

TRENDS ON TRENDS ON

Big risks.
Bigger possibilities.

INTRODUCTION

The summer blockbuster and Oscar-winning film *Oppenheimer* details the classified Manhattan Project and efforts led by J. Robert Oppenheimer to develop the first atomic bomb in a race to win World War II. What it doesn't detail are the efforts of scientists John von Neumann and Stanislaw Ulam as they created a new statistical method necessary for the safety of the scientists during the tests conducted in the desert – a memorable scene in the movie.

The scientists needed to identify what materials would protect them from the radiation of the blast while they observed it from a distance. This required an estimation of how neutrons propelled by the blast would shoot through different materials. Calculating this with existing deterministic models wouldn't work – there were just too many neutrons. So, the scientists created a brilliant new approach that calculated the probability based on a random subset of neutrons instead. As with everything developed during the clandestine project, the new approach was veiled in secrecy with a codename – the Monte Carlo method.

The scientists saw similarities between the probabilistic method and the games in the Monte Carlo casino in Monaco. Not only was it an effective way to simulate the movement of neutrons (no scientists were harmed during the bomb tests), but it's proven a useful statistical simulation approach in many industries, from finance to medical uses and supply chain operations (Virginia Tech). Developing the simulation capability provided the Manhattan Project one more slight edge over its competitors.

That advantage was maintained by the approach to epistemic security taken during the highly secret military project. *Oppenheimer* details the measures the project went to in order to maintain secrecy – building a

temporary town in the desert so scientists and their families could be contained without contact with the outside. All communication in and out of the town was monitored and controlled, and even within the project itself information was compartmentalized on a need-to-know basis.

There are two lessons to draw from this for IT leaders looking ahead to 2025. Historically, chief information officers have been accountable for the recordkeeping at their organizations. Like a resident historian, CIOs maintained the integrity of an organization's past, making it verifiable and auditable. With digital transformation, CIOs were asked to do more to report on the current state of the organization – in as real-time as possible. The business intelligence and analytics required to drive decision-making couldn't be based on old information. Now, as firms push their investment into artificial intelligence (AI) and more specifically generative AI, the focus shifts to simulating the future. In a fast-changing and uncertain world, AI predicts different scenarios based on the probability of the outcome. Generative AI provides an output that aims to simulate a human response prompted by an input.

SIMULATED FUTURES

Evolution of IT from recordkeeping to forecasting probable futures

In 2025, CIOs need to graduate from being recordkeepers to being forecasters of probable futures. In *Tech Trends 2025*, Info-Tech will explore three trends along the theme of "simulated futures":

- > AI Avatars
- > Quantum Advantage
- > Expert Models

EPISTEMIC SECURITY

The imperative for IT to protect knowledge creation and curation

At the same time, CIOs must push to develop forecasts and advance the knowledge of their organizations in a way that carefully manages the integrity of the knowledge creation and curation process. Like the Manhattan Project, CIOs need to create a trusted environment that ensures "epistemic security." Here we explore three other trends:

- > Deepfake Defense
- > Post-Quantum Cryptography
- > AI Sovereignty

Altogether, our six trends reflect the opportunities ahead for organizations to seize upon with emerging technology capabilities and the risks they must mitigate along the way. Just like a player putting a bet down at the Monte Carlo's roulette table knows they may win or lose based on the probabilities, these three themes represent both risks and rewards:

- > Digital Humans
- > Pre-Quantum Foundations
- > Exponential AI

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FORECASTERS
OF PROBABLE →
FUTURES

Simulated Futures



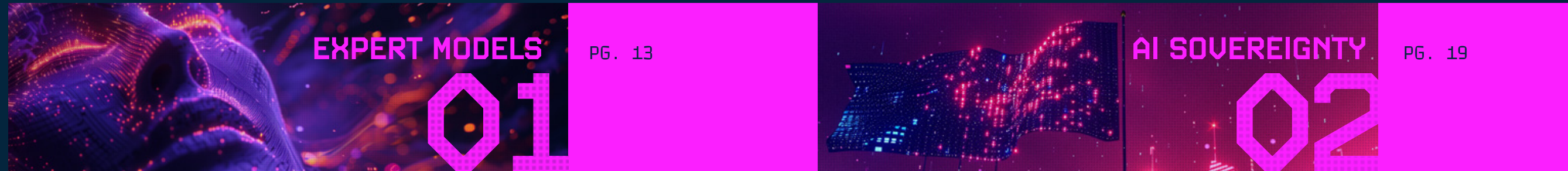
Knowledge Assurance



Opportunities

Risk Mitigation

Exponential AI



Pre-Quantum Foundations



Digital Humans



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