

NANO TOOLS FOR LEADERS®

ADAPTIVE EXPERIMENTATION IN THE AGE OF AI

Nano Tools for Leaders® are fast, effective leadership tools that you can learn and start using in less than 15 minutes—with the potential to significantly impact your success as a leader and the engagement and productivity of the people you lead.

GOAL

Accelerate innovation, reduce uncertainty, and generate more impactful results by continuously testing ideas and adapting in real time—now enhanced by AI-driven insights and automation.

NANO TOOL

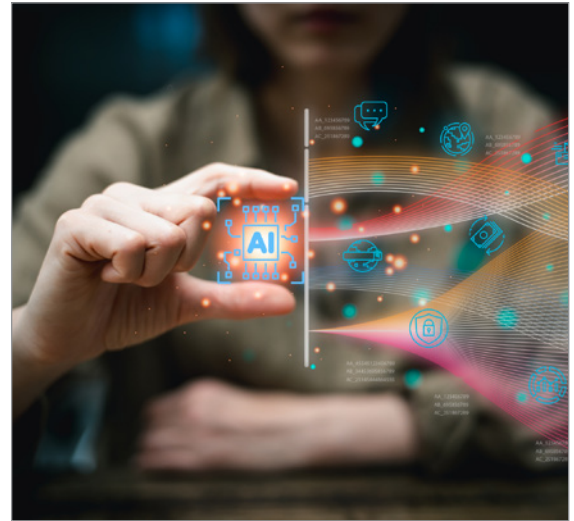
Adaptive experimentation (AE) replaces one-shot “big bet” initiatives with a process of generating multiple options, testing them quickly, and refining based on what works. Traditionally, AE relied on sequential experiments and statistical analysis. Today, AI can assist by enabling real-time feedback, automated decision rules, and the ability to run many simultaneous tests.

Companies like Google have shown how effective AE can be at scale. For years, it has used adaptive experimentation to optimize everything from product features and ad performance to user experience, shifting traffic dynamically toward better-performing variants and retiring weaker ones early. By running thousands of experiments in parallel, Google demonstrates how AE, powered by AI, can accelerate learning, allocate resources more efficiently, and create significant value.

By combining experimentation with AI, leaders can identify winning strategies earlier, scale them faster, and retire poor performers before they drain resources. The result: smarter investments, lower risk, and greater agility in fast-changing environments.

ACTION STEPS

1. **Define success and guardrails.** Establish clear objectives and KPIs (e.g., engagement, conversion, risk limits). Decide where AI will assist (predictive modeling, anomaly detection, or early stopping).
2. **Design for adaptability.** Generate multiple options to test. Incorporate adaptive designs (multi-armed bandits, reinforcement learning) that can shift traffic or resources toward better-performing variants as data comes in.
3. **Leverage AI-enabled monitoring.** Use real-time analytics to track performance, flag anomalies, and enforce fairness or compliance checks. Adjust or terminate underperforming experiments quickly.
4. **Scale what works.** Move promising results into broader deployment faster than traditional testing cycles allow. AI can help model interactions across customer segments, markets, or contexts.
5. **Capture and share learning.** Document not only the winners but also the failures—AI can help surface patterns across experiments. Feed these insights back into your innovation pipeline to improve future design and decision making.



HOW LEADERS USE IT

- **State and local policy innovation:** Many state and local governments are exploring new ways to tackle challenges in housing, climate, and health. One emerging model is AI-enabled adaptive experimentation: piloting policies on a small scale, monitoring results in real time, and then scaling or revising based on early outcomes. For example, a city could trial different approaches to affordable housing incentives, track neighborhood-level data using AI, and rapidly shift resources toward the most effective interventions. This adaptive model allows policymakers to learn faster, reduce wasted funding, and address community challenges with more agility.
- **Supply chain hyper-personalization:** In industries selling a wide variety of SKUs, companies are using AI-enabled demand sensing plus adaptive experiments to improve forecast accuracy and optimize inventory across locations. They test different forecasting models, reorder thresholds, and supplier options under varying promotional or seasonal conditions. AI helps detect early signals to shift between models or supplier routes.
- **Fashion distribution optimization:** A fashion brand with many styles uses deep learning plus optimization to decide how to distribute low-volume/high-variety items to physical stores. An AI model assesses which stores will generate enough sales for each style (using image-based style embedding plus local purchase histories) and experiments with different mixes of styles per store. Poorly performing style allocations get shifted or dropped adaptively.
- **Adaptive user journeys in pharma e-commerce:** A digital platform for pharmacists in Southeast Asia uses reinforcement learning to adapt user journeys. It experiments with different prompts, features, recommendation flows, or content timing based on in-app engagement and purchase history. The system continuously adjusts toward variants that increase basket size and user retention.

KNOWLEDGE IN ACTION: RELATED EXECUTIVE EDUCATION PROGRAMS:

[*Analytics for Strategic Growth: AI, Smart Data, and Customer Insights*](#): Use data to learn, adapt, and refine strategy, including predictive/prescriptive analytics and experimenting and testing approaches.

[*Business Model Innovation in the Age of AI*](#): Reimagine your value propositions and business models in light of AI and through repeated testing, iteration, and adaptation.

[*Leading AI and Digital Transformation*](#): Rethink strategy, leadership, and organization in the face of digital disruption, including how to spot digital or AI-led opportunities.

CONTRIBUTOR TO THIS NANO TOOL

Yoram (Jerry) Wind, PhD, The Lauder Professor Emeritus of Marketing, The Wharton School; co-founder of the Reimagine Education global competition. His new Coursera course, [*Creativity in Business and Other Disciplines*](#), and book [*Creativity in the Age of AI*](#) (October 2025) help leaders challenge entrenched thinking, harness AI, and turn bold ideas into tangible results.

ABOUT NANO TOOLS

Nano Tools for Leaders® was conceived and developed by Deb Giffen, MCC, Director of Innovative Learning Solutions at Wharton Executive Education. It is jointly sponsored by Wharton Executive Education and Wharton's Center for Leadership and Change Management, Michael Useem, Director. Nano Tools Academic Director is Professor John Paul MacDuffie, Professor of Management at the Wharton School and Director of the Program on Vehicle and Mobility Innovation (PVMI) at Wharton's Mack Institute for Innovation Management.