

# *Simulating innovative and disruptive business strategies*

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## ***Innovation in products, markets, and business models is the fuel for business growth***

- Innovative and disruptive strategies radically change the value network.
- When managing innovation firms must decide what investment to make in new products for markets that don't exist with business models that haven't been tried.

## ***Leaders consistently miss big opportunities when faced with disruption of the value network ....***

***"There is no reason anyone would want a computer in their home." – Ken Olsen (1977), CEO of DEC***

***"I predict the Internet will soon go spectacularly supernova and in 1996 catastrophically collapse." – Robert Metcalfe (1995)***

***"There's no chance that the iPhone is going to get any significant market share. No chance." – Tech Company CEO***

***"By 2013, 84% of US households have a home computer." – Pew Research Center***

***"Fulfilling his promise columnist Bob Metcalfe dines on his own words." – Sandy Reed, InfoWorld, April 28, 1997,***

***"Apple iPhones accounted for 40% of U.S. smartphone market in 2015" – Parks Associates, Feb 10, 2016***

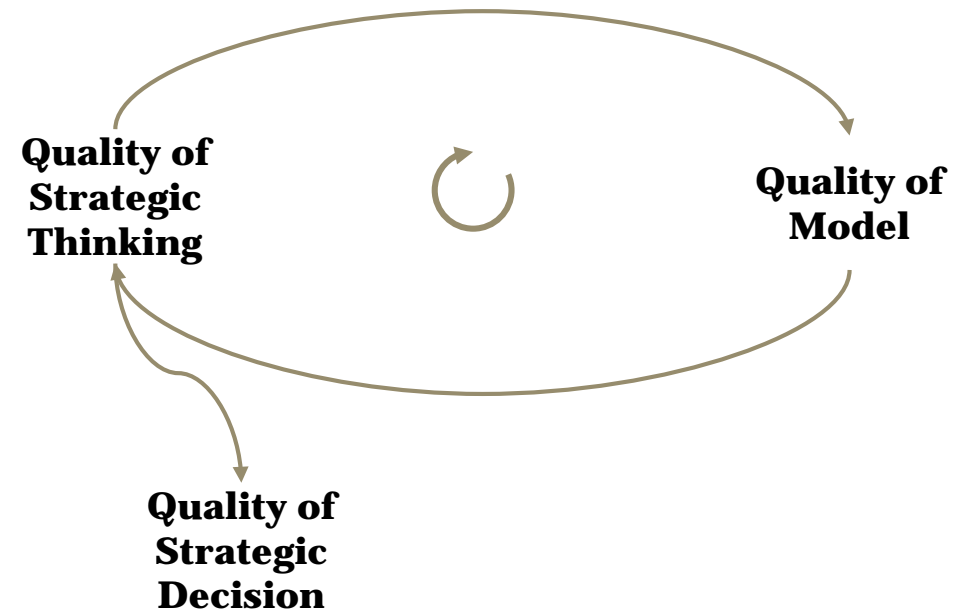
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***Much of this problem is because traditional approaches to thinking about and analyzing innovation are inadequate***

- Qualitative scenario analysis approaches are too subjective and general.
- Data-driven techniques are useful when the future is like the past.
- By definition, innovative businesses are different from the past.

## ***Although they are commonly used, spreadsheet models are inadequate to describe innovative new business systems***

- Spreadsheet models are a popular approach.
- All business systems have feedback, non-linearity, and delay. Spreadsheets cannot describe these structure adequately.
- Spreadsheet models do not support high quality strategic thinking.



# ***Spreadsheet models focus on accounting relationships instead of causal mechanisms***

A spreadsheet model for valuing Uber provides a recent example:

## ***Author's mental model of the Uber's opportunity***

$$\text{Market opportunity} = \text{TAM} * \% \text{ Share}$$

*TAM (Total Addressable Market) estimated from existing Taxi and Limo service market size. If the future is different than the past then the TAM will be different*

*Limited by regulatory restriction and competition*

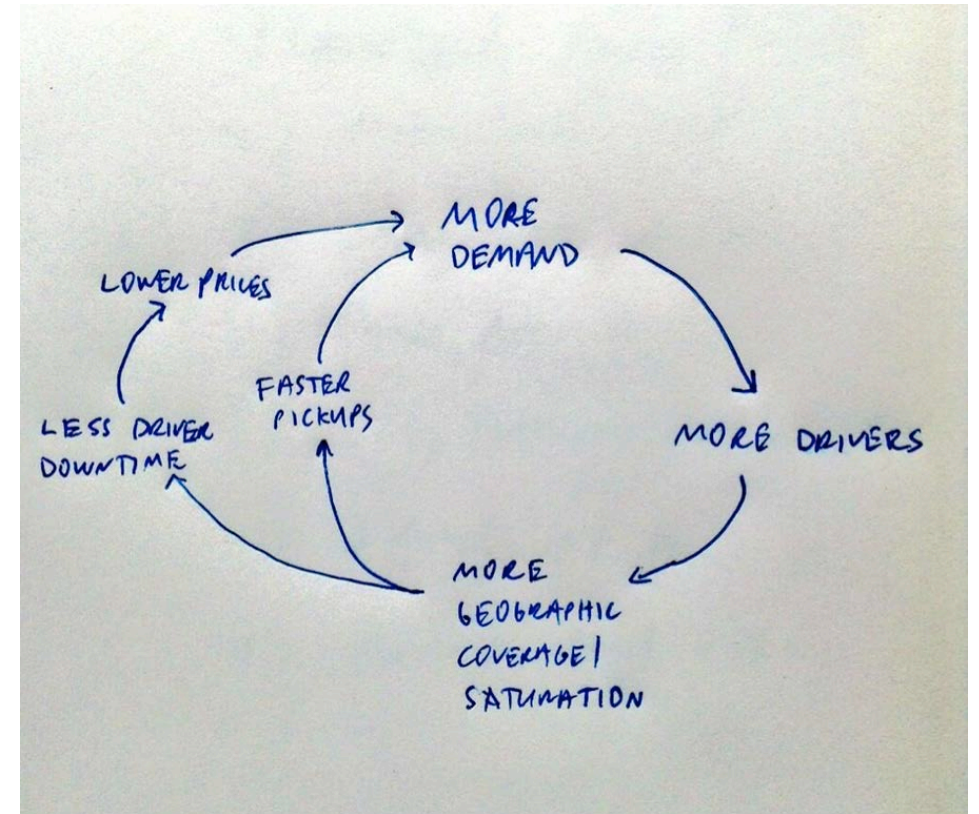
## ***Spreadsheet Representation***

<b>TAM</b>	<b>%Share</b>	<b>Market opportunity</b>
\$100B	3%	~\$3B
\$100B	5%	~\$5B
\$100B	10%	~\$10B

\* Damodaran "Musings on Markets" June 2014, [Link](#)

***In contrast, simulation models focus on the dynamics of market development and the “new economics” of the value network created by innovation***

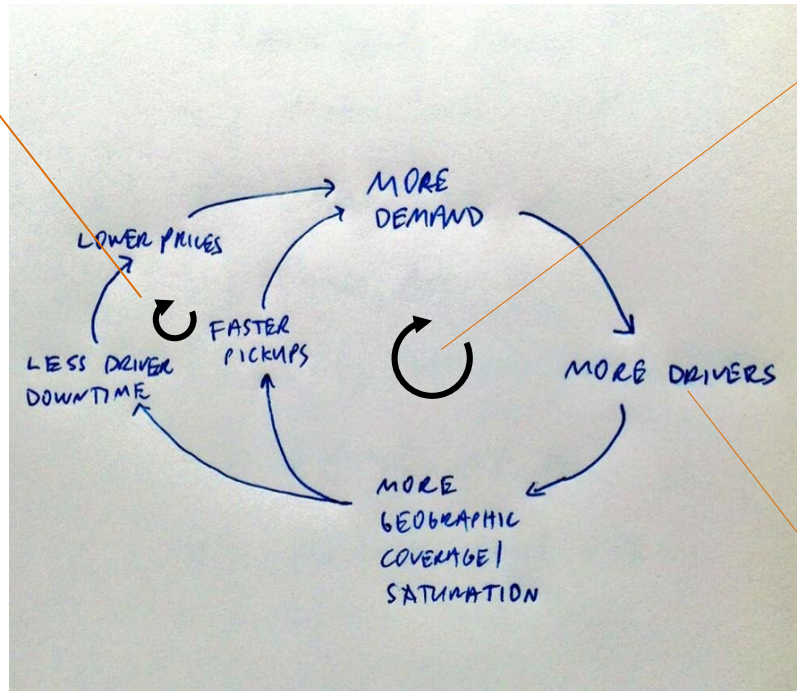
By virtue of feedback, this story produces a market opportunity that is 25x (~\$250B) the spreadsheet version.



Source: Bill Gurley “Above The Crowd” July 2014, ([Link](#))

# ***A qualitative mental mode is great, but simulation is required to quantify the effects***

*This positive loop generates a larger market and a competitive cost advantage, but simulation and perhaps market research are necessary to quantify the effect*



*Positive feedback loop is an engine of rapid growth, but simulation is needed to test its potential magnitude*

*The mental model leaves out important growth limiting negative feedbacks like competition for customers and drivers*

Source: Bill Gurley "Above The Crowd" July 2014, ([Link](#))



# ***AnyLogic platform develops strategic simulation models using its multi-method capabilities, extensibility, and optimization***

**Evaluate complex interaction among many system components**

**Uncertain view of the future**

**Longer evaluation time horizons**

**Profitable strategies hidden within a large search space**

## **Business strategy simulation**

- More and better strategies
- Multi-method modeling is essential
- Optimization is required
- Building the model is only one component of the analysis

# ***Building the simulation model is only one component of analyzing innovation***

## **Innovation analysis process**



### **Model development**

Model structure captures business system dynamics (e.g. customer adoption, competitor response, asset utilization).



### **Performance metrics**

Performance metrics extends those that are traditionally used by stakeholders to evaluate strategic decisions.



### **Visualizations**

Choosing between strategic alternatives involves weighing complex tradeoff's in investment levels, opportunity creation and risk.

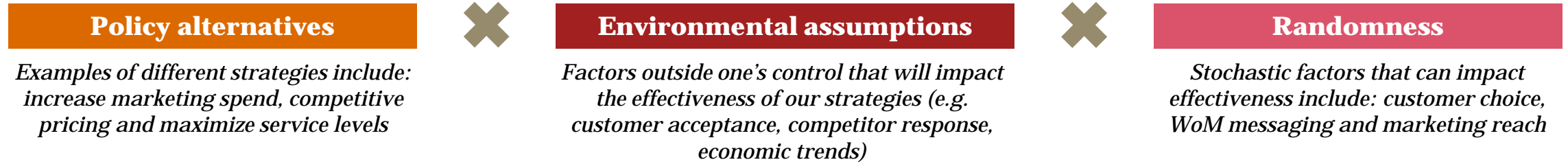


### **Scenario analysis**

The model is used to test thousands of strategy variations and scenarios that also capture uncertainty.

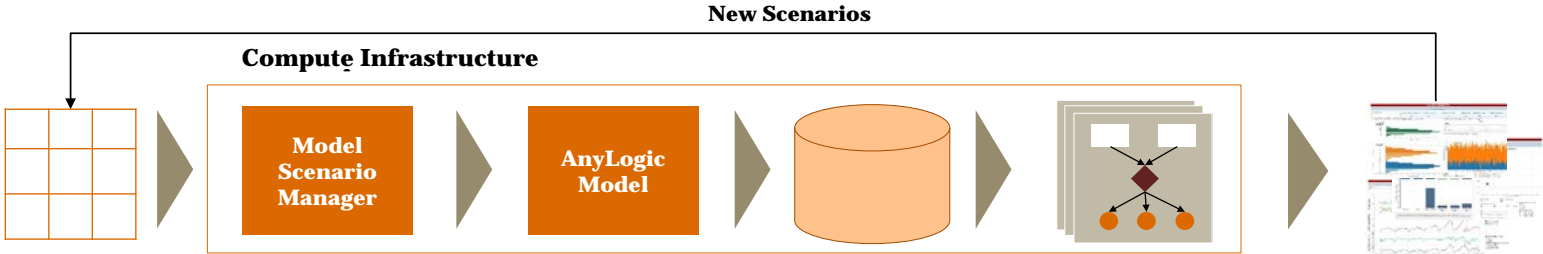
***Each strategy alternative has to be evaluated across the entire range of realistic conditions and then compared against all of the other alternatives***

**This requires running thousands of simulations. Overall, a strategy analysis may require ~500K simulations**

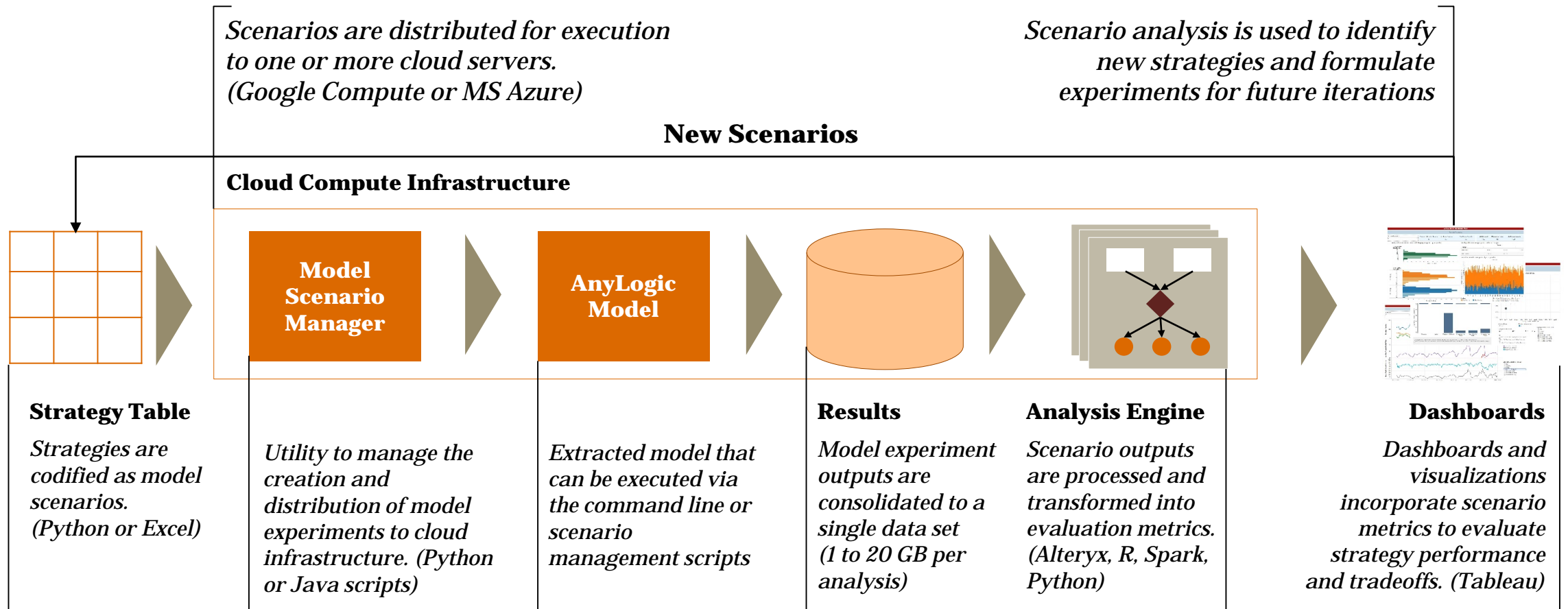


**~1,000 - ~10,000 scenarios for evaluation**

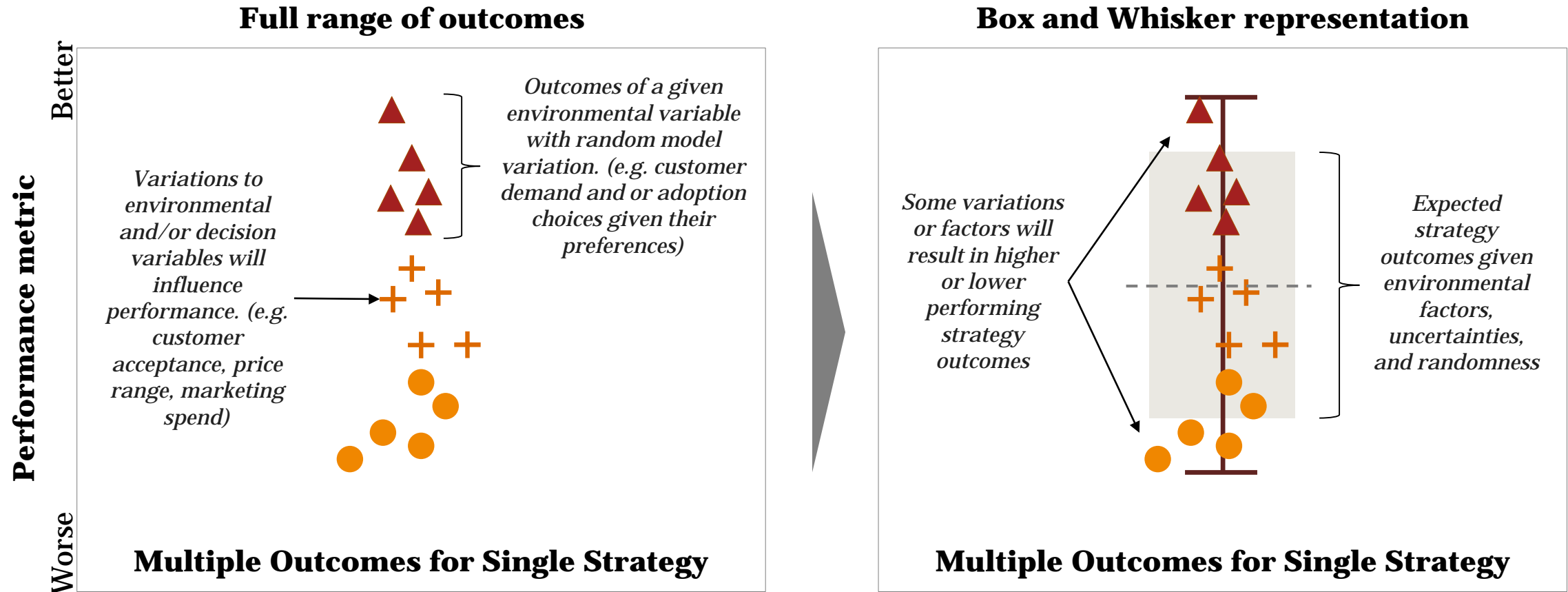
**Scenario execution pipeline**



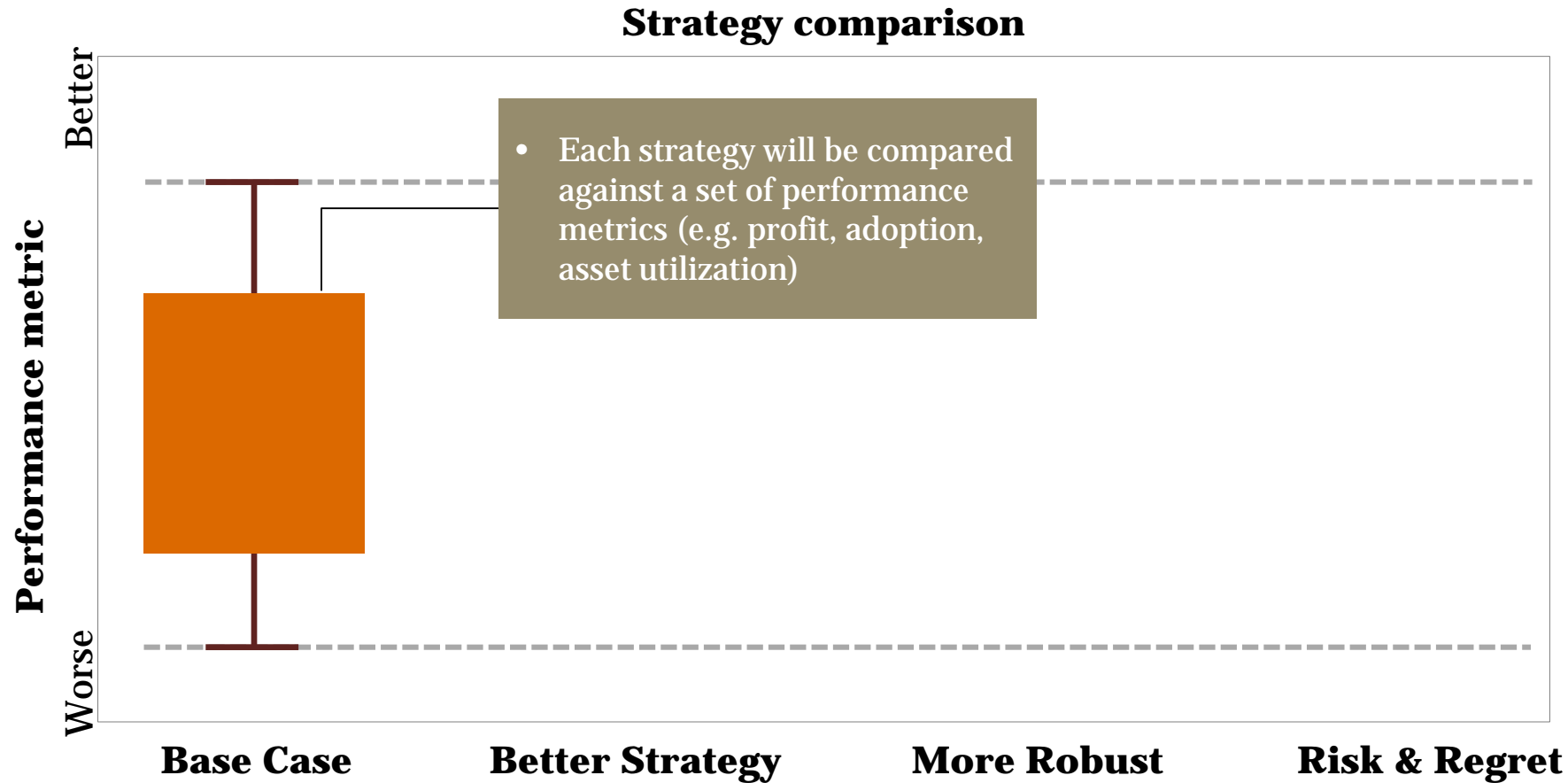
# ***To make this practical, we build a cloud-based analysis pipeline that allows us to iteratively generate new strategies and explore results***



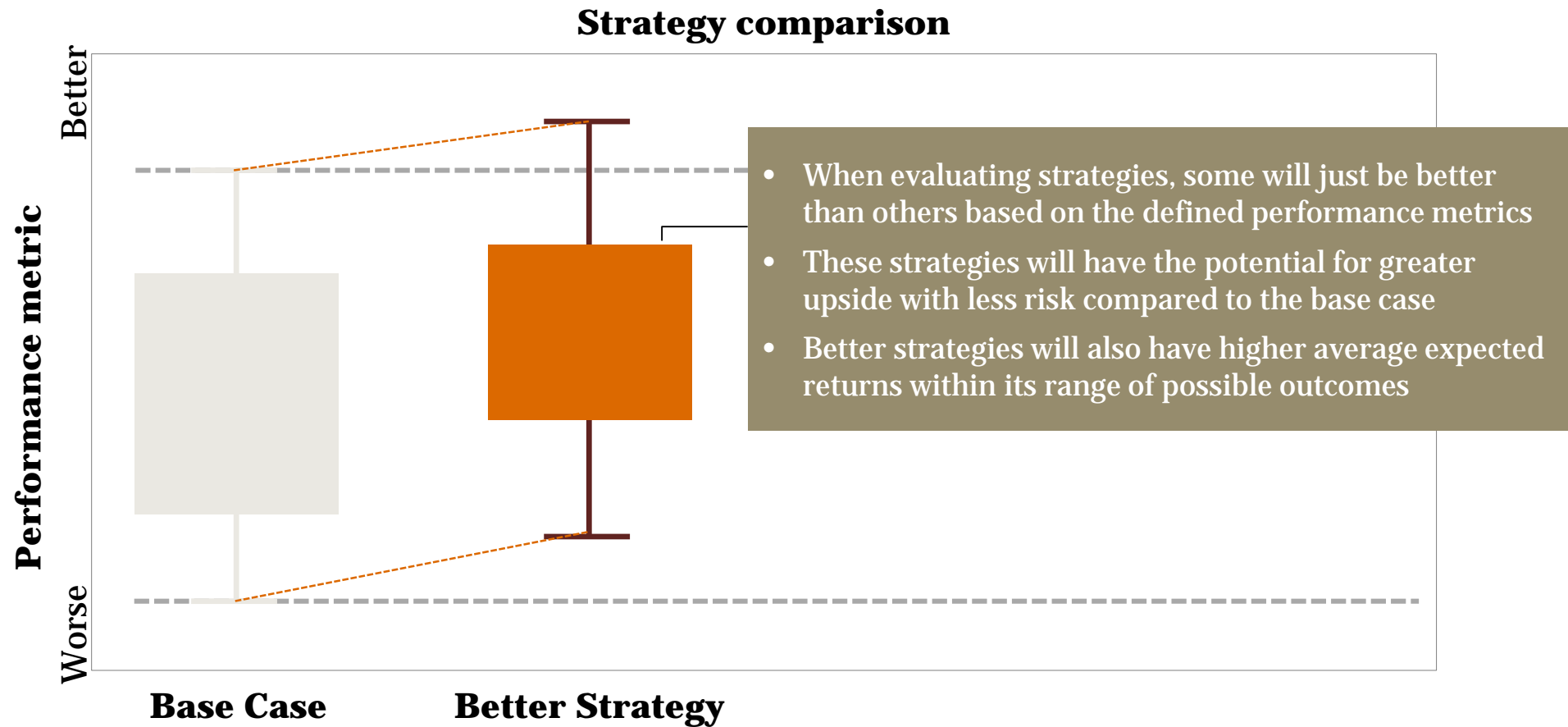
**Because of deep uncertainties in the environment and random variation, each strategy alternative produces a range of outcomes. One way to summarize these for easy comparison is a Box and Whisker plot**



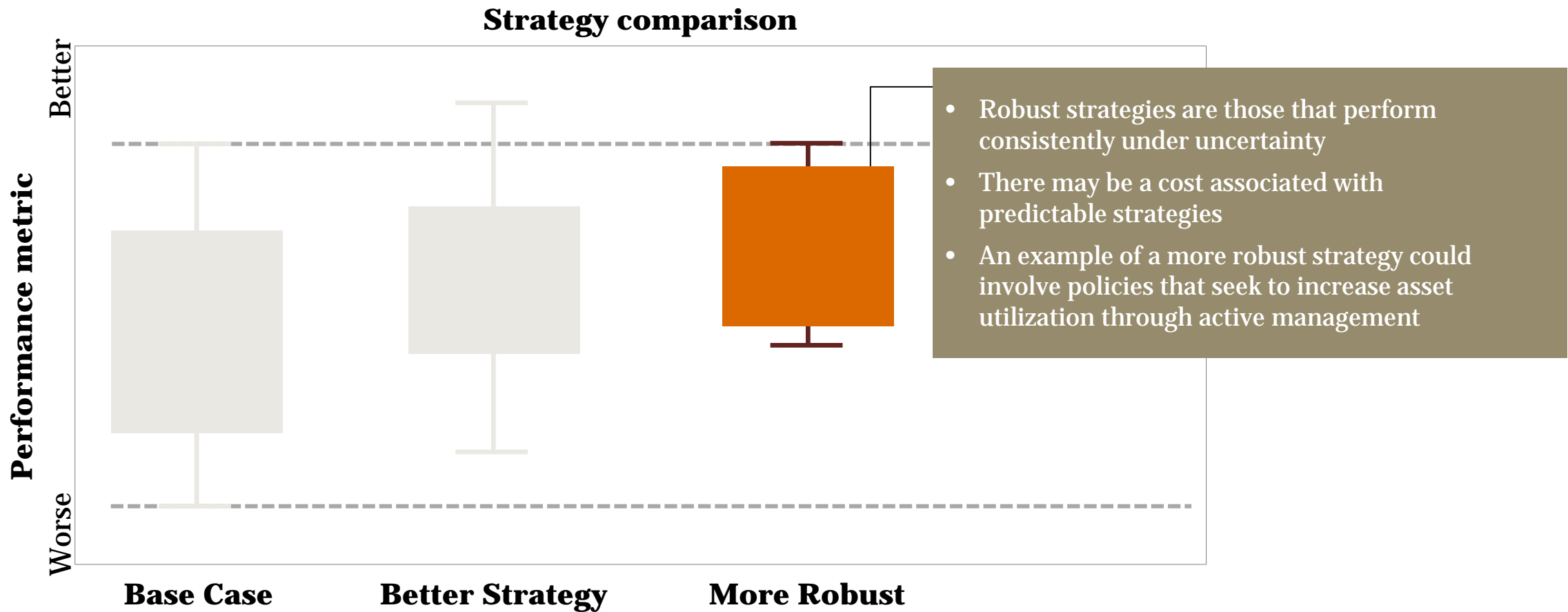
***Distribution of outcomes for each strategy can be compared to determine performance, robustness and risk associated with each decision***



# Strategy comparison - performance

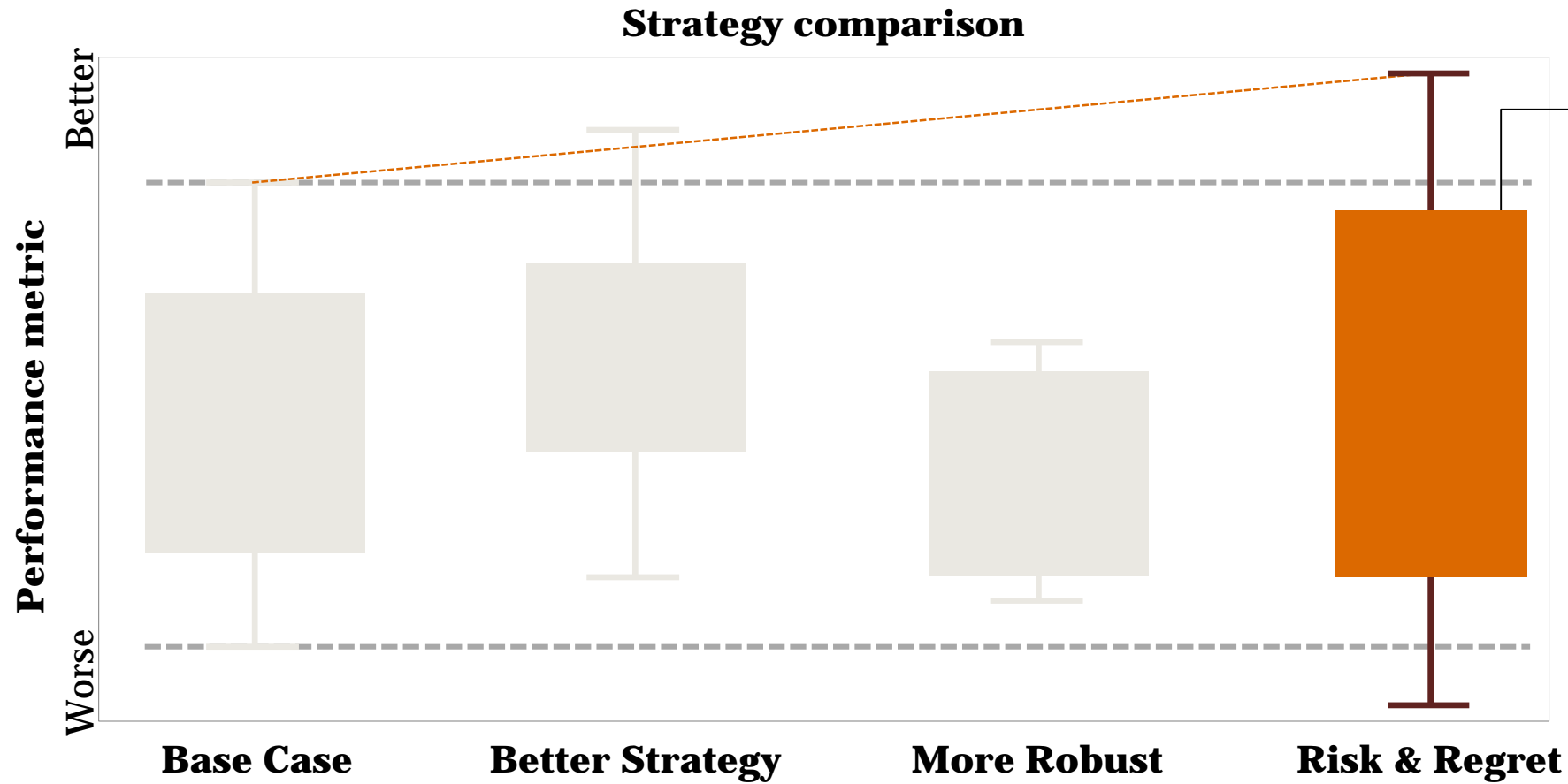


## Strategy comparison - robustness





# Strategy comparison – risk and regret



- Good strategies have disproportionate upside potential
- Large upsides are driven by strong positive feedback loops and nonlinearity

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## ***Why not just use the AnyLogic optimizer to find the “optimal” solution?***

- Optimization is a central tool in model development and calibration.
- However, strategy choices by stakeholder groups cannot be reduced to a single objective function.

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## ***Simulation at scale is a powerful analytic tool to create and evaluate innovative and disruptive business strategies***

- Innovation disrupts existing value networks creating a new economic reality
- Spreadsheets are an inadequate tool to understand this process
- Dynamic simulation complements the fundamentally creative process of creating new businesses
- Dynamic simulation is an integral part of a rigorous process for quantifying and managing the inherent uncertainty of developing new business models and strategies
- The AnyLogic platform supports strategic simulation models through its multi-method capabilities, extensibility, and optimization.

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***Thank you***



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