



SUPPLY CHAIN RESILIENCE WITH AI

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UNDERSTANDING SUPPLY CHAIN RESILIENCE

Supply Chain Resilience: The ability of a supply chain to anticipate, prepare for, respond to, and recover from disruptions to maintain continuity of operations. → **bounce back**

Traditional Concepts:

- Diversification of supply sources
- Building inventory buffers
- Investing in technology for better visibility and analytics
- Developing strong relationships with suppliers and partners

SUPPLY CHAIN IMMUNITY

Supply Chain Immunity (Handfield & Finkenstadt, 2023): The comprehensive capability of a supply chain to **not only withstand disruptions** but also to **evolve and thrive** in the face of ongoing and emerging threats. Particularly important during mass contingency events (i.e. COVID-19 crisis) → **learns to thrive in chaos**

- **Flexibility:** The capability to adapt to new, different, or changing requirements, **involving advanced planning** and strategic sourcing to address emergencies efficiently.
- **Traceability and Transparency:** The ability to **track and visualize** the journey of supplies across the supply chain, ensuring materials travel from origin to receipt across a **trusted network**.
- **Persistence and Responsiveness:** The capacity for **rapid decision-making** based on sound market intelligence and preparation, allowing for **quick adjustments** to sourcing issues or capacity limitations.
- **Global Independence:** Achieving supply chain agility through **sophisticated awareness of global risks**, promoting security of supply on a national level while considering global impacts.
- **Equitability:** Ensuring fair and ethical distribution of supplies, responsive to **need rather than demand**, guided by principles that facilitate equitable access for all.

SUPPLY CHAIN RESILIENCE AND AI



A futuristic, glowing blue and orange digital network with a magnifying glass focusing on a globe.

AI-ENHANCED SUPPLY CHAIN VISIBILITY

- **Visibility is Foundational:** Essential for proactive and agile disruption response.
- **AI Augmentation:** AI enhances visibility by alerting to and even predicting disruptions across the global network.
- **AI Mapping Limits:** Initial and final mapping with AI requires network verification for integrity.
- **Network Verification:** Ensures all supply chain tiers are accurately represented and committed.
- **Responsiveness Commitment:** All tiers must agree to respond to disruptions with strong communication.
- **AI as Complementary:** Integrates with human efforts for network accuracy and stakeholder collaboration.

BUSINESS CONTINUITY PLANNING

Definition and Purpose: Business Continuity Plans (BCPs) are strategic frameworks designed to prepare firms for effective response to disruptions, ensuring operational continuity and resilience.

- **Proactive Planning:** Prepares for new disruptions through scenario planning, essential for quick recovery.
- **Challenges:** Small to medium-sized firms face resource constraints in creating extensive scenario-based plans.
- **Adaptation and Recovery:** Aims for quick adaptation and recovery to pre-disruption levels by focusing on plausible futures.



Lin Wells
CF: Amdm

Thoughts for the 2001 Quadrennial Defense Review

April 12, 2001 10:22 AM

All of which is to say that I'm not sure what 2010 will look like, but I'm sure that it will be very little like we expect, so we should plan accordingly.

SUBJECT: Predicting the Future

You will recall that we had Andy Marshall come over, and we briefly discussed the defense strategy review and what the future might hold.

I ran across this piece on the difficulty of predicting the future, written by one of the folks here at the Pentagon, Lin Wells. I thought you might find it interesting.

Respectfully,

Attach.
Lin Wells: "Thoughts for the 2001 Quadrennial Defense Review"

DHR:dh
041201-13

- If you had been a security policy-maker in the world's greatest power in 1900, you would have been a Brit, looking warily at your age-old enemy, France.
- By 1910, you would be allied with France and your enemy would be Germany.

I would have been fought and won, and you'd be arms race with your erstwhile allies, the U.S. and Japan.

When limitation treaties were in effect, the Great Depression the defense planning standard said "no war for ten years."

- ...five years later world War II had begun.
- By 1950, Britain no longer was the world's greatest power, the Atomic Age had dawned, and a "police action" was underway in Korea.
- Ten years later the political focus was on the "missile gap," the strategic paradigm was shifting from massive retaliation to flexible response, and few people had heard of Vietnam.
- By 1970, the peak of our involvement in Vietnam had come and gone, we were beginning détente with the Soviets, and we were anointing the Shah as our protégé in the Gulf region.
- By 1980, the Soviets were in Afghanistan, Iran was in the throes of revolution, there was talk of our "hollow forces" and a "window of vulnerability," and the U.S. was the greatest creditor nation the world had ever seen.
- By 1990, the Soviet Union was within a year of dissolution, American forces in the Desert were on the verge of showing they were anything but hollow, the U.S. had become the greatest debtor nation the world had ever known, and almost no one had heard of the internet.
- Ten years later, Warsaw was the capital of a NATO nation, asymmetric threats transcended geography, and the parallel revolutions of information, biotechnology, robotics, nanotechnology, and high density energy sources foreshadowed changes almost beyond forecasting.

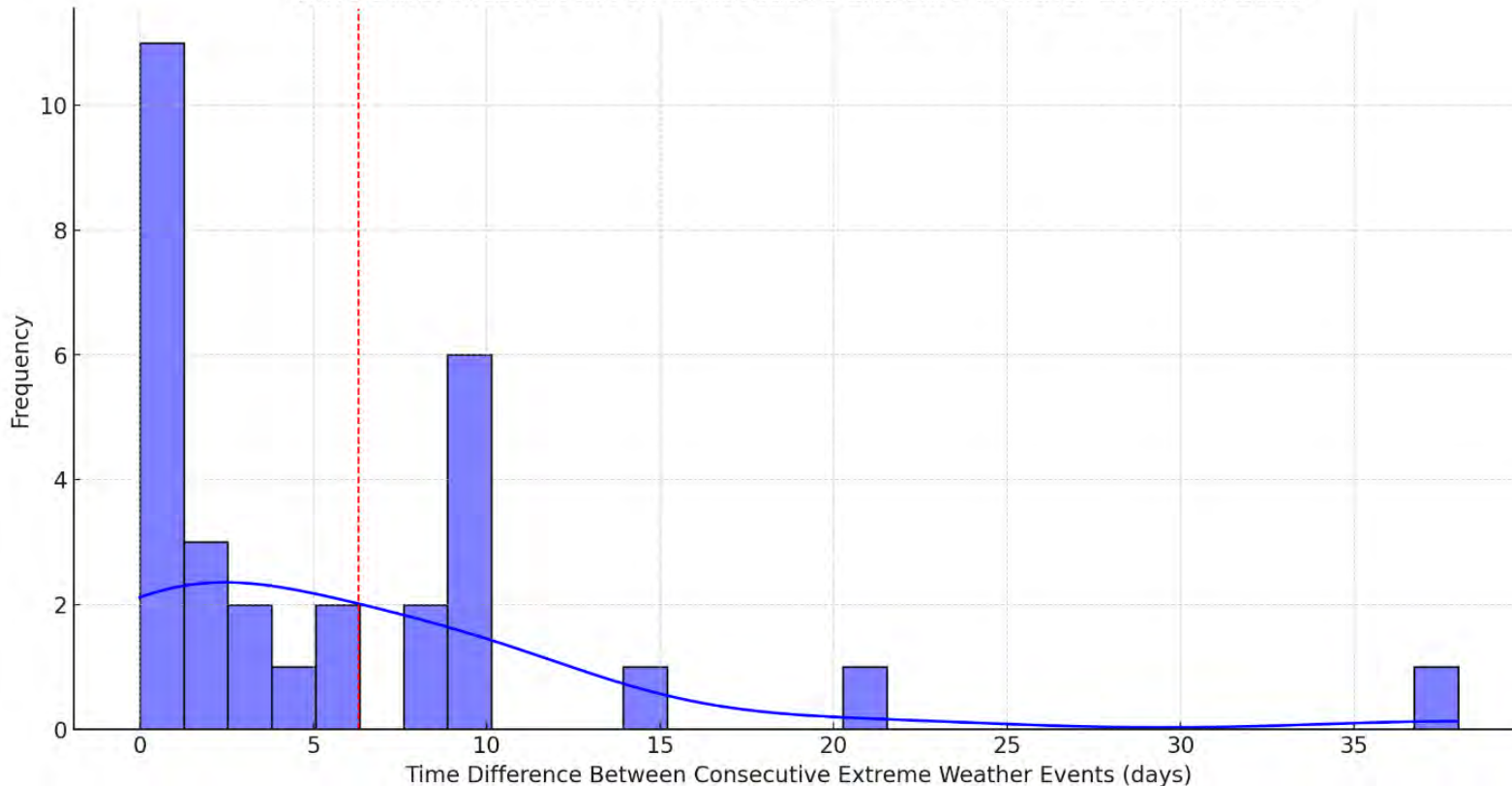
All of which is to say that I'm not sure what 2010 will look like, but I'm sure that it will be very little like we expect, so we should plan accordingly.

Certified As Unclassified
January 2, 2009
IAW EO 12958, as amended
Chief, RDB, ESD, WBS

Lin Wells

CONTINGENCY RESPONSE WINDOWS SHRINKING

Time Differences Between Consecutive Extreme Weather Events in 2023



Data shows consecutive extreme weather disruptions often occurring within shorter than a 6-day response window, highlighting the need for swift action in today's global market



CONTINGENCY SCENARIO PLANNING

- **Rapid Response Framework:** CSP is a strategic approach designed for situations changing quickly, often minute by minute, requiring **immediate and flexible planning responses**.
- **Anticipation of Disruptions:** It enables organizations to **anticipate and prepare for potential disruptions** by closely engaging with their environments and adapting swiftly to environmental shifts.
- **Adaptation to Rapid Changes:** CSP is critical for adapting strategies in response to emerging market changes and cultural shifts, fostering a **culture of quick crisis adaptation**.
- **Enhanced Preparedness:** By practicing scenario planning regularly, organizations become **more comfortable with ambiguity**, counteract overconfidence, and are better prepared to maintain operations or recover quickly during disruptions.

SHELL

- **Proactive Strategy:** Shell's foresight and scenario planning positioned them ahead during crises, like the 1970s energy crisis.
- **Adaptability Culture:** Regular scenario planning **embedded adaptability**, quickly responding to market and cultural shifts.
- **Navigating Ambiguity:** Shell's exercises in scenario planning enhanced their **capability to navigate ambiguity** and challenge overconfidence.
- **Prepared for Any Future:** Emphasis on **plausible futures**, not predictions, ensures Shell is ready for any eventuality, maintaining operational continuity.





LIMITS TO TRADITIONAL SCENARIO PLANNING

- **Generating Scenarios:** Traditional scenario planning offers little formal guidance on identifying trends and uncertainties, leading to potential tunnel vision and overconfidence.
- **Selecting Scenarios:** Choosing the right scenarios is challenging due to the need for robustness in business continuity plans, making detailed preparation daunting.
- **Preparing for Scenarios:** Lacks guidance for preparing for multiple, potentially contradictory realities simultaneously, complicating strategic preparation.
- **Resource Limits:** For Small-to-Med firms/orgs there is a limit to how much time/\$\$/manpower can go into traditional forms of 'what-if' analysis
- **Adaptation Strategies:**
 1. **Most Likely Scenario Focus:** May not suffice due to inherent future uncertainties.
 2. **Intermediate Scenario Balance:** Useful when the cost of one scenario is too high or the most likely scenario is unclear.
 3. **Agility in Action:** Building a culture of agility to adapt strategies based on emerging scenario information is crucial but difficult to implement effectively.

AI-ENHANCED SCENARIO PLANNING

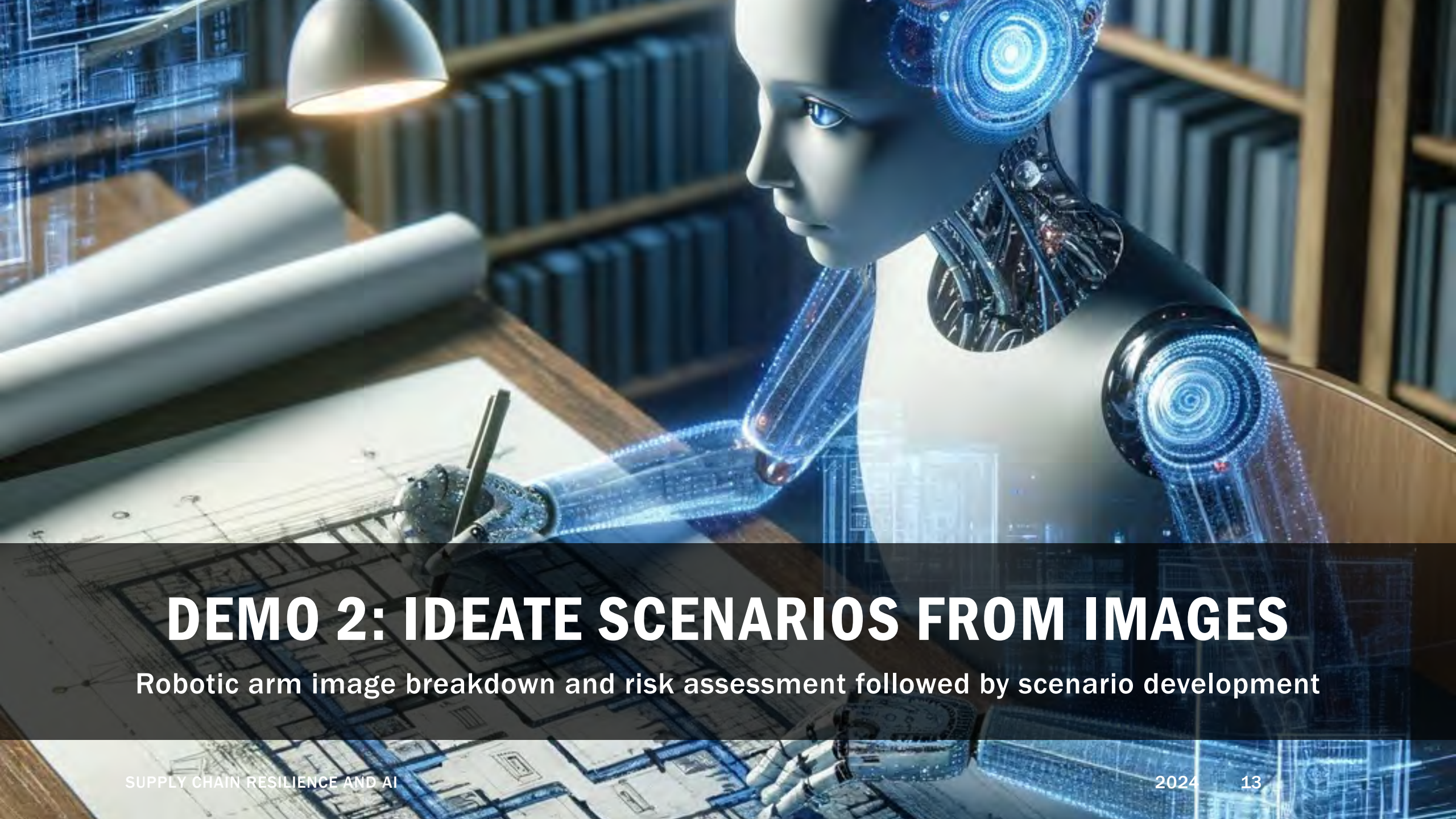
- **Gather Event Data:** Employ AI-enabled technology to **collect data** on global disruption events across your supply chain, ensuring a comprehensive understanding of **potential risks**.
- **Identify Baseline Scenarios:** Utilize generative AI to analyze collected data, **recognizing patterns** to establish a solid foundation for scenario planning.
- **Formulate Trend-Based Scenarios:** Leverage the vast knowledge and predictive capabilities of LLMs to **create scenarios that align with emerging trends** for more accurate planning.
- **Generate Innovative Ideas:** Use LLMs to **stimulate creativity**, producing novel ideas and courses of action for enhanced strategic decision-making.
- **Combine Scenarios for Comprehensive Analysis:** With AI assistance, **efficiently merge scenarios** and assess their implications for more thorough planning and risk analysis.
- **Evaluate Strategic Options:** Apply generative AI tools to **scrutinize ideas and actions** for different scenarios, identifying the most promising strategies to improve survivability.





DEMO 1: IDEATE SCENARIOS FROM DATA

Whatif_Whatnow tool with updated EventWatch warroom data



DEMO 2: IDEATE SCENARIOS FROM IMAGES

Robotic arm image breakdown and risk assessment followed by scenario development