Keynote

Bold Choices, Proven Methods:

How Optimization Empowers Confident Decision-Making

Kostja Siefen

Ronald van der Velden

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“Dancing With Your Risks”

Bold on the Outside
Confident on the Inside

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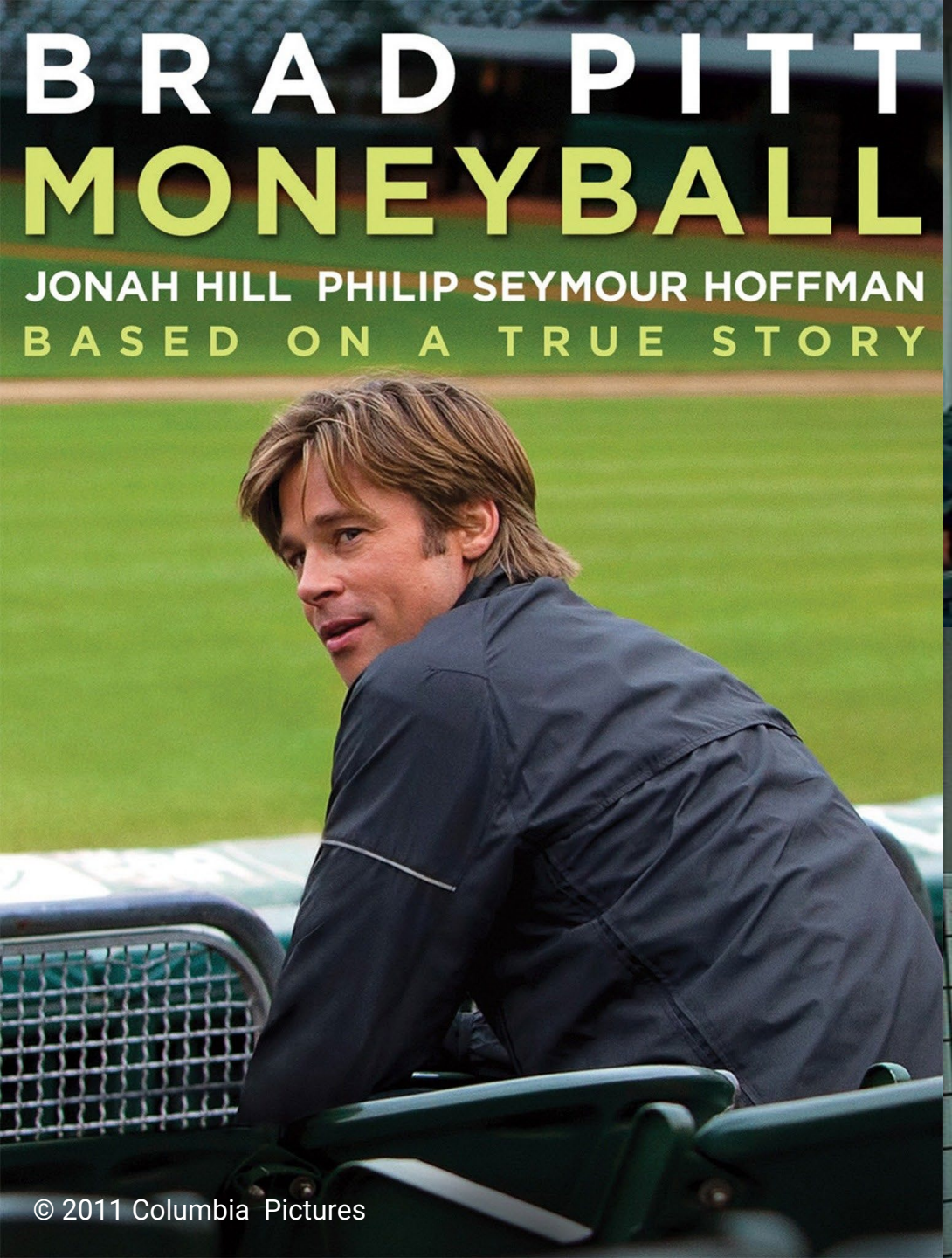
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EXIT

Topics Today

Navigating the Bigger Picture

01 Challenging The Status Quo

02 Mastering The Projects

03 Achieving Business Value

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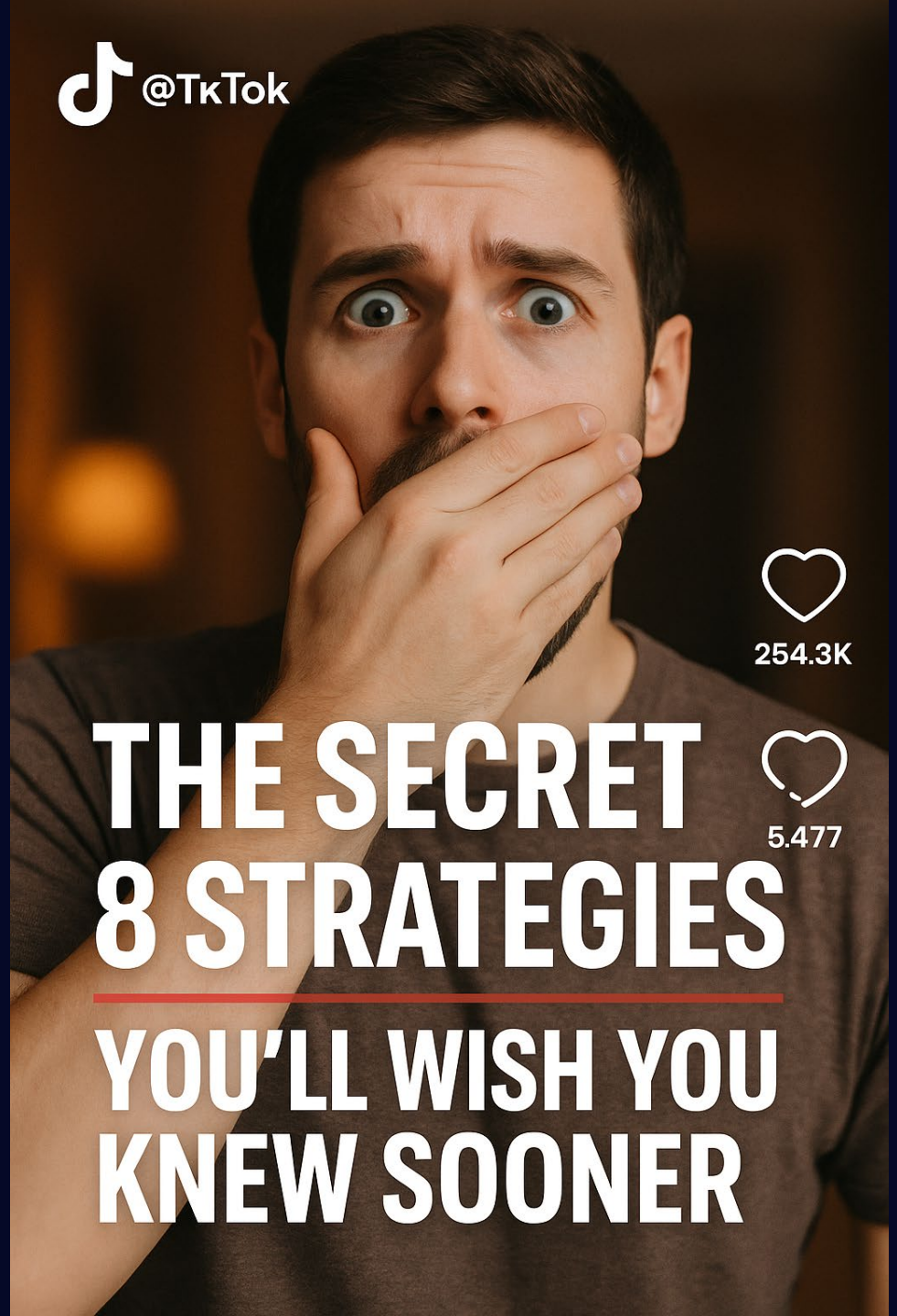

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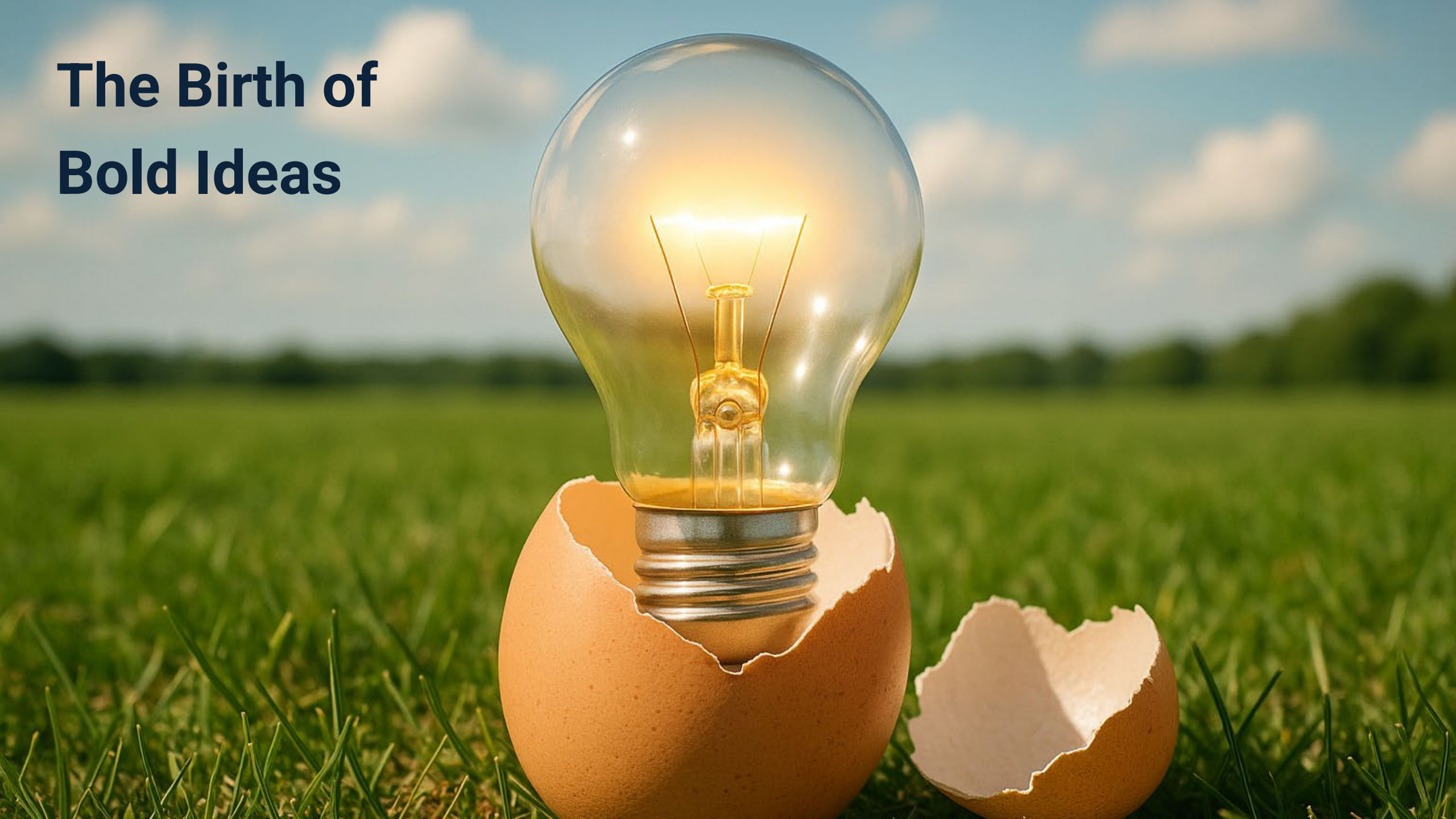
01

Challenging The Status Quo

The Birth of Bold Ideas

The Birth of Bold Ideas



The Birth of Bold Ideas

In the fast-paced world of business decision-making, new ideas rarely come from a single spark - they emerge from a constellation of insights.

- Individual's creative thoughts
- Data analysis revealing patterns that suggest a smarter way forward
- Customers voicing wishes, frustrations or unmet needs.
- Market shifts and competitive pressures
- Yesterday's tools struggle to keep pace

Ideas to improve decision-making processes are born out of creativity, evidence, feedback, and pressure.

What does it take for a good optimization idea to cross the bridge from inspiration to implementation?

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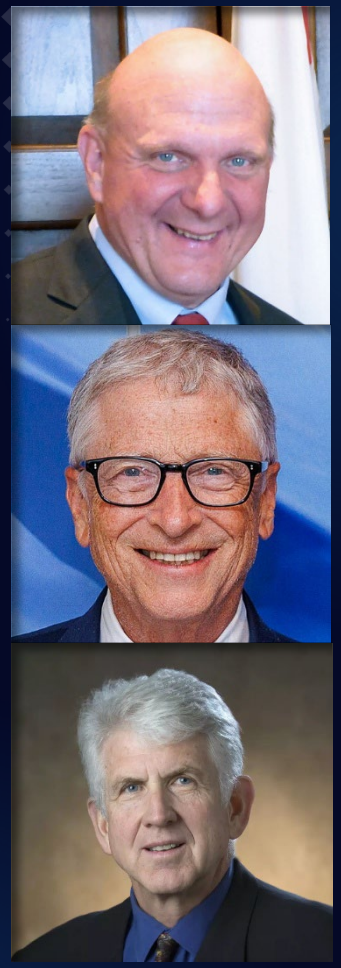
Resistance...

In the 1840s, Ignaz Semmelweis discovered that handwashing with chlorinated water drastically reduced deaths from childbed fever. Doctors rejected his ideas because they felt insulted.

In 1866, Gregor Mendel revolutionized biology by using pea plant experiments to mathematically describe inheritance as a statistical process. But at that time, Biologists lacked the tools and mindset to interpret math in biology.

In the 1930s, Alan Turing proposed a theoretical model that could simulate any computation, but without hardware to realize it, many dismissed the idea of a “machine” doing logic as implausible or unsettling.

Expectations…



"There's no chance that the iPhone is going to get any significant market share."

Steve Ballmer, 2007

"Two years from now, spam will be solved."

Bill Gates, 2004

"The internet will catastrophically collapse in 1996."

Robert Metcalfe, 1995

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“Nobody wants to wait 10 minutes for an optimal plan when a random guess looks fine in 3 seconds.”

Product Manager

“We need to be careful not to offend the team whose spreadsheet you want to replace with the new planning system.”

HR

“There’s no way that we can get three business units to agree on a common goal.”

VP of Strategy

“We could build it in-house, sure - right after someone learns what a solver is.”

IT

“Dynamic routing algorithms will never beat my gut instinct. I’ve been optimizing delivery routes since GPS was a paper map.”

Senior Specialist

“The model is perfect. The data, however, thinks we have negative capacities.”

Operations Researcher

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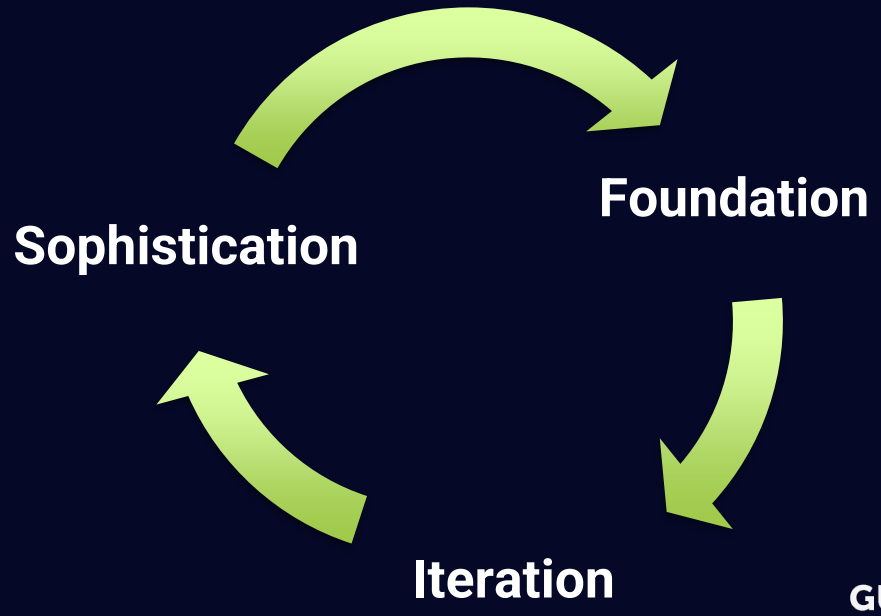
Emotional Readiness

Your **Emotional Readiness Strategy** recognizes that transformation impacts habits and comfort zones.
By aligning logic with emotion, it places humans at the center of the process and treats resistance as a natural response - managed through understanding and preparation rather than confrontation.

Rome Wasn’t Built in a Day

Mastery, innovation, and excellence are the results of persistent iteration, not instant perfection



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Connecting Old and New

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Example: Route Optimization

Stage 1

“Smart Calculator”

Daily Planning

Automated Per-Vehicle Route Construction

Map-Based Time Estimates

Stage 2

“Navigation Assistant”

Real-Time Data

Intra-Day Route Updates

Consider Traffic, Weather, Order Updates

Stage 3

“Strategic Advisor”

Simulation Capabilities

Multiple Objectives / KPI Tradeoffs

Predictive Forecasts

Stage 4

“Operations Cockpit”

Autonomous Planning

Real-Time Optimization

Integrated planning with order system

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Evolution

Your **Evolution Strategy** should rest on the belief that the past and the future are partners, not opponents. It’s about a clear vision of *how* things evolve, not just *what* changes. Move forward in focused stages that make progress clear and meaningful for everyone. Start small, learn fast, and adapt, rooted in understanding what exists and why.

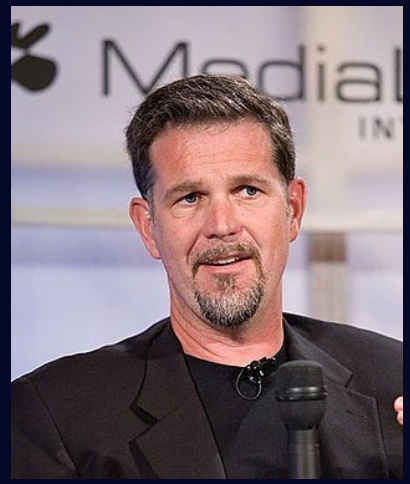
The “Right Timing”?

“We found ourselves at the right place at the right time. Part insight, part strategy, part serendipity.”

Jensen Huang, NVIDIA CEO

“We were fortunate to be in the right place at the right time when the tidal wave hit.”

Reed Hastings, Netflix CEO



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The Importance of Strategic Timing

Source: http://utmb.world/finals

Pacing the Idea

Natural Momentum

Organizational moments of opportunity

Recognizing when your idea aligns with an organizational need, leadership attention, or a shift in priorities

Eagerness vs. Readiness

Excited but underprepared?

Doing the groundwork before pitching: Collecting data, aligning stakeholders, refining the concept

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Be a Pacemaker

Partner with Experts

”We really believe this specific use case can be optimized and would add value, but we’re still growing our team of data scientists so we can’t tackle it today”

Iteration isn’t failure

”Past ambitious attempts haven’t succeeded, so there’s little appetite to try again.”

Prototyping has never been easier

”We were not able to secure budget for a 6-month PoC.”

Conceptual Validity vs. Data Fidelity

”We’re intrigued by the concept of optimization but we’re currently struggling with data availability and quality issues first”

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Pacing

Your **Pacing Strategy** brings an idea into an organization by managing energy and timing - starting small, showing results, and expanding as readiness and need align. By introducing change gradually and building on early successes, it creates momentum, minimizes resistance, and ensures the idea takes root through steady, well-timed progress.

Challenging The Status Quo

Connect past and future

Create momentum from early successes

Place humans at the center of the process

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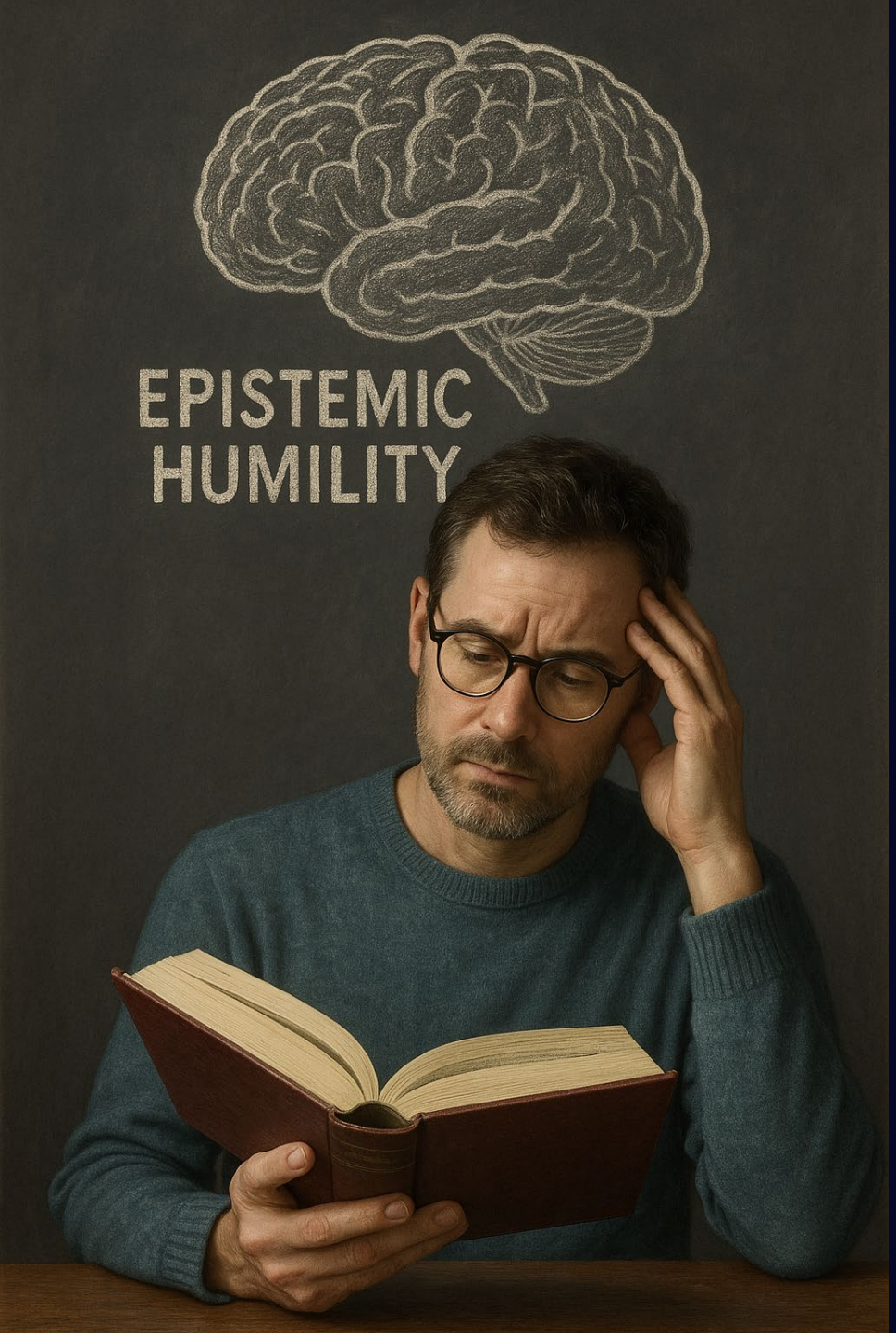
02

Mastering The Projects



Epistemic humility is the intellectual virtue of recognizing the limitations and fallibility of one’s own knowledge and understanding, acknowledging that beliefs are provisional and can be revised in light of new evidence.

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The Importance of Details

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Tradeoffs

Every complex decision situation
strikes a balance between relevance, detail,
and feasibility within the limits of time.

- **Relevance -** All aspects and decision constraints essential to ensure a meaningful solution.
- **Detail -** The chosen level of model granularity involving structural accuracy, data precision/availability, time horizon/resolution, etc.
- **Time -** Computational effort required to solve the formalized decision model within the available time.

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Layered Details

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Capture More Reality

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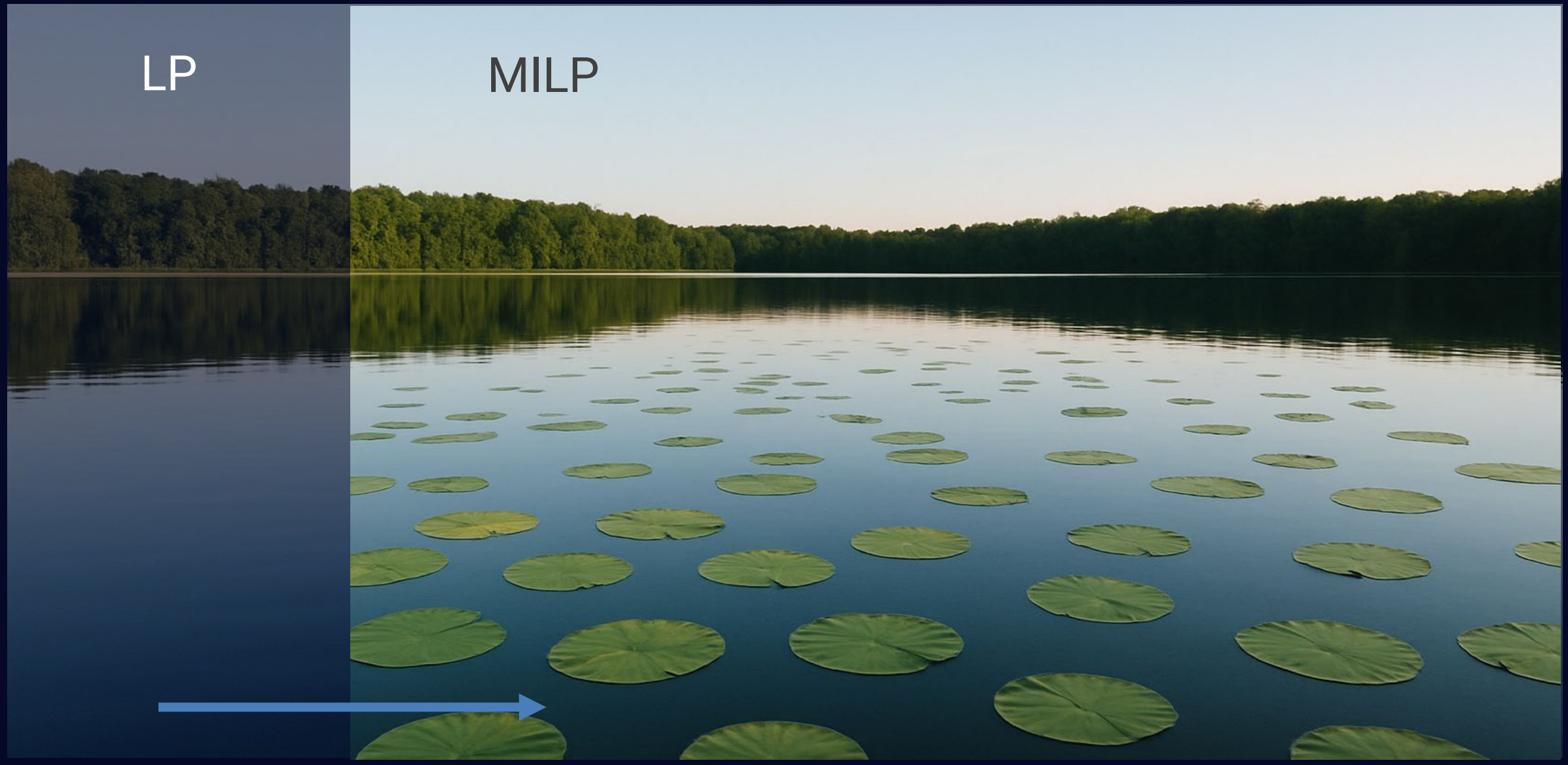
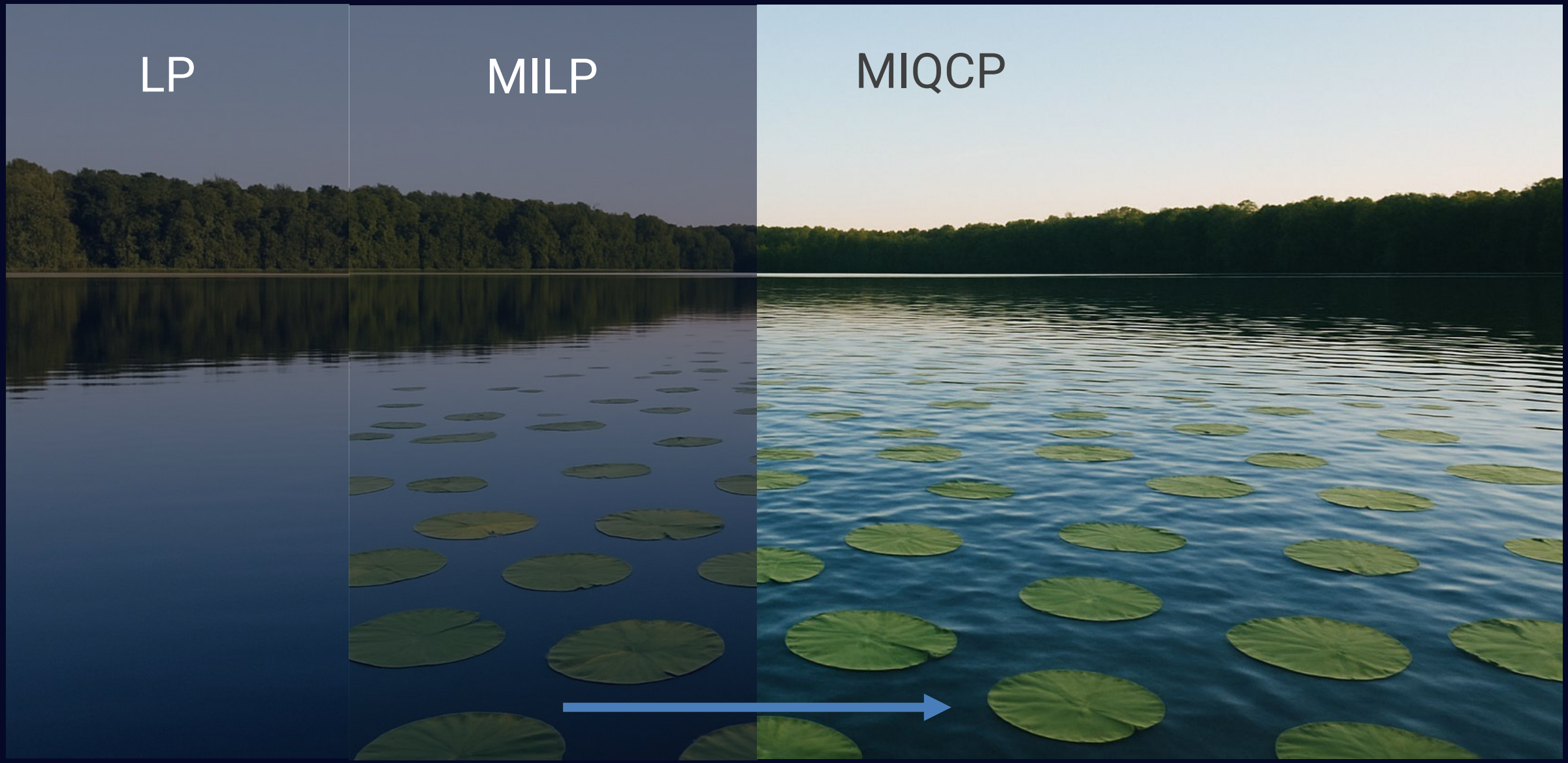
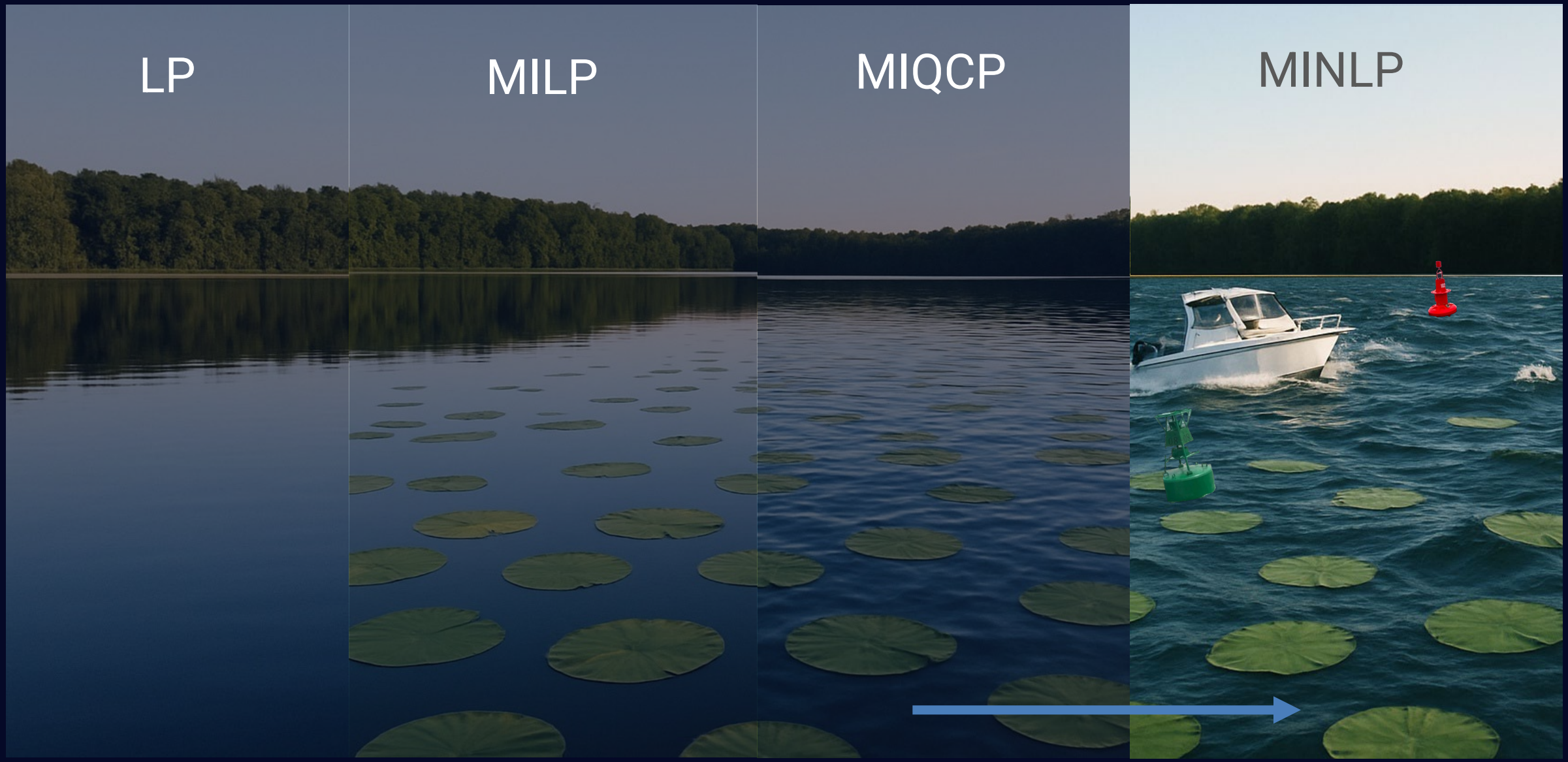


Capture More Reality



Capture More Reality



How Much Detail is Enough?

- **Discover what matters**
  The identification of what is relevant and what needs details is not obvious. Great projects include explicit discovery phases with input from experts and stakeholders.

- **Layered Levels of Detail**
  Great projects don’t just address a single problem at face value, they examine and document a decision process across multiple layers of detail.

- **Technology has evolved**
  The boundaries of how much detail can be addressed within the available time are constantly shifting. By keeping the level of detail adjustable, it becomes easier to benchmark new developments.

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Adaptive Focus

Your **Adaptive Focus Strategy** should capture decision situations at multiple levels of detail, balancing abstraction and complexity. It is a layered structure of what is included and what is left out to influence solving performance while ensuring that results remain valid and actionable in the real world. It is the practice of purposeful abstraction to create robust and verifiable output.

Selecting AI Technology

Artificial Intelligence is the capacity of computer systems to exhibit or simulate intelligent behavior by processing data and performing tasks typically associated with human intelligence

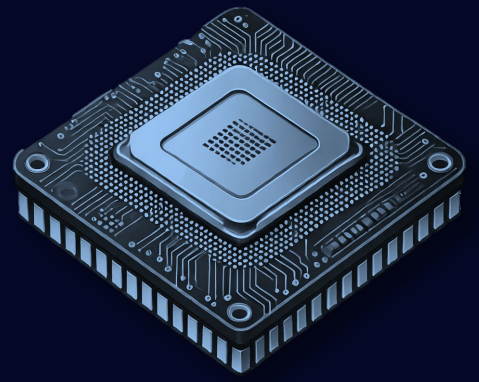
Human Intelligence

Learning **Logic**

Problem-Solving

Creativity **Deciding**

Artificial Intelligence



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Key Aspects

- **Quality & Scalability**
  Avoid short-sighted technology choices that have the risk of creating a bottleneck when adoption increases and quality expectations rise.

- **Vendor Flexibility**
  Consider the strategic freedom to choose and change best-of-breed solutions without being confined to a single ecosystem.

- **Open Source vs. Commercial**
  Screen the market and understand the differences in engineering rigor, quality assurance, and industry-grade performance.

- **Expertise & Ecosystem**
  Harness the vendor’s expertise and ecosystem to accelerate development.

Heuristics vs. Solver

- **Quality Measure**
  What is your solution quality benchmark? What is the impact if not knowing how far from a best solution you truly are, even when “good enough” might suffice?

- **Model Evolution**
  Anticipate the evolution of your decision-making process with changes to priorities and external requirements.

- **Combined Strengths**
  Do you need to choose between alternatives when you can combine them to achieve the best of both worlds?

Technology Selection

Your **Technology Selection Strategy** should focus on choosing the right tool for the job, ensuring solutions are fit for purpose today and adaptable for tomorrow. It emphasizes understanding dependencies early, building safety nets to manage risk, and selecting scalable technologies that can evolve with changing requirements.

Progress Takes Practice

- **Verification & Validation**

  Verification ensures that the system's outputs are correct, consistent, and do not violate any requirements.

  Validation focuses on how people use the system and confirms that the processing and interpretation of its outputs work effectively in real-world scenarios.

- **Performance**

  There are many ways to measure and evaluate system performance. Ultimately, the key question is how a decision intelligence system can consistently deliver meaningful outputs in the shortest possible time.

Pulling the Right Performance Levers

- **Start with the maximal concept** without any simplifications or additional algorithmic helpers.
- **Formulation matters** so make sure you try alternatives if there are multiple ways to formalize the decision model.
- **Performance profiling** is essential to first understand precisely where time and resources are being spent.
- **Adjust objectives** to see if a change of perspective yields better results or enhances the overall user experience.
- **Rethink architecture** to leverage more powerful hardware or add a higher degree of parallel computing.
- **Tune data and algorithms** and experiment with techniques to speed up the overall process

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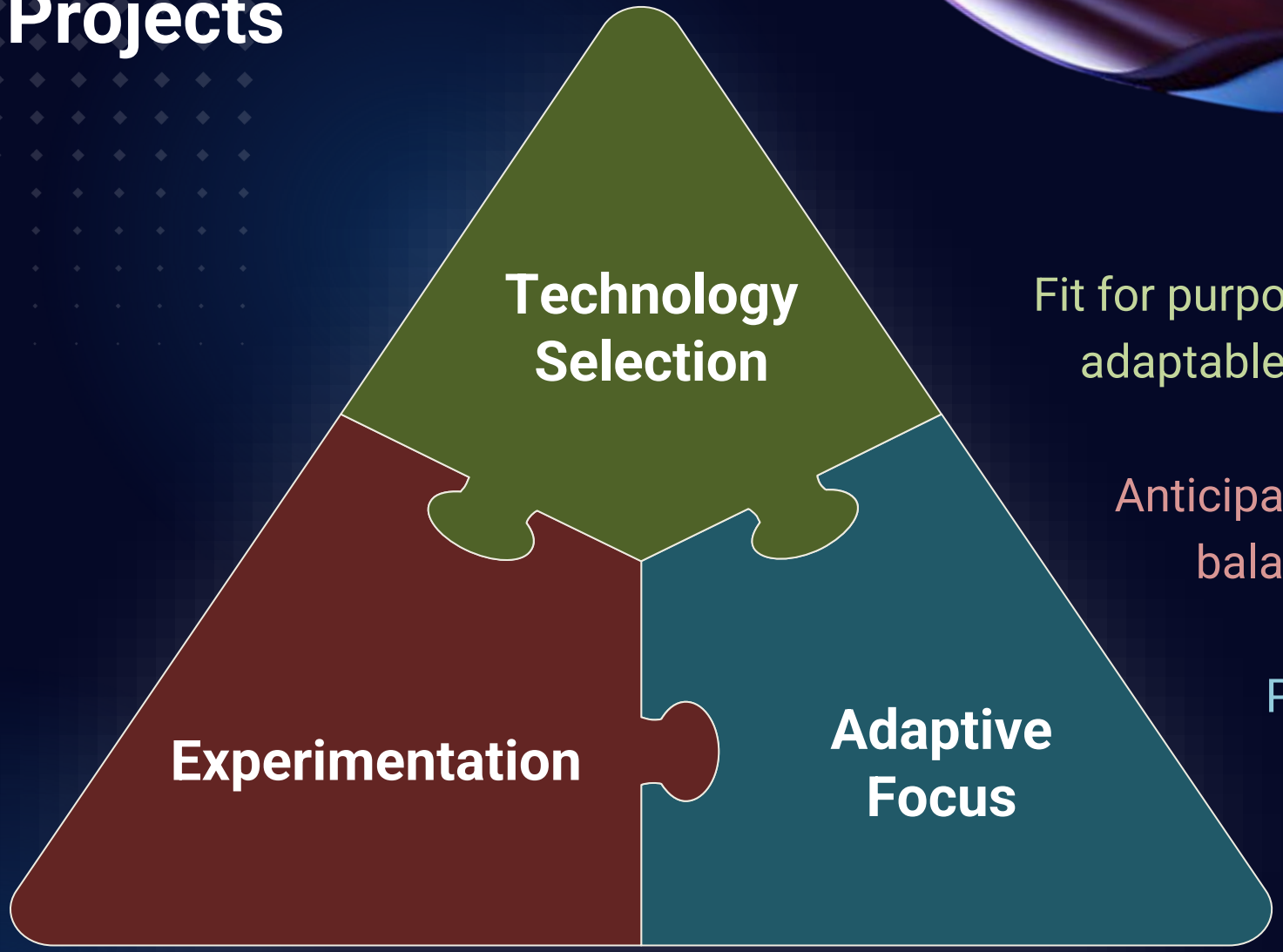
Experimentation

Your **Experimentation Strategy** recognizes that implementing optimization technology is inherently a test-and-learn process. From data preparation to model formulation, solver tuning, and analysis, each step demands iteration and insight. Projects should be designed to anticipate learning curves, maintaining a careful balance between exploration and execution.

Mastering The Projects



Fit for purpose today but adaptable and scalable for tomorrow

Anticipate learning curves and maintain the balance between exploration and execution.

Practice purposeful, layered abstraction

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03

Achieving Business Value


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Impact & Experience

- ***Quantitative* ROI**

  The translation of Decision Intelligence into measurable business and financial terms

- **Monitoring the realization of the promised value-add**

  Baseline vs. actual, financial gains, operational efficiency, risk reduction, scalability, …

- **Driven by KPIs**

  Benchmark for future initiatives

- ***Qualitative* ROI**

  Human, cultural, and cognitive benefits and other effects on organizational behavior

- **Monitoring usage intensity and change of behavior**

  Confidence, Collaboration, Empowerment, Cultural Shifts, Mindset evolution

- **Driven by trust**

  Transforming compliance to commitment

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What is your Trust Strategy?

- Trust transforms compliance into commitment. It is the #1 invisible currency that determines whether change takes root or fails.
- Trust in technology should never be an emotional leap but an informed stance. Build it not by asking people to believe, but by giving them *reasons to believe*.

Social Proof

Scenarios "What If"

Counterintuitive (Black Box)

Explainability

Surveys

User Groups

Optimality

Human-In-The-Loop

Job Security

Mathematical Foundation

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Adoption

Your **Adoption Strategy** recognizes that the success of any new development depends on trust. No matter how advanced a solution is, people embrace it only when they trust its purpose and reliability. This is driven less by technical merit and more by human psychology - every innovation strategy must first be a trust strategy.

What is a good decision?

Judged by Information (Ex Ante)

- *"Did we make the best choice given what we knew?"*
  - Focuses on **process and reasoning.**
  - Evaluates **quality of thinking**, not luck.
  - Values **discipline, logic, and clarity** over outcome.
  - This is the **planner's mindset** - measure the wisdom of the path, not the weather.

Judged by Outcome (Ex Post)

- *"Did it work out well in the end?"*
  - Focuses on **results and consequences.**
  - Easy, emotional, and retrospective.
  - Rewards luck, punishes intelligence.
  - This is the **spectator's mindset** - success justifies everything, even foolishness.

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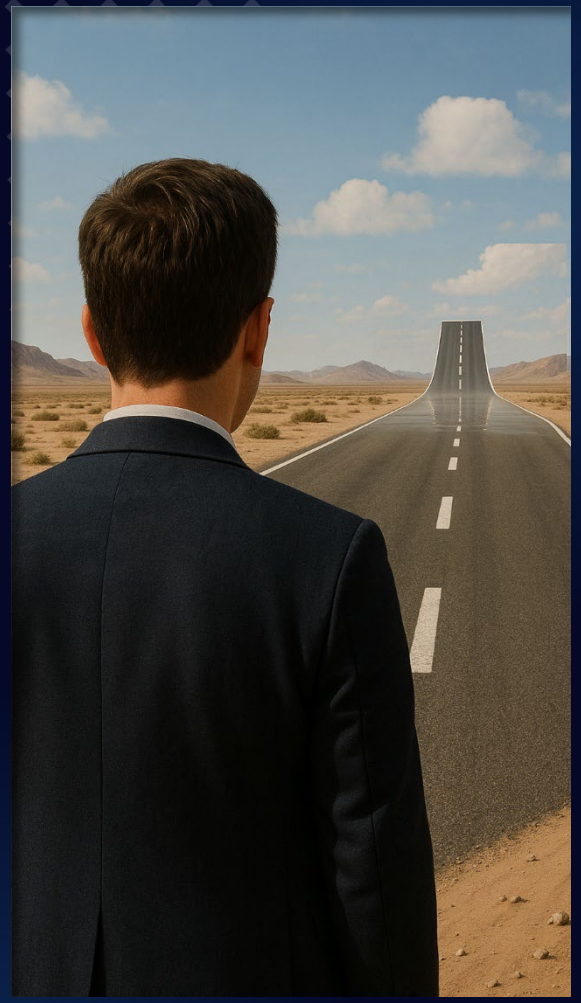
Facing Uncertainty



Failures in planning and strategy often stem from misplaced confidence and the illusion of certainty rather than from making the "wrong" decision.

Ignoring uncertainty leads to fragility. Over-optimizing for a single, unrealistic scenario makes plans highly sensitive to small deviations and unexpected changes.

Resilience over prediction. The goal isn't to eliminate uncertainty but to design decision-making processes that can adapt and endure when reality diverges from expectations.

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Certain about Uncertainties?

In most cases, you should not optimize for a single, perfect future - but neither should you automatically assume that a probabilistic model reflects future reality.

Stochastic models quantify uncertainty, but don’t necessarily understand it.

The ability to quantify uncertainty does not imply an ability to control it.

Modeling randomness can create false certainty about unknowable futures.

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Uncertainty-Aware Optimization

Dealing with uncertainty is to recognize that every plan is also a bet on the value of information.

- **Agree on relevant uncertainties**
  Knowing what you don't know doesn't automatically make you plan better. But it gives you a strong handle on your understanding of the limitations and can drive a better process design to continuously react to change of information.

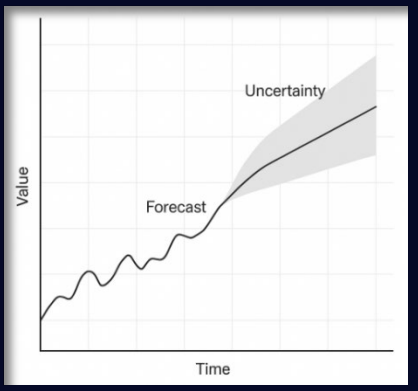
- **Agree on your sweet spot**
  In your decision situation, what is your target balance between performance (optimality in expectation) and robustness (resistance to uncertainty).

Levels of Consideration

- **Deterministic** - A single assumed future
- **Sensitivity Analysis –** Generate answers to “what if” questions
- **Scenario Planning** – Optimize different futures with different outcomes
- **Robust/Stochastic Programming**
  Optimize the outcome of a stochastic system

Fast response to a change of information

- **Build “Online Optimization”**
  Incorporate new information as it arrives (proactive updating)
- **Optimize “Best Next Steps”**
  If possible, update short-term decisions first
- **Make Uncertainty Explicit**
  Visualize/Explain the uncertainty impact



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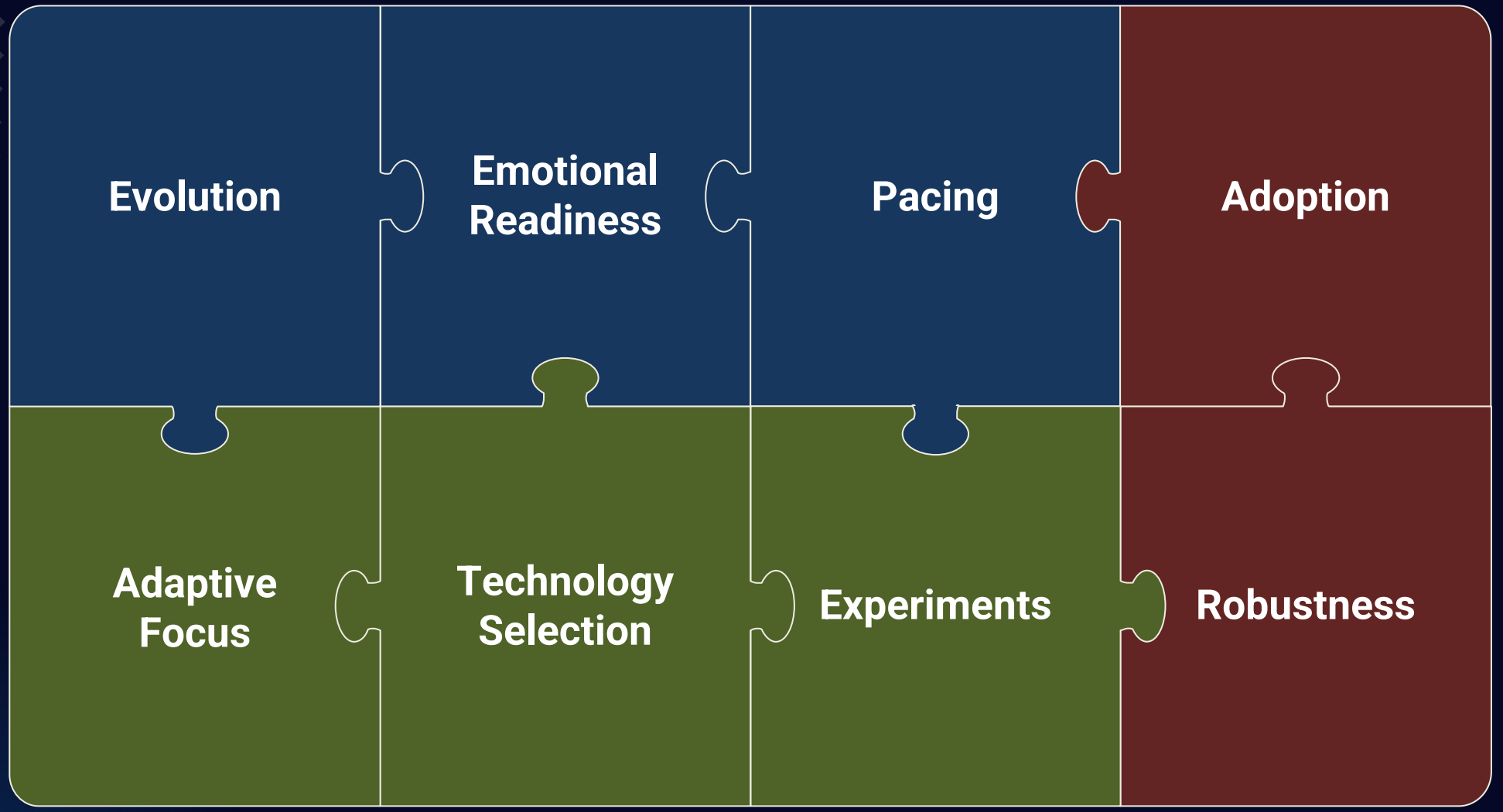
Robustness

Your **Robustness Strategy** describes how you plan for the unknown. Failures rarely come from bold choices, they come from false certainty. Overconfidence breeds overoptimized, fragile systems. A robustness strategy accepts uncertainty and designs a process that stay effective when reality disagrees with expectations. The best lever for optimizing the future is the ability to react quickly to change within a rolling planning horizon.

Connecting the Strategies



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THANK YOU!