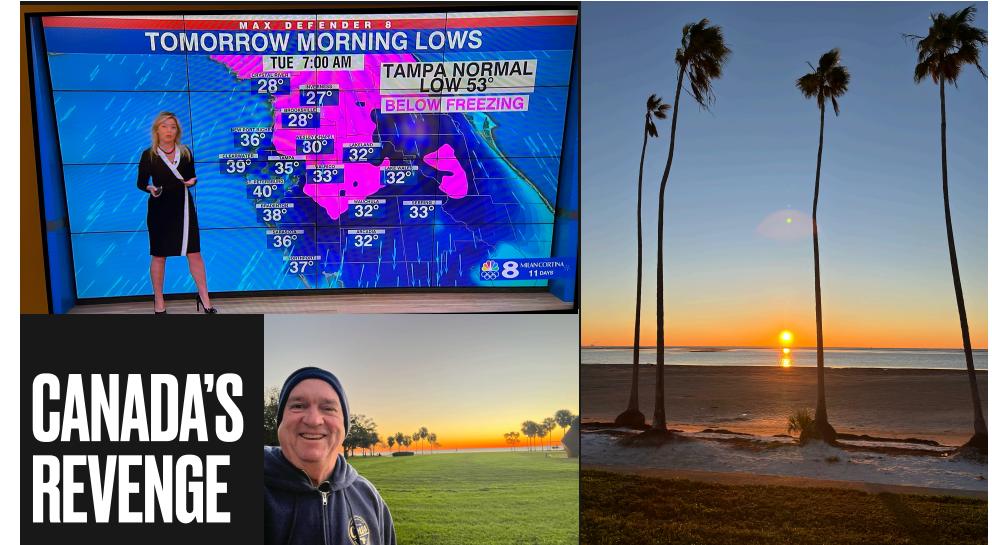
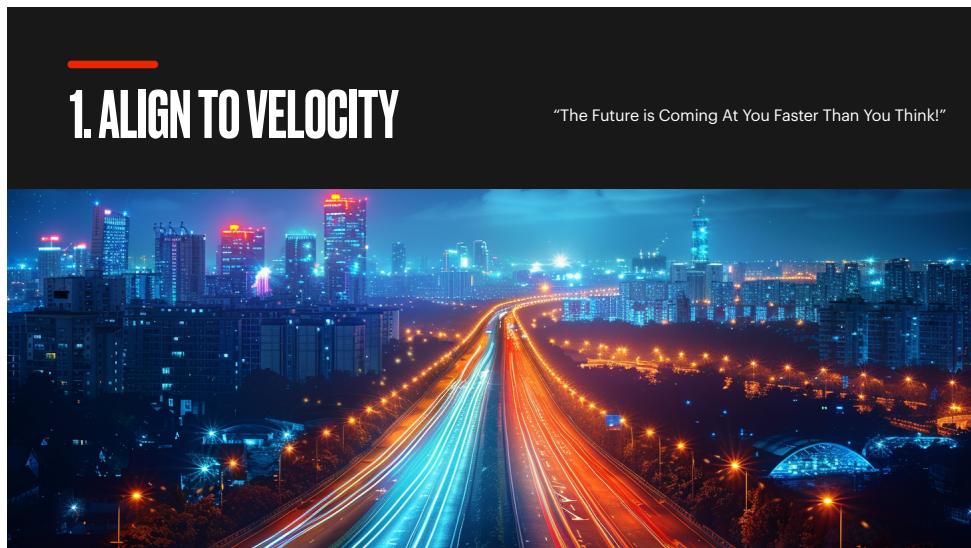
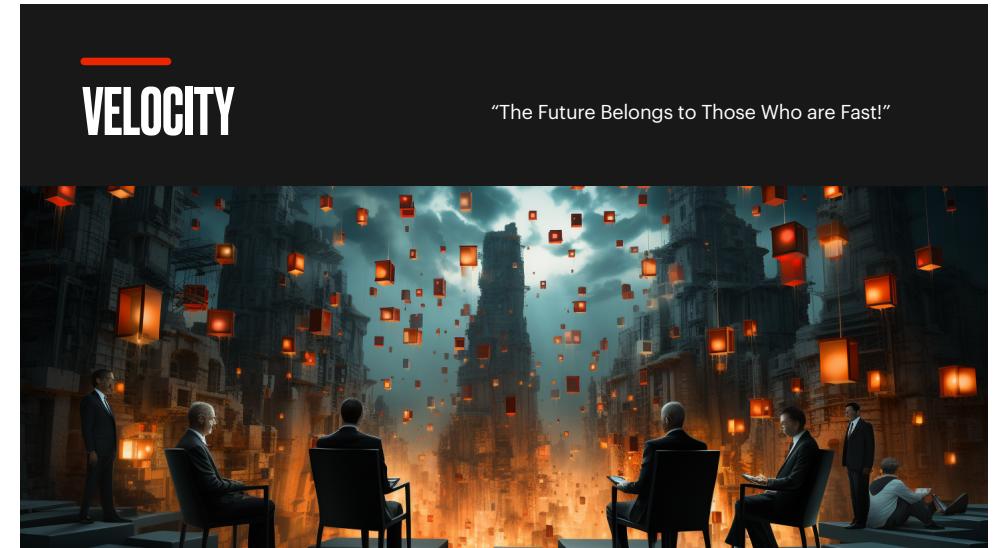


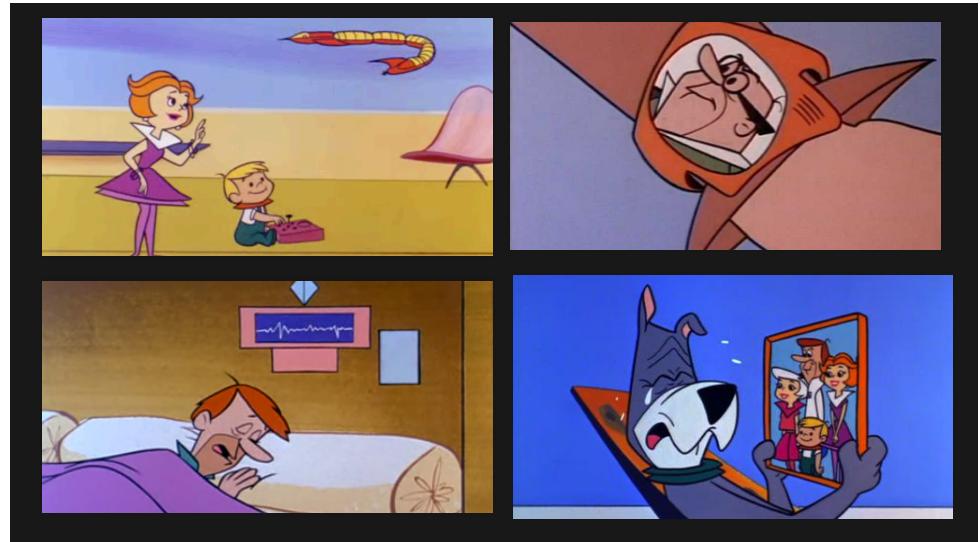
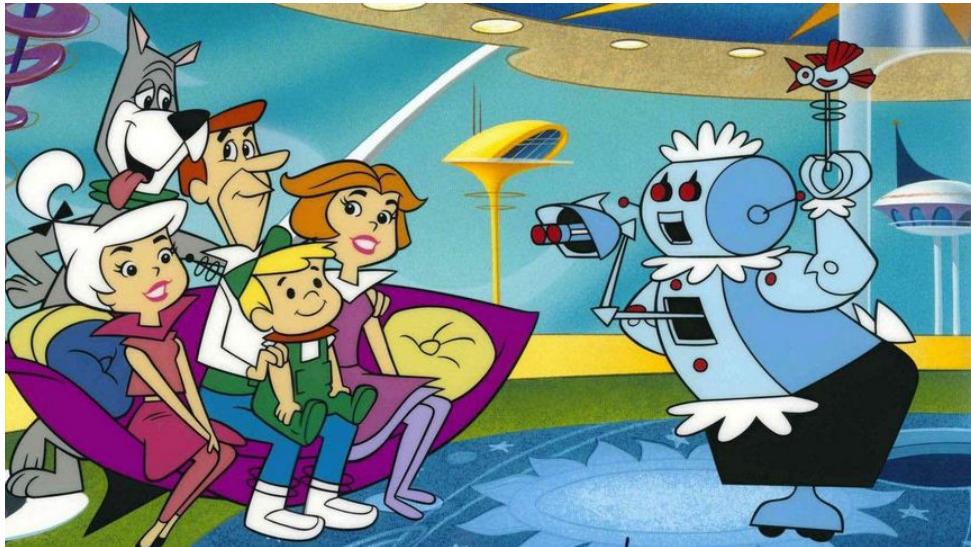
HARNESSING TECHNOLOGY FOR  
UNPRECEDENTED GROWTH!

BIFMA 2026

PRESENTED BY:  
Futurist Jim Carroll







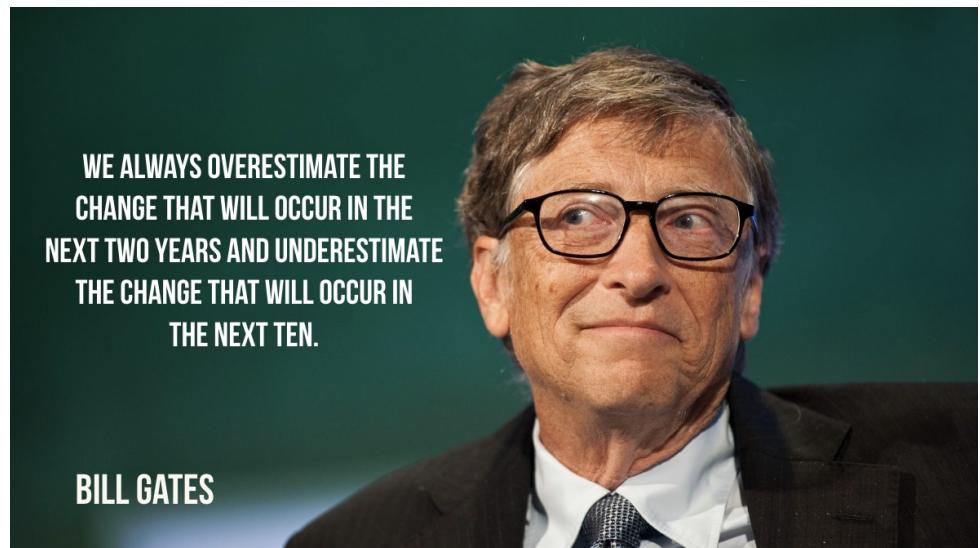
# DISRUPT

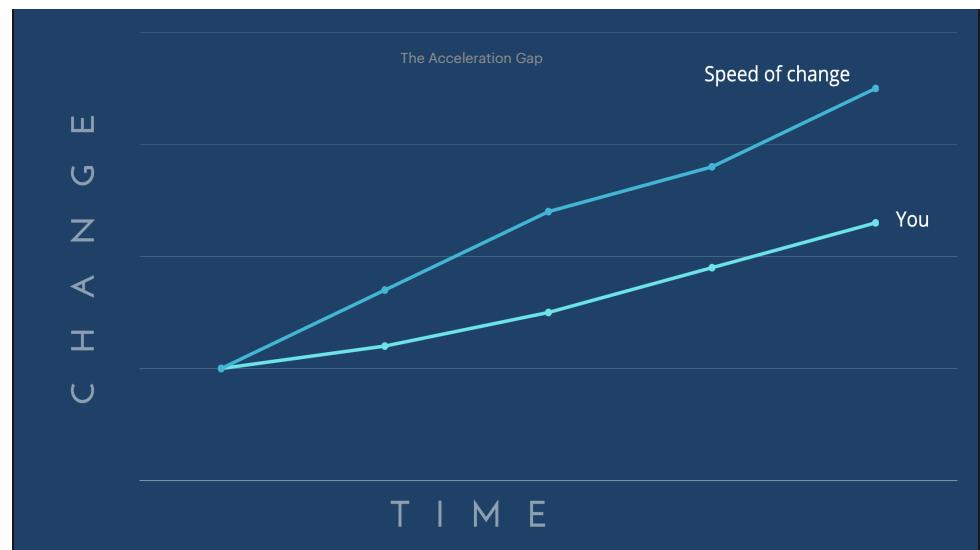
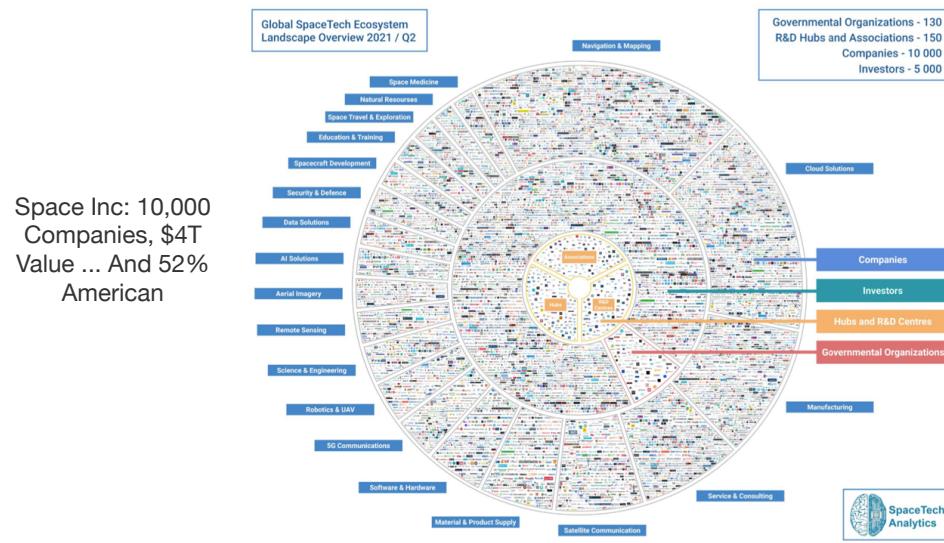
[phonetic] verb

specifically : to successfully challenge (established businesses, products, or services) by using an innovation (such as a new technology or business model) to gain a foothold in a marginal or new segment of the market and then fundamentally changing the nature of the market

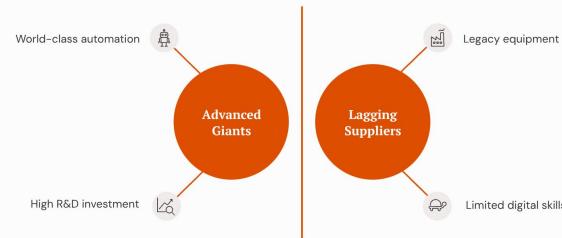
WE ALWAYS OVERESTIMATE THE  
CHANGE THAT WILL OCCUR IN THE  
NEXT TWO YEARS AND UNDERESTIMATE  
THE CHANGE THAT WILL OCCUR IN  
THE NEXT TEN.

BILL GATES





## The Dangerous "Barbell" Structure



Current policies are creating a brittle industrial structure: a few hyper-advanced giants dependent on a technologically lagging supplier ecosystem, with a dangerously hollowed-out middle.

This is not a resilient model for prosperity or security – it's a recipe for systemic bottlenecks and failure to capture full productivity benefits.

## 2. SEE THE FUTURE

"Volatility is the New Normal"



## PROJECT AURA!

January 26, 2035



## THE CLIENT REQUEST

A global biotech firm requiring a "hyper-responsive" workspace for their remote executive team.



## THE PRODUCT

A desk/chair ecosystem that adapts physically to the user's stress levels and seamlessly projects remote colleagues as 3D holographic presences.



## THE BRAND IMAGE:

CUSTOMIZED  
UNIQUE  
ONE OF A KIND

"INFINITELY YOU!"

## THE AURA WORKSPACE



YOUR WORKSPACE. YOUR AURA.  
INFINITELY YOU.



LIMITED-TIME PRE-ORDERS. UNLOCK EXCLUSIVE CUSTOMIZATION.  
VISIT AURACO

## 1: THE COGNITIVE BRIEF

INTERACTIVE, ITERATIVE DESIGN

Input: Executive biometric stress patterns.

Goal: Lower cortisol, enable remote intimacy.

AI generated 500 geometric variations.

Design refined via voice and data.



## 2: THE VIRTUAL REVIEW

DESIGNING BEFORE COMMITTING

Client experiences the digital twin.

Real-time design iteration from feedback.

"Privacy screen feels too enclosing."

Instant approval signed on digital asset.



## 3. THE DIGITAL TWIN SIMULATION

THE REAL PRODUCT BEFORE IT'S REAL

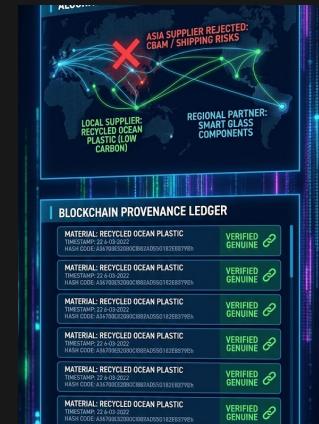
Proving viability before physical manufacturing.  
Simulated 50,000-hour product lifecycle.  
Stress-testing bio-responsive fabric fibers.  
Verified structure for heavy projector loads.



## 4. RESILIENT "GREEN" SOURCING

SUPPLY CHAIN AND CIRCULAR ECONOMY

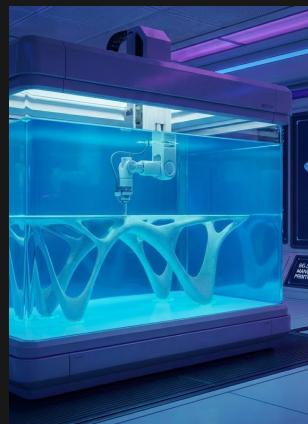
AI rejects high-risk, high-carbon suppliers.  
Algorithmic sourcing for local resilience.  
Utilizing verified recycled ocean plastics.  
Blockchain ledger guarantees material provenance.



## 5. PROTOTYPING THE IMPOSSIBLE

THE ACCELERATION OF MATERIAL SCIENCE

Printing gravity-defying organic shapes.  
Gel-Supported Additive Manufacturing enables overhangs.  
Physical prototype scanned immediately.  
Dimensions auto-corrected against Digital Twin.



## 6. THE "PHYGITAL" INTERFACE

THE INTEGRATION OF TECH INTO SMART FURNITURE

The desk surface is the screen.  
Embedded holographic "Project Ghost" technology.  
"Smart Thread" sensors woven into fabric.  
Biometrics adjust desk height automatically.



## 7. THE SWARM FACTORY

CHANGING PROJECT WORKFLOW

Dynamic, non-linear production floor.  
Swarm robotics move parts autonomously.  
Humanoid robots route electronic components.  
Cobots augment human assembly dexterity.



## 8. QUALITY ASSURANCE VISION AUDIT

AI ENABLED QUALITY CONTROL

Ensuring absolute perfection before shipping.  
AI machine vision detects microscopic flaws.  
Real-time comparison against Digital Twin.  
Unit's digital "birth certificate" created.



## 9. "WHITE GLOVE" DELIVERY

NICHE, BRANDED HIGH END PRODUCT

Assembled in local micro-factory.  
Drastically reduced shipping emissions.  
AR glasses guide precise installation.  
Optimal placement via room scan data.



## 10: LIFECYCLE PRODUCT-AS-A-SERVICE

"CONNECTED FURNITURE!"

Sensors enable predictive maintenance.  
Technician dispatched before part failure.  
Modular upgrades for evolving technology.  
Prevents obsolete furniture e-waste.



“ THAT'S THE DUMBEST THING I EVER HEARD!

(Just about everybody)

### 3. UNDERSTAND THE TRENDS

“Why Now - and When?”



### ALREADY HERE

“Active Implementation”

#### CURRENT IMPLEMENTATION

ALREADY HERE IN ACTIVE USE

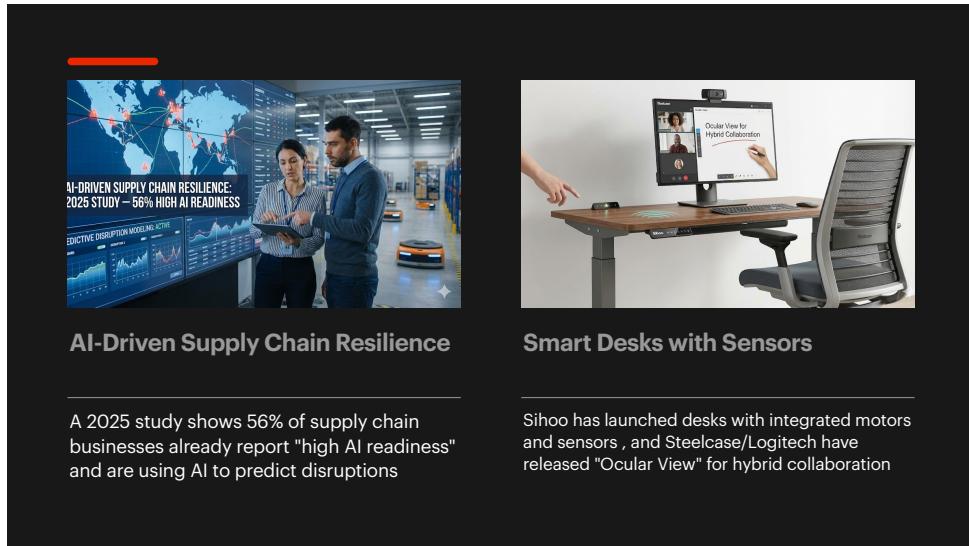
#### Circular Materials (Textile Waste)

Humanscale and Kvadrat Really have already partnered to launch tabletops made from 70% discarded textiles



#### Acoustic & Neuro-Inclusive Lighting

Sabin (founded 2021) is actively selling the LINEAR series of acoustic lighting designed for sensory environments



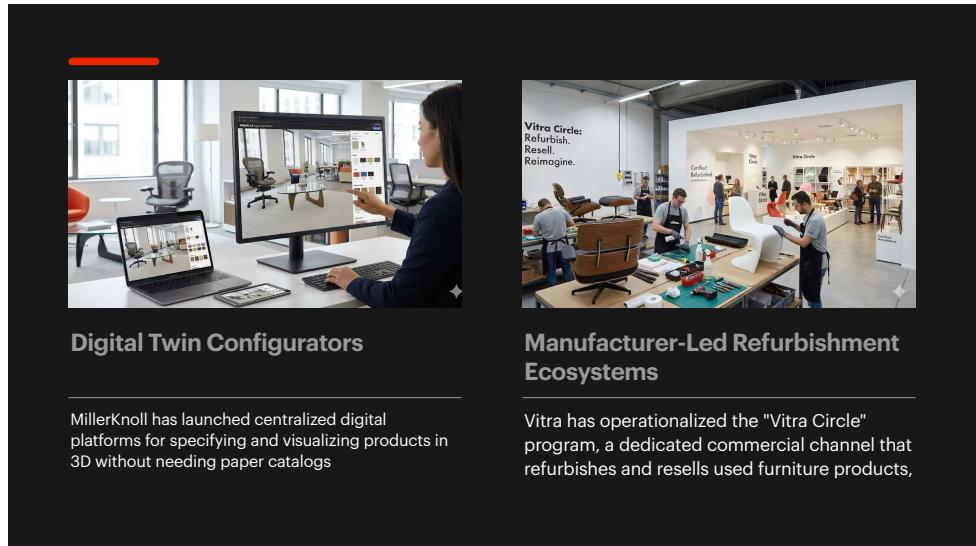
**AI-Driven Supply Chain Resilience**

A 2025 study shows 56% of supply chain businesses already report "high AI readiness" and are using AI to predict disruptions



### Smart Desks with Sensors

Sihoo has launched desks with integrated motors and sensors, and Steelcase/Logitech have released "Ocular View" for hybrid collaboration

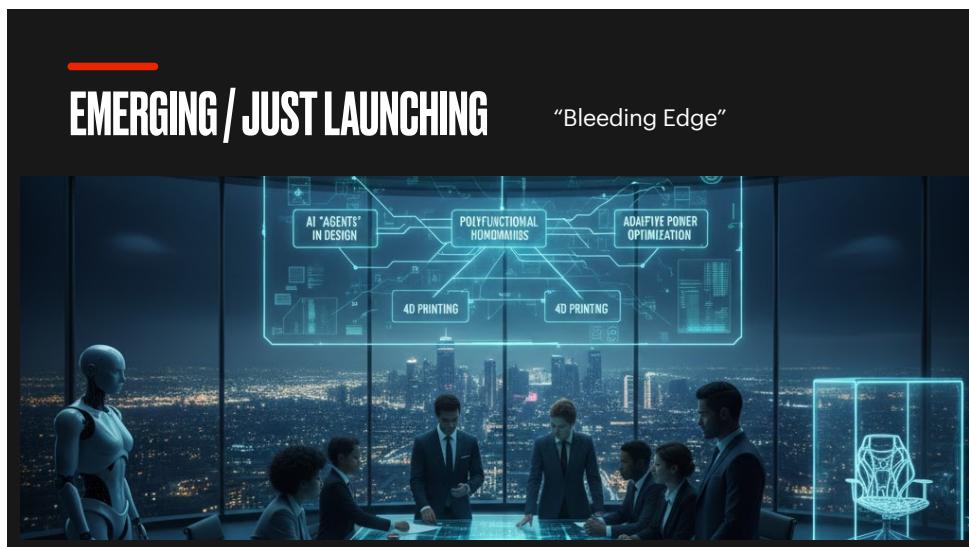


**Digital Twin Configurers**

MillerKnoll has launched centralized digital platforms for specifying and visualizing products in 3D without needing paper catalogs

**Manufacturer-Led Refurbishment Ecosystems**

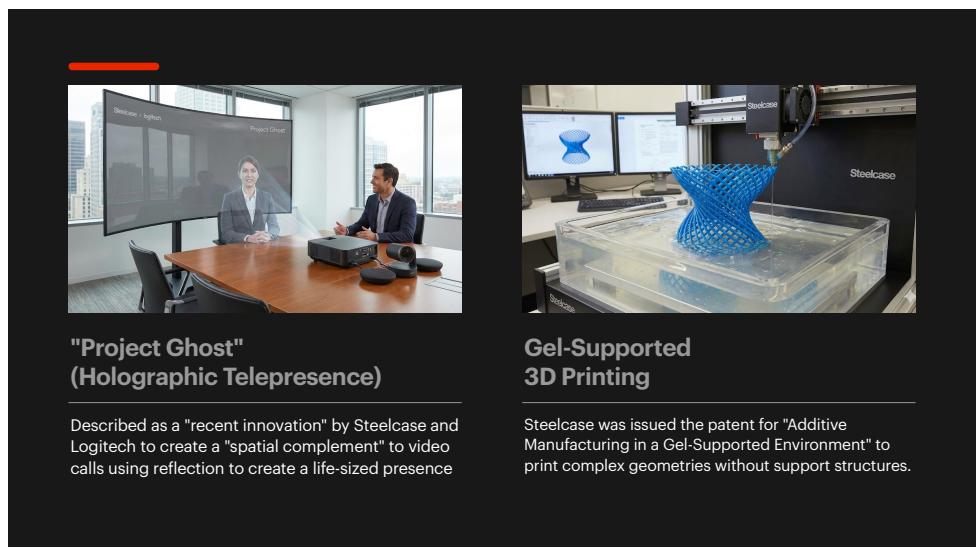
Vitra has operationalized the "Vitra Circle" program, a dedicated commercial channel that refurbishes and resells used furniture products,



**EMERGING / JUST LAUNCHING**

**"Bleeding Edge"**

AI "AGENTS" IN DESIGN  
POLYFUNCTIONAL HOMOMORPHS  
ADAPTIVE POWER OPTIMIZATION  
4D PRINTING  
4D PRINTING



**"Project Ghost"**  
**(Holographic Telepresence)**

Described as a "recent innovation" by Steelcase and Logitech to create a "spatial complement" to video calls using reflection to create a life-sized presence

**Gel-Supported 3D Printing**

Steelcase was issued the patent for "Additive Manufacturing in a Gel-Supported Environment" to print complex geometries without support structures.



## AI "Agents" in Design (Generative)

A shift to "Agentic AI" (AI that takes action, not just generates text) is currently a major trend being adopted by marketers and designers for 2025.



## Adaptive Power Optimization

Brexford Manufacturing was issued a patent in June 2025 for an "Adaptive laptop computer charging system" that dynamically negotiates power delivery with connected devices

# FORTHCOMING (THE 2030-2035 VISION)

"Bleeding Edge"



## The "System Twin"

While we have digital twins of products now, the ability to simulate 50,000 hours of lifecycle wear in a virtual environment before manufacturing is part of the "Intelligent Manufacturing" vision for the next decade.



## Swarm Manufacturing

AGVs (robots) exist in warehouses (like Amazon), but their use on the furniture assembly floor to replace linear assembly lines is a "Future Vision" for 2035



## 4D Printing

The concept of materials that change shape after printing (self-assembly) is currently in the research phase for biomedical and aerospace applications, expected to mature for furniture by the 2030s



## Polyfunctional Humanoid Robots:

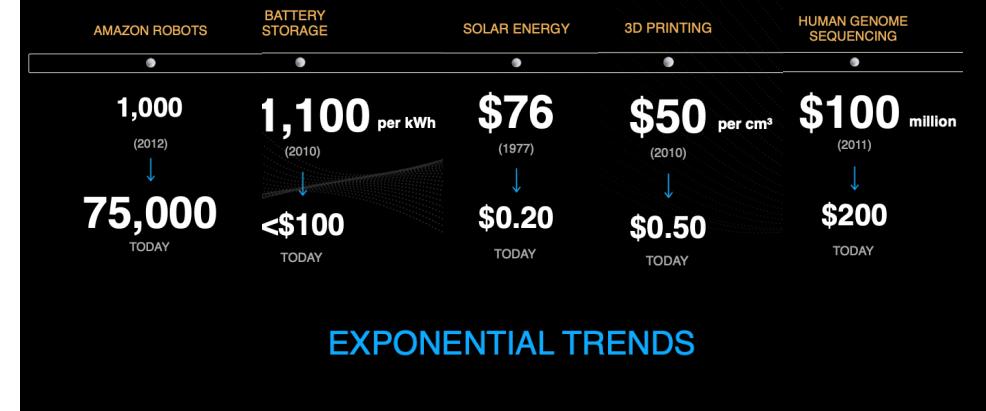
They can switch seamlessly between diverse tasks—such as unloading trucks, handling delicate upholstery tools, or climbing stairs—within infrastructure originally designed for humans

## 4. UNDERSTAND THE VELOCITY

"The Exponential Era"

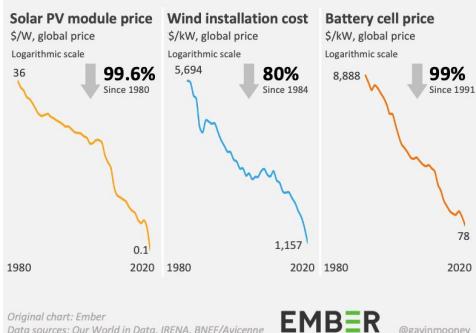


### THE ERA OF ACCELERATION



### Clean energy technology costs have been falling for decades on learning curves

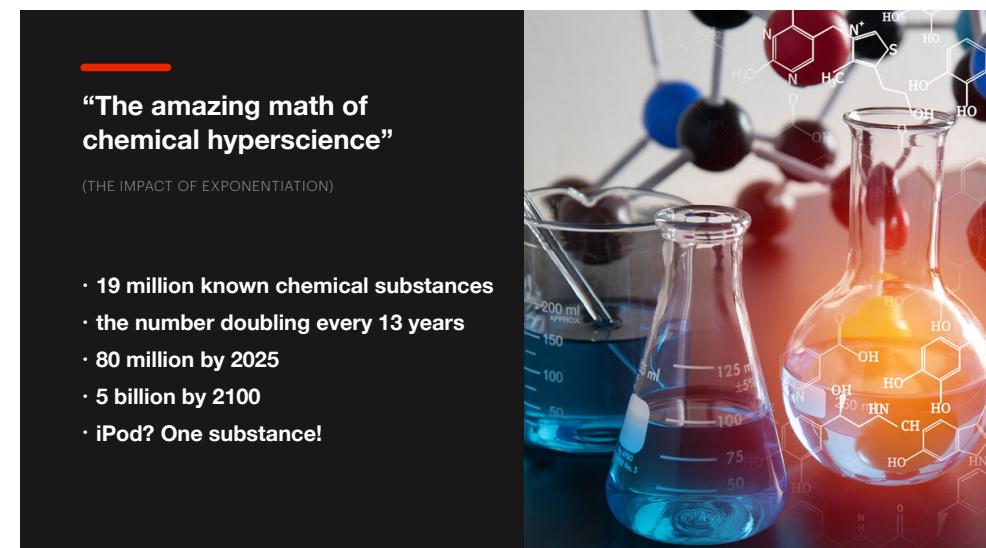
Continuous innovation has vastly improved electrotech economics, and continues to do so



### "The amazing math of chemical hyperscience"

(THE IMPACT OF EXPONENTIALITY)

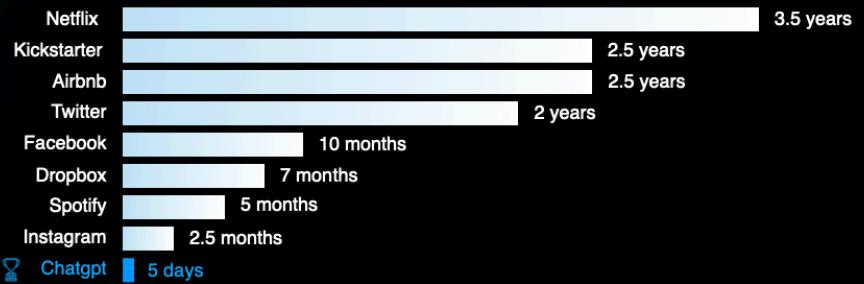
- 19 million known chemical substances
- the number doubling every 13 years
- 80 million by 2025
- 5 billion by 2100
- iPod? One substance!



# “REINVENTION” AND TRANSFORMATION OF PRODUCT AND METHODOLOGY



## TIME IT TOOK TO REACH 1 MILLION USERS

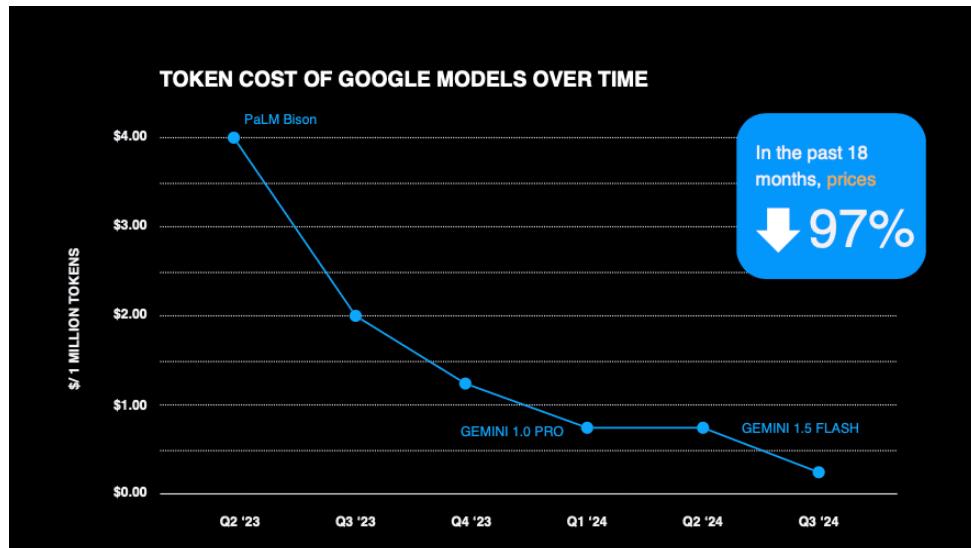


Growth in AI Model Parameters Over Time (Linear Scale)



## COLLAPSING COST





# THE ROBOTIC REVOLUTION

2025 IS THE YEAR OF DISRUPTION

- accelerated venture capital
- PC-like reduction in cost curve
- open-system collaborative innovation
- arrival of digital training tools

**UNITREE**

Home Professional Education & Industry Humanoid Robot Accessories Contact Disclaimer

Home > Unitree G1 (Contact us for the real price)

**Unitree G1 (Contact us for the real price)**

\$16,000.00 USD

Contact sales to get G1 Edu price

Customize products according to your needs

Please contact us for delivery time

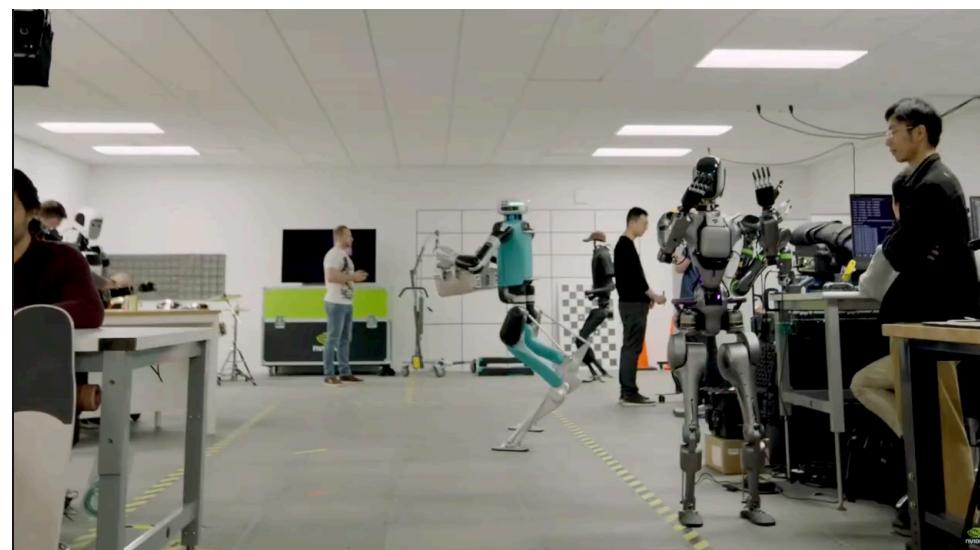
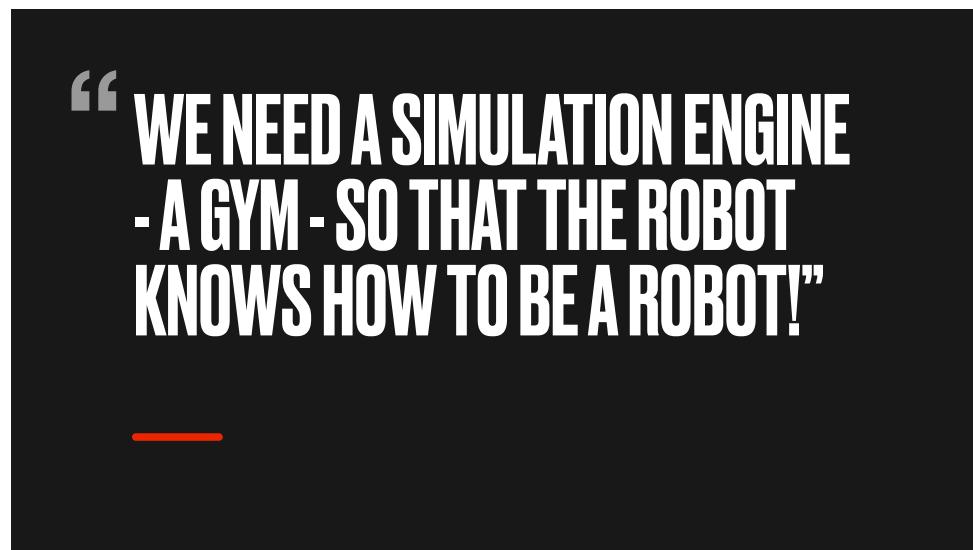
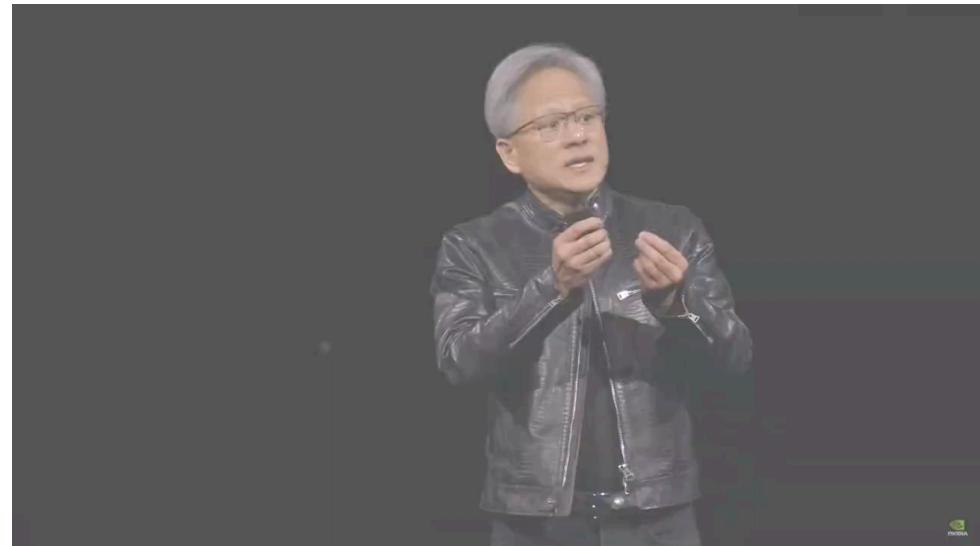
Product

G1

Contact Sales: sales\_global@unitree.cc

Description

Chat with us



## 5. HOW DO WE GET THERE?

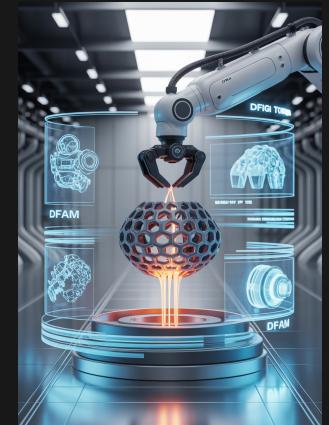
"Why Now - and When?"



## MAJOR TRENDS

FASTER TIME TO MARKET IS EVERYTHING

- Rapid concept generation
- Rapid concept development
- Rapid prototyping
- Combined with "Design for Additive Manufacturing" (DfAM)"



### LINEAR PRODUCT DEVELOPMENT



### ITERATIVE PRODUCT DEVELOPMENT

#### Change:

Rapid cycles replace long, sequential design.

#### Benefit:

Agile, adaptive products meet market needs faster.

### COSTLY PROTOTYPING AND DEVELOPMENT



### ON-DEMAND, COST-EFFECTIVE PROTOTYPING & PRODUCTION

#### Change:

Quick, affordable models without huge investment.

#### Benefit:

Faster, cheaper, democratized, custom manufacturing.

## RESTRICTED DESIGN FREEDOM



## UNPRECEDENTED DESIGN FREEDOM AND COMPLEXITY

### Change:

Create intricate shapes, previously impossible.

### Benefit:

Boosts innovation, leads to better designs.

## PRODUCT DEVELOPMENT IN ISOLATION



## ENHANCED, COLLABORATIVE DESIGN

### Change:

Rapid cycles replace long, sequential design.

### Benefit:

Agile, adaptive products meet market needs faster.

## ISOLATED MANUFACTURING METHODOLOGIES



## INTEGRATED DIGITAL ECOSYSTEMS

### Change:

Manufacturing connected with AI, VR, IIoT.

### Benefit:

Drives optimization, efficiency; Industry 4.0.

## CLEAR DISTINCTION BETWEEN PROTOTYPING AND PRODUCTION



## BLURRING LINES BETWEEN PROTOTYPING AND PRODUCTION

### Change:

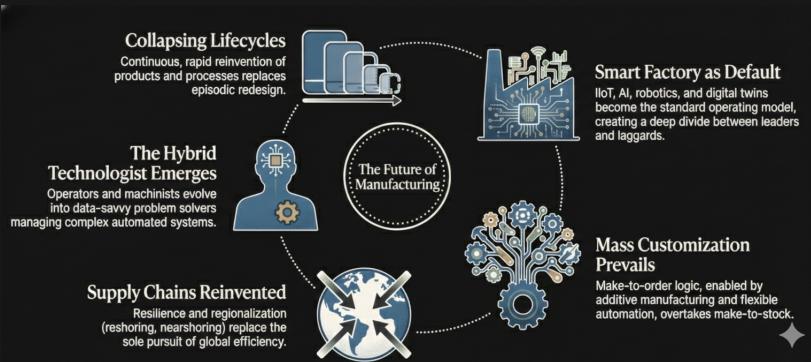
Prototypes become direct production.

### Benefit:

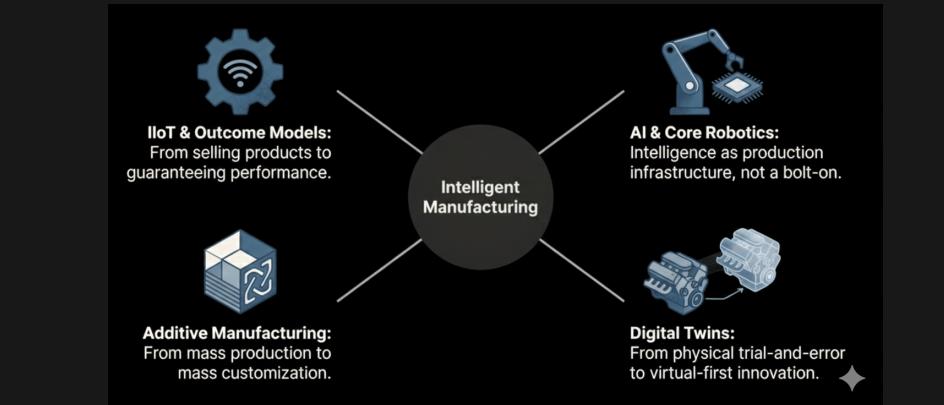
Flexible, responsive, customized manufacturing.

## FIVE STRUCTURAL SHIFTS

"CONSTANT EVOLUTION AND INNOVATION"



## A NEW MANUFACTURING OPERATING SYSTEM



## #1 IIoT



### IIoT & Smart Furniture

The potential for health monitoring (posture, movement) and connectivity with smart home devices, enabling "furniture-as-a-service" models.

## #2 AI AND ROBOTICS INFRASTRUCTURE

### High-Impact Applications



**Machine Vision:** AI-based quality inspection becomes standard on high-mix lines.



**Predictive Maintenance:** AI reduces downtime and scrap by predicting equipment failures.



**Cobots:** Collaborative robots become standard for repetitive handling and inspection tasks.

## #3 NEW METHODOLOGIES & MATERIALS



### Additive Manufacturing & Mass Customization

This technology enables **production of complex, custom geometries** at scale.

## #4 DIGITAL TWIN TECHNOLOGY

### Key Use Cases



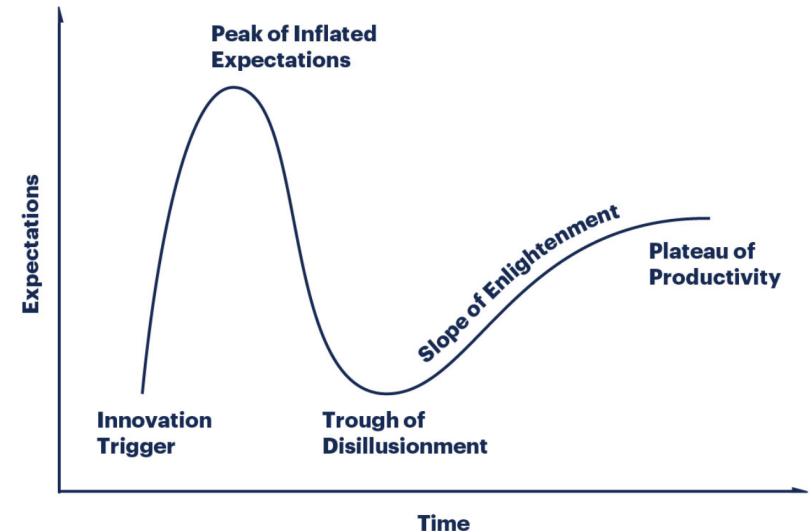
**Iterative Design Loops:** Design, simulate in the twin, print/build, measure feedback, redesign. Compress cycles and lower risk.



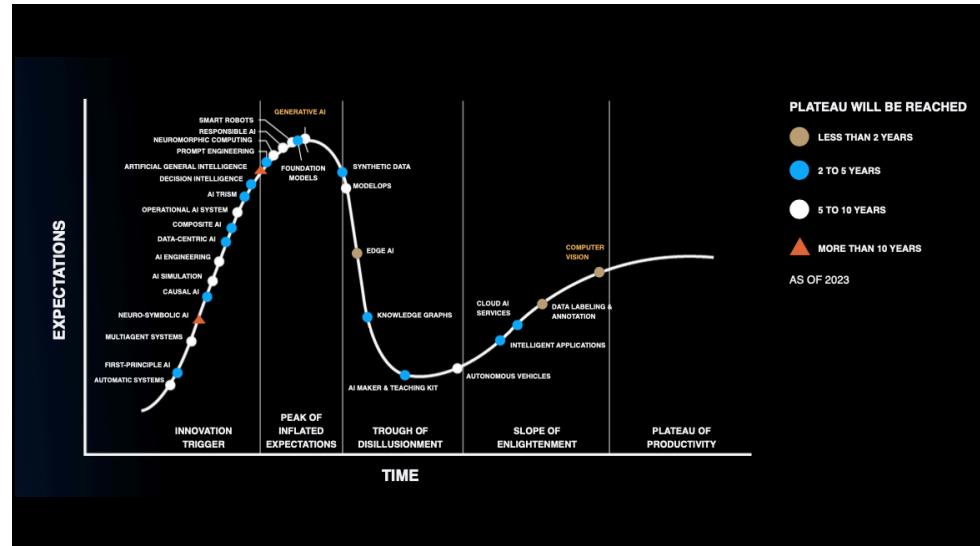
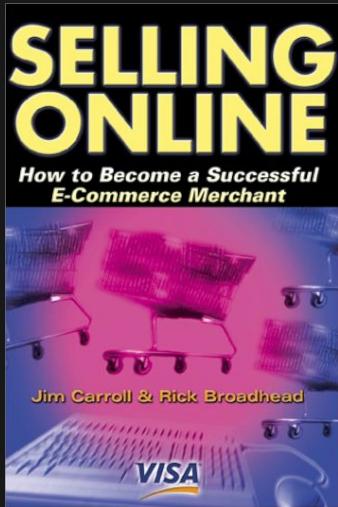
**Risk-Free Experimentation:** Test new materials, process parameters, and line configurations before physical changes.

## 6. WHEN DO WE DO IT?

"Why Now - and When?"



1998!

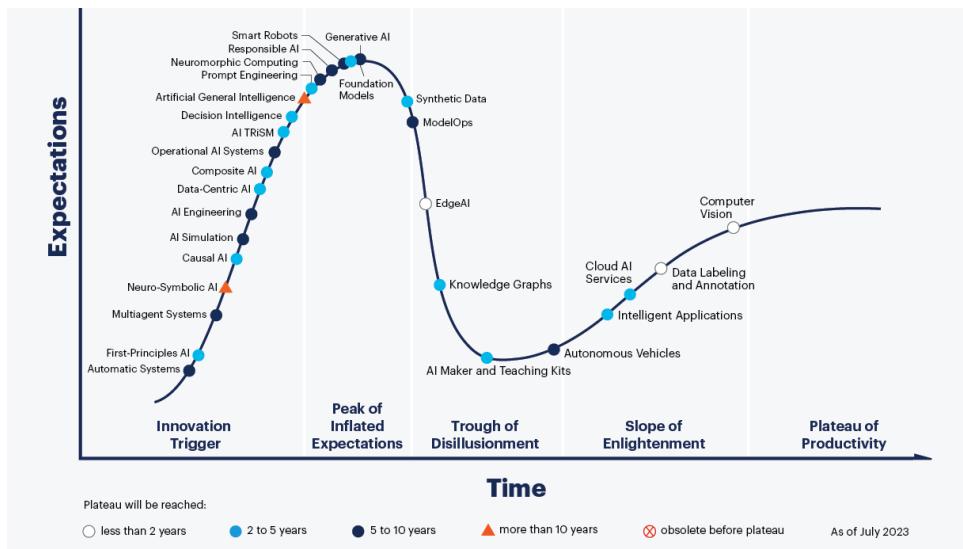


“THE FUTURE HAPPENS SLOWLY, AND THEN, ALL AT ONCE”

The “tipping point” theory

“INTERNATIONAL BUSINESS MACHINES CORP. CHIEF EXECUTIVE OFFICER ARVIND KRISHNA SAID THE COMPANY EXPECTS TO PAUSE HIRING FOR ROLES IT THINKS COULD BE REPLACED WITH ARTIFICIAL INTELLIGENCE IN THE COMING YEARS. HIRING IN BACK-OFFICE FUNCTIONS – SUCH AS HUMAN RESOURCES – WILL BE SUSPENDED OR SLOWED, KRISHNA SAID IN AN INTERVIEW.” BLOOMBERG, MAY 1, 2023

(We are clearly at the peak of inflated expectations!)



## 7. WHAT DO WE DO RIGHT NOW?

**"The Future is Coming At You Faster Than You Think!"**



# THE ACCELERATION OF MANUFACTURING

- ✓ acceleration of robots and cobots
- ✓ digital twin technology
- ✓ industrial IOT
- ✓ quality control (vision / machine learning)
- ✓ predictive maintenance
- ✓ supply chain optimization
- ✓ workplace safety management and monitoring
- ✓ product enhancement and development





- Data scientists / data quality analysts
- Machine learning engineers
- Collaborative robotics specialists
- AI solutions programmers/ software designers
- Predictive Maintenance specialists
- Digital Manufacturing Managers

## FUTURE MANUFACTURING CAREERS

"JOBS THAT DO NOT YET EXIST"

- AI Integration specialist
- Automation consultant
- AI ethics officer
- Digital transformation strategist
- Human-Machine Interaction Designer
- AI Training Coordinator
- AI System Auditor



# INNOVATION

[phonetic] noun

1 : a new idea, method, or device : NOVELTY

2 : the introduction of something new

## The Dangerous "Barbell" Structure



Current policies are creating a brittle industrial structure: a few hyper-advanced giants dependent on a technologically lagging supplier ecosystem, with a dangerously hollowed-out middle.

This is not a resilient model for prosperity or security – it's a recipe for systemic bottlenecks and failure to capture full productivity benefits.

## The Innovation Killers

- You can't do that (because we've always done it this way!)
- It won't work!
- Why can't we keep doing what we've always done
- It's a bad idea!
- That's the dumbest thing I ever heard
- It's too risky
- It's not necessary
- The boss won't go for it!

Kill the killers!

[innovationkillers.jimcarroll.com](http://innovationkillers.jimcarroll.com)



## GET OUT IN FRONT

"Innovation at the forefront of opportunity!"



## INVEST IN EXPERIENTIAL CAPITAL

"As important as financial capital"



## BUILD AN 'XBOX ROOM'

"Explore the unknown with next generation insight"



## WASTE TIME ON FRIVOLOUS THINGS

"Serendipitous innovation"



## ASSESS YOUR SKILL SET

"The rebels, the outliers, the misfits"



## KEEP AN EYE ON THE FUTURE

"Become your own futurist!"



## ABOVE ALL!

(MY MANTRA)

Think **BIG.**

Start *small.*

Scale *fast!*



“  
inspiration.jimcarroll.com

Think BIG.

Your future will  
thank you for it.

—  
Futurist Jim Carroll



# PROTEUS



## CONTAINERIZED az robx STORAGE SYSTEM



## BLUE STAR, INDIA

“QUALITY INSPECTION”

AC / commercial refrigeration

Copper tube expansion issues in assembly

AI vision inspection of expansion process

Production increase 10%, reduction in quality issues

UNIVERSAL ROBOTS Products Insights Industries Applications Services & Support About Us Get Started

Home > Case Stories > Blue Star Limited

## Collaborative robots pave the path to zero quality rejections

Blue Star Limited

Watch video

## JK TYRE & INDUSTRIES LTD.

PREDICTIVE MAINTENANCE

India based truck tire manufacturers

monitor the condition of machinery and equipment in real-time

detecting anomalies and predicting potential failures

scheduling maintenance activities proactively, minimizing downtime, and optimizing maintenance costs



2 & 3 wheeler transport

Electric vehicle manufacturer, partner with BMW



## TVS MOTOR COMPANY LTD.

## AI ASSISTED PRODUCT DESIGN

THE DOMINANCE OF DIGITAL TWIN TECHNOLOGY

Generate multiple design options (iterative design) based on cost, weight, function, durability, intelligence (IoT/IoIoT)

Process customer feedback / warranty / service records on previous products

Integrate to additive / 3d printer tech for specs and CAD design

Running simulation and virtual testing (AI based digital twin tech)



## iQUBE DESIGN

AI was used to analyze customer data to identify the features that were most important to consumers.

Second, AI was used to simulate the performance of the iQube under different conditions, to optimize for efficiency and performance.

Third, AI was used to test the iQube's safety features, aligning to safety standards.

"As a result of using AI, the iQube is a more efficient, safer, and more user-friendly electric scooter than anything else on the market."

