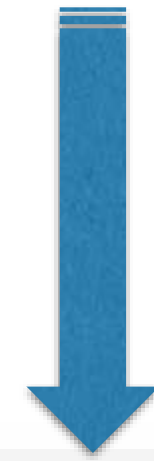
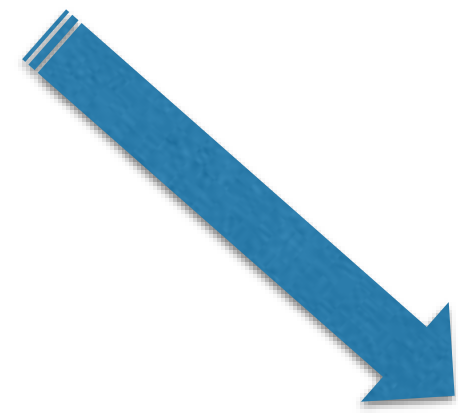
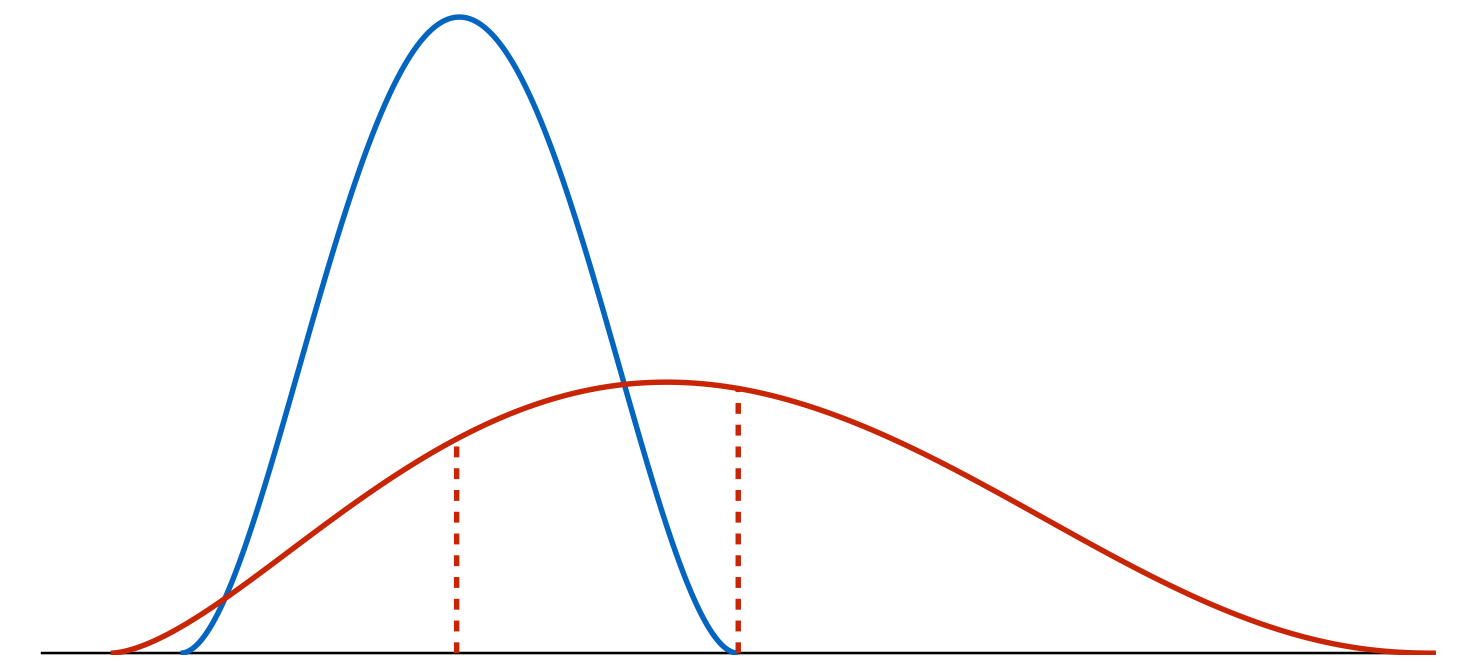
Cost



Production



Time

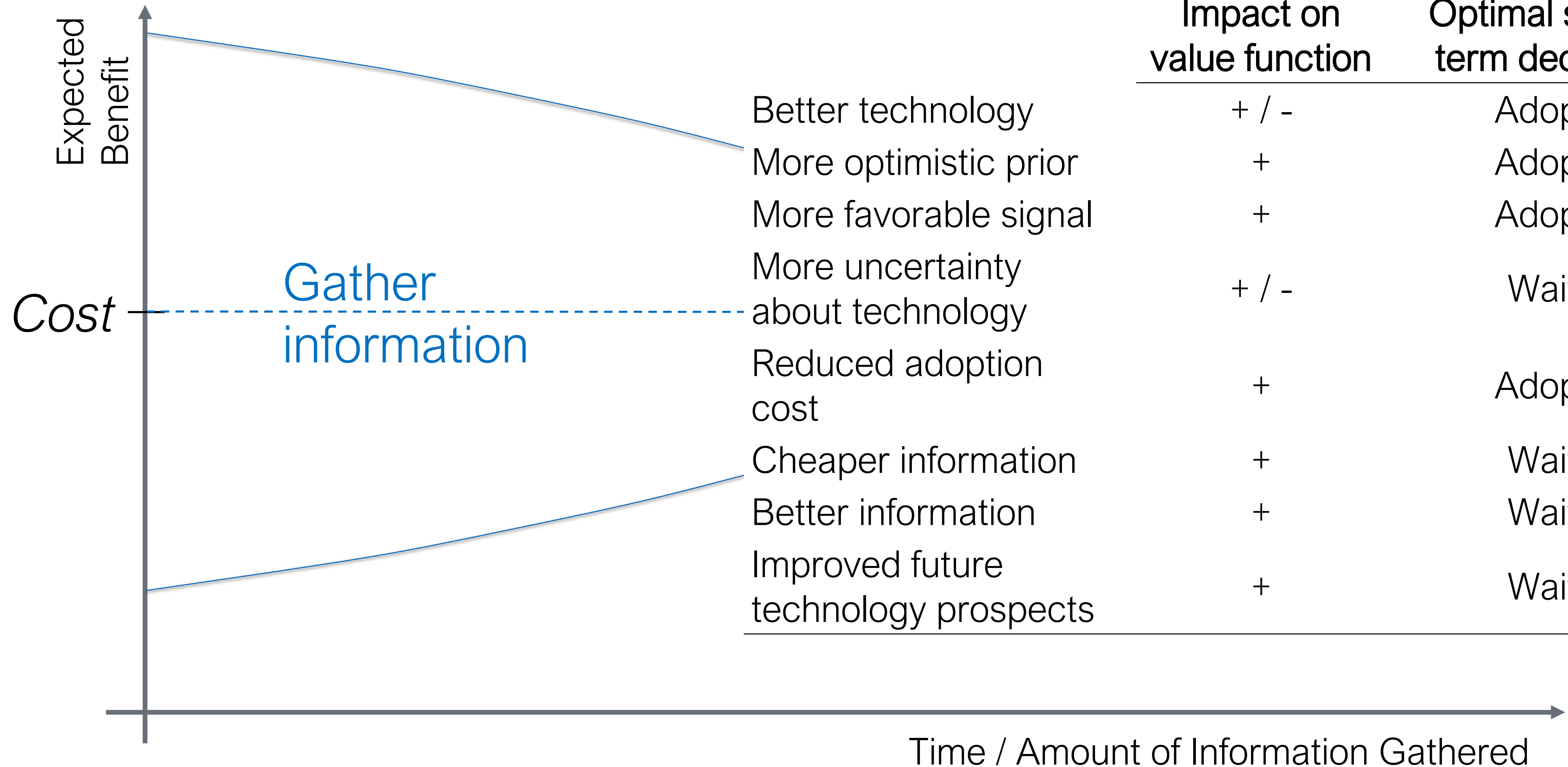


Value erosion

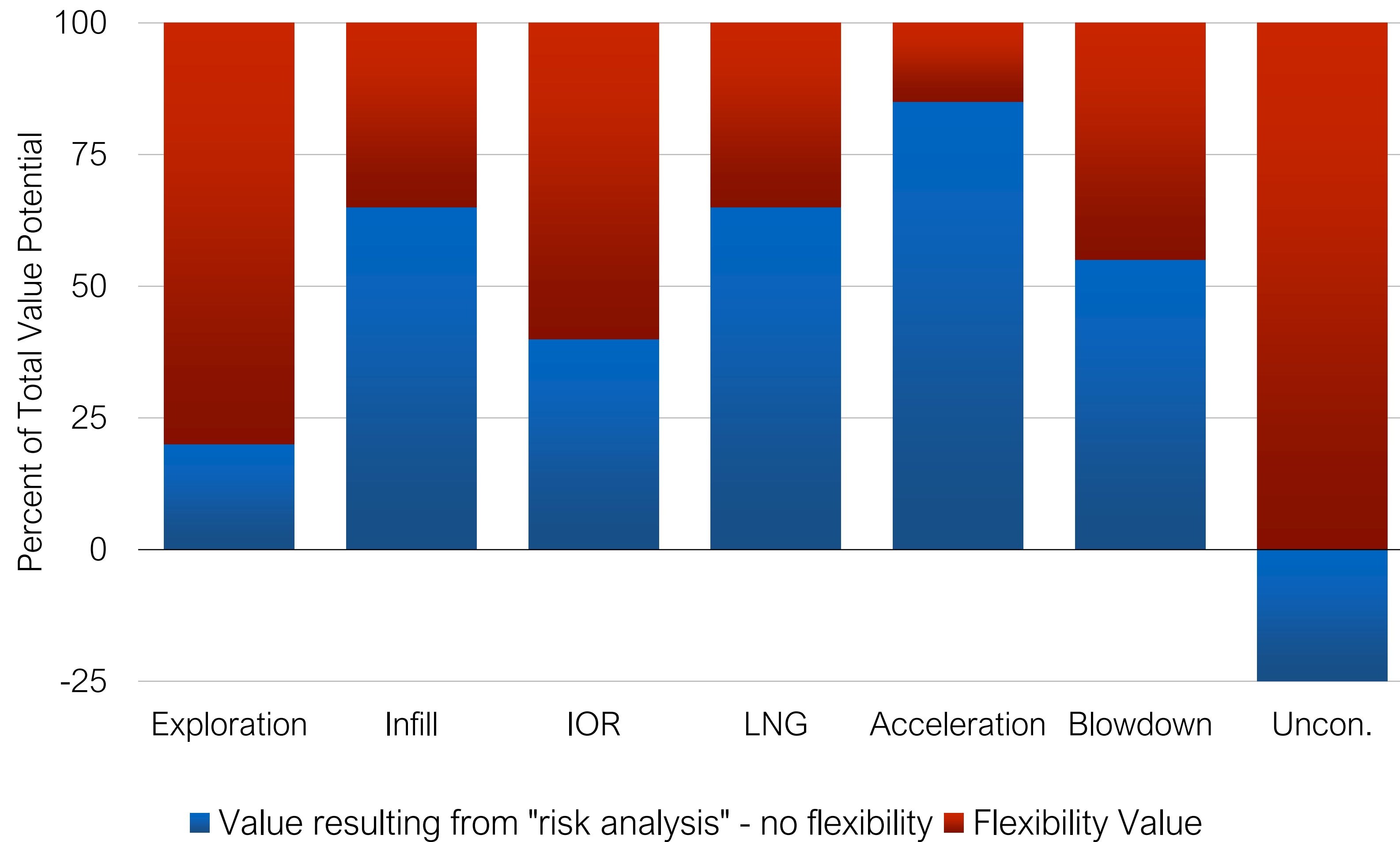
Inability to capture the value potential from flexibility

# When to Invest in New Technology

## A Sequential Decision Problem



# A significant fraction of the overall value potential from oil & gas investments comes from flexibility



# Two Cheers for Uncertainty

- The enemy is not uncertainty but our lack of acceptance of it combined with a biased and error prone approach to dealing with it.
- Embracing uncertainty requires a deep awareness of the fact that we are dealing with a world for which we do not have perfect information, do not fully understand, and never will.

Uncertainty is not a negative; combined with decision flexibility it can be a source of value.