Engineering the Antifragile Supply Chain

How AstraZeneca and Decision Lab Built a Strategic Simulation Twin for Global Capacity Planning

Disa Ray – Decision Lab Consultant
Gareth Alford - AstraZeneca New Technology Innovation Director

The Challenge: Planning for a Future That Never Arrives

9 out of 10 Supply Chain leaders believe that supply chain disruption is there #1 risk

63% of Supply Chain classed are fragile (based on losing value when under stress)

DECISION LAB

Our Goal: A Shift from Resilience to Antifragility

Fragile (Breaks)

Business fails to recover

Resilient (Bends)

Business recovers

Antifragile (Strengthens)

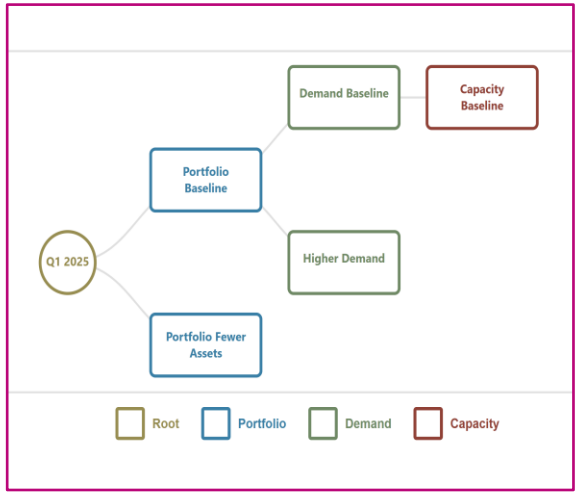
Business thrives

From Surviving to Thriving

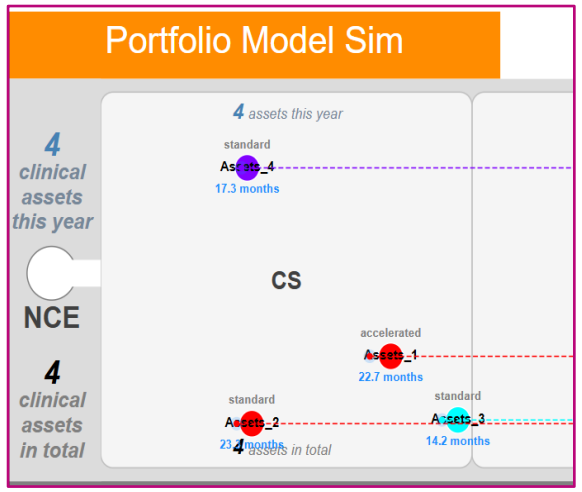
- **Resilience is not enough:** A defensive strategy that only aims to recover is a recipe for stagnation in a volatile world.
- **The goal is advantage:** We needed a system engineered to thrive on volatility, not just endure it.
- **This is an offensive strategy:** It required a fundamental shift in our planning philosophy—from reaction to pro-action.

DECISION LAB

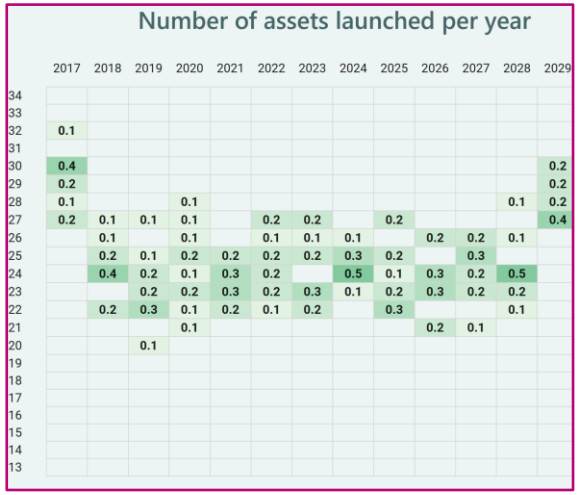
Our Solution: A Strategic Simulation



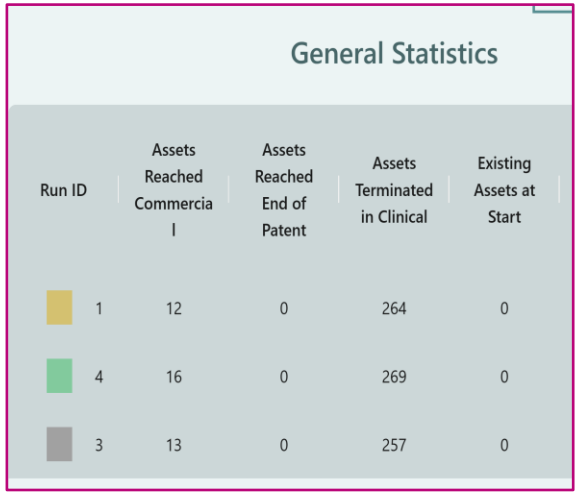
GUI for Scenario Branching



Runtime Animations



Visualise Multi-Run Results



Scenario Comparison

A Platform which replaces brittle, manual workflows with cutting-edge tech (AnyLogic Cloud and React) to integrate 3 different models — Portfolio, Demand and Capacity.

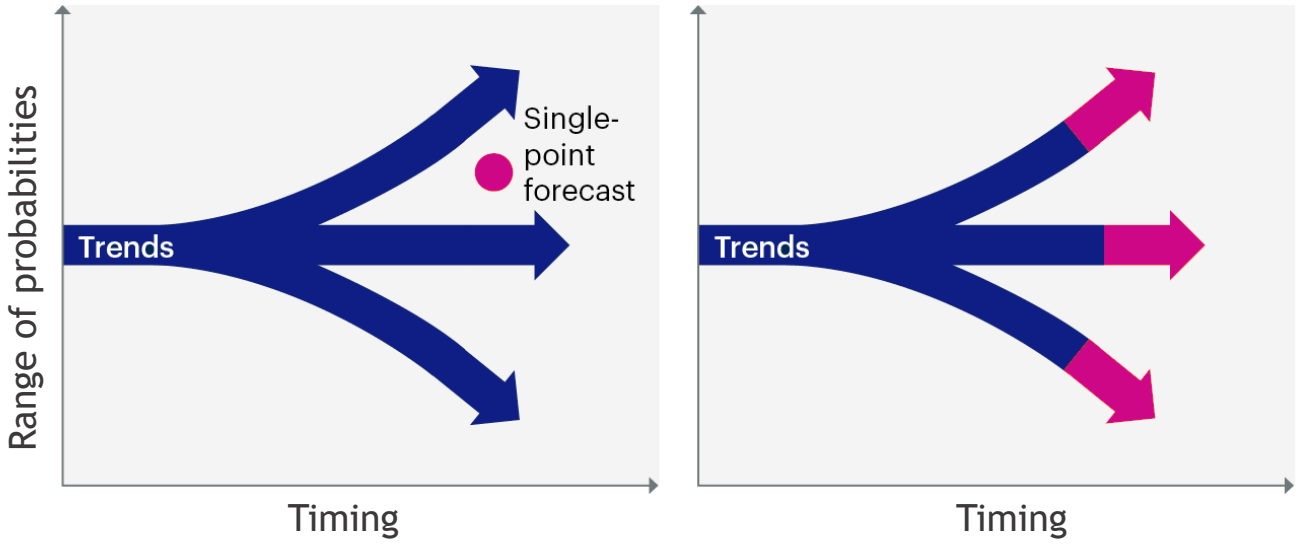
Engineered for Antifragility: It turns uncertainty into an advantage by facilitating rapid testing of a range of future scenarios and using the results to improve strategic plans.

Choosing AnyLogic for Antifragile Engineering

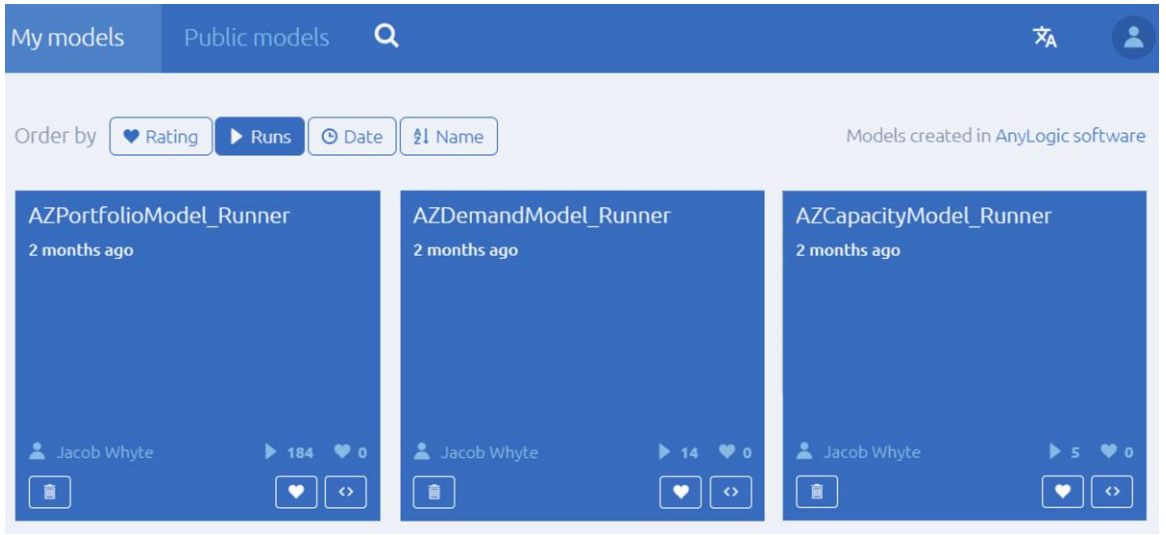
Monte Carlo experiments enable **range-based planning** for making decisions that are robust across the entire range, not just optimised for one fragile point.

From: Single-point forecast

To: Plan within a range



AnyLogic Cloud supports a **modular architecture** to improve explainability and facilitate adaption to a changing environment.



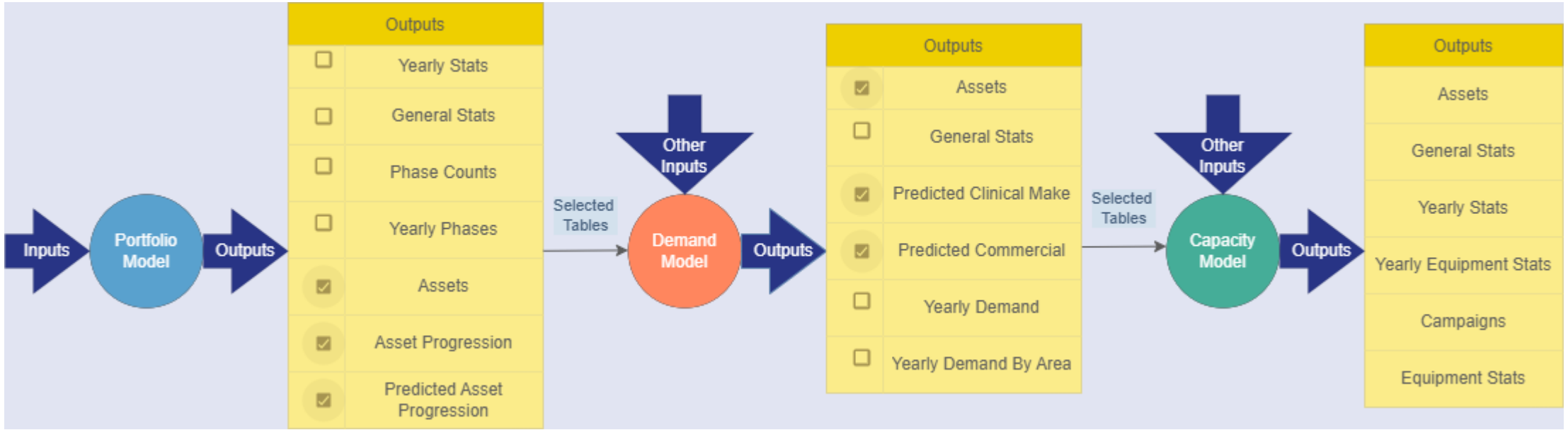
Portfolio Demand Capacity

DECISION LAB

How It Works: A Modular Simulation Workflow

Our platform integrates three distinct but interconnected AnyLogic models:

- **Portfolio:** generate the lifecycles of R&D assets.
- **Demand:** produce a forecast of required active ingredients.
- **Capacity:** evaluate manufacturing options and investment plans.

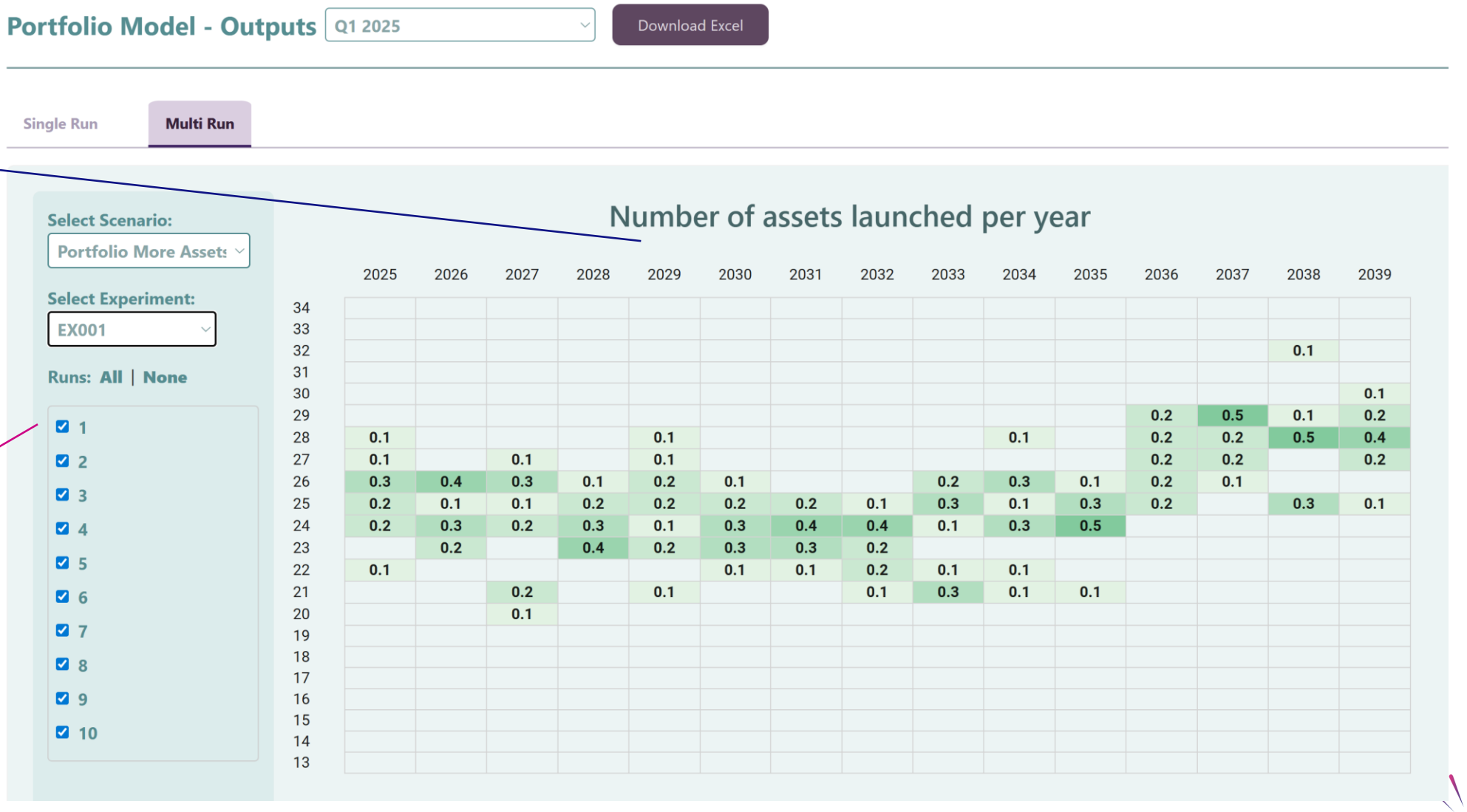


DECISION LAB

The Paradigm Shift: From Single-Point to Range-Based Planning

Visualise range of plausible futures

Filter which runs to explore as ‘inputs’ to next model in sequence



	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
34															
33															
32														0.1	
31															
30															0.1
29												0.2	0.5	0.1	0.2
28	0.1				0.1					0.1		0.2	0.2	0.5	0.4
27	0.1		0.1		0.1							0.2	0.2		0.2
26	0.3	0.4	0.3	0.1	0.2	0.1			0.2	0.3	0.1	0.2	0.1		
25	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.3	0.1	0.3	0.2		0.3	0.1
24	0.2	0.3	0.2	0.3	0.1	0.3	0.4	0.4	0.1	0.3	0.5				
23		0.2		0.4	0.2	0.3	0.3	0.2							
22	0.1					0.1	0.1	0.2	0.1	0.1					
21			0.2		0.1			0.1	0.3	0.1	0.1				
20			0.1												
19															
18															
17															
16															
15															
14															
13															

DECISION LAB

DR Disa Ray

- Scenarios
- Models
- User Guide
- Log Out

Scenario List

Welcome Disa Ray!

Table View | Graph View

Create New Workflow | Import

Filter

No data available to render the graph.

Root | Portfolio | Demand | Capacity

The Impact: Confidence in Complexity

Automated Workflow

Eliminated slow, error-prone manual data handling, freeing AstraZeneca's internal experts to focus on high-value strategic analysis.

A Common Language

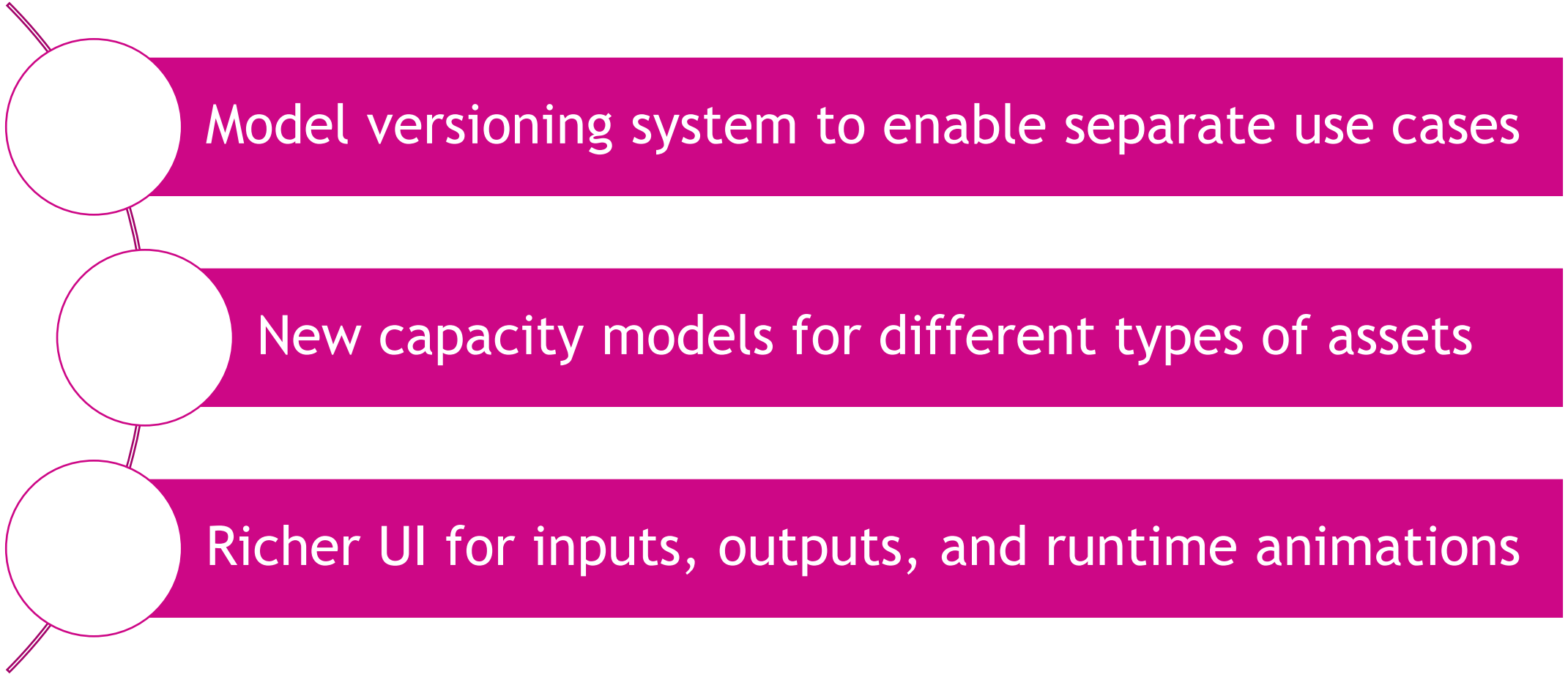
The intuitive, explainable UI is an educational tool, breaking down silos to unite technical and leadership teams around a single, trusted view.

Data-Driven Confidence

Empowering leadership to de-risk high-stakes investment decisions, backed by robust, transparent, and user-validated insights.

DECISION LAB

Building a Roadmap for Future Development



DECISION LAB

Thank you!

Any questions?

DECISION LAB

Turn Uncertainty into Your Competitive Advantage

Let's discuss how to lever AI and Digital Twins to deliver data-driven confidence for your most critical investment decisions.

Phone: +44 (0)20 3735 8580

Email: sales@decisionlab.co.uk