GenAI and NPD: The Landscape, Current and Future State

May 7, 2026

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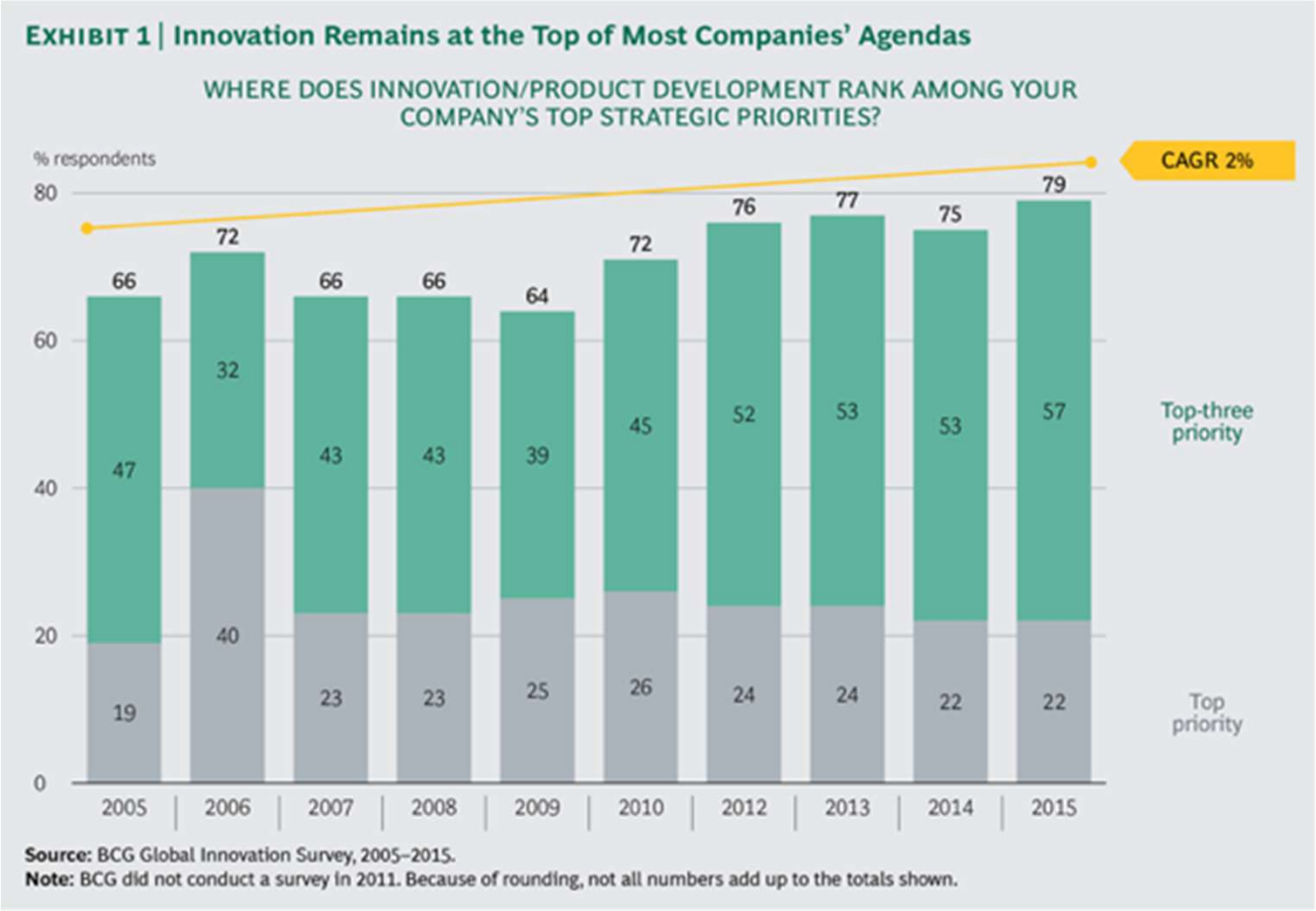
Welcome and Framing

Opportunities and Challenges of the Innovation Process and the potential of AI

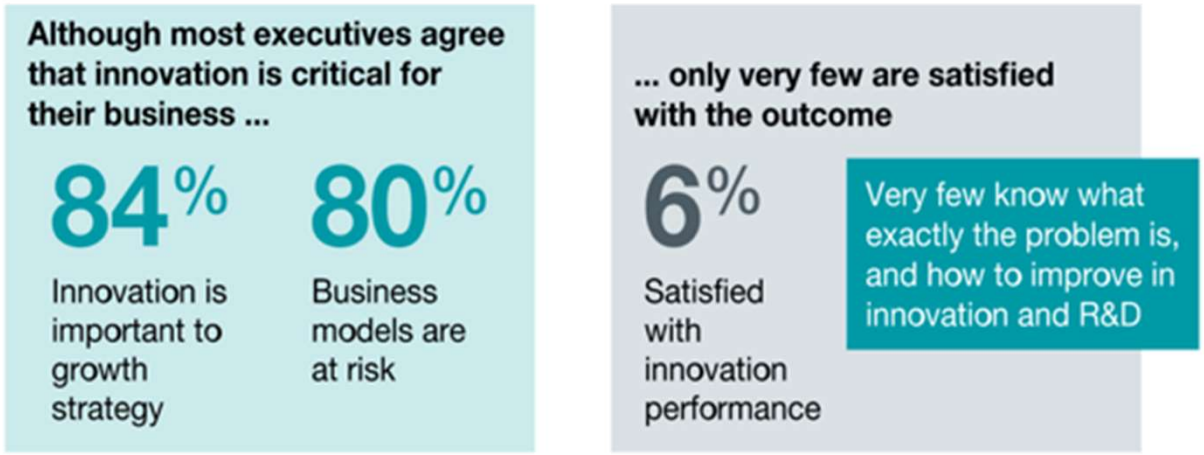
Innovation:
The Basics and The Challenges

Innovation is critical in the 21st Century



But few executives are satisfied with their organizations' innovation performance

Executives agree on the importance of innovation but are often dissatisfied and lack clarity on what the problem is and how to improve.



McKinsey&Company | Source: McKinsey Global Innovation Survey, McKinsey analysis

Accessed, Dec. 20, 2016

The Risk

- Many firms struggle with an effective approach…

Photo courtesy of www.finance.yahoo.com.

Issue: Response to disruptive innovation

The Risk

Photo courtesy of www.finance.yahoo.com.

Issue: Poor Anticipation and Response to New Competition

Microsoft

The Risk

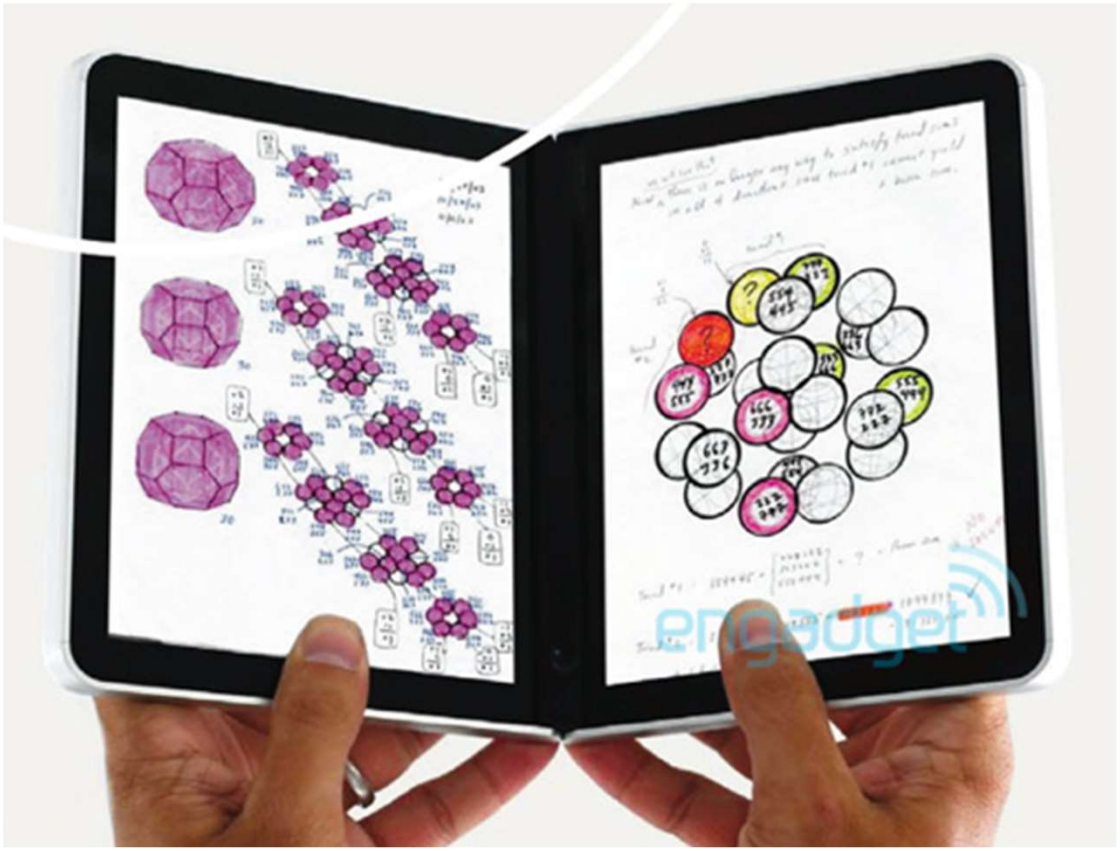


Photo courtesy of www.engadget.com.

Issue: Not taking a risk, tied to legacy platforms

Microsoft

Innovation Risk and Rewards

Lessons Learned

Defunct Courier Tablet

Surface series and Office 365

Valuable corporate learning and strategic changes to innovation

Innovation Successes and Failures

Good idea: Continuous improvement and scalable platforms

Bad Idea: Poor range and expensive development

Good Idea: Fast, secure texting

Bad idea: articulating touchscreen

40% failure rate in New Products and Services

Source: PDMA CPAS Survey, 2012

The Actual Problem is Much Worse

Every year 60 to 70% of new apparel products fail to gain traction with consumers.

60 to 80% of all new footwear products fail resulting in $274 to $361B in losses

$600B is lost annually with toys, games, and outdoor equipment

In the auto parts industry $750 to $800B is lost due to margin erosion, write-offs and lost sales.

Taking a Step Back to Basics…

Innovation:

: a new **idea**, device, or method

: the act or **process** of introducing new **ideas**, devices, or methods

http://www.merriam-webster.com/dictionary/innovation

To achieve
innovation as a ***result,***
requires understanding of
innovation as a ***process.***

The innovation process is ***stochastic**** in nature.

Innovation management is not about guaranteeing success, but about ***improving the odds***.

*Random properties

To improve the odds of harvesting a ***high-value idea***, requires creating an ***idea pool*** with appropriate characteristics.

Let’s try an experiment…

In 60 seconds, write down as many uses for this as you can!

AI’s Current Impact

Examples of generative AI benefits across functions

Customer service and contact centers

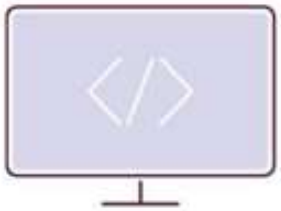
20%-35%

time reduction for manual responses

Sales and marketing

30%-50%

less time spent on content creation



Software product development

15%

time reduction in coding-related activities

Back office and other productivity

20%-50%

task automation for document comparison

Source: Bain & Company

Example in Action: Merck and Nvidia

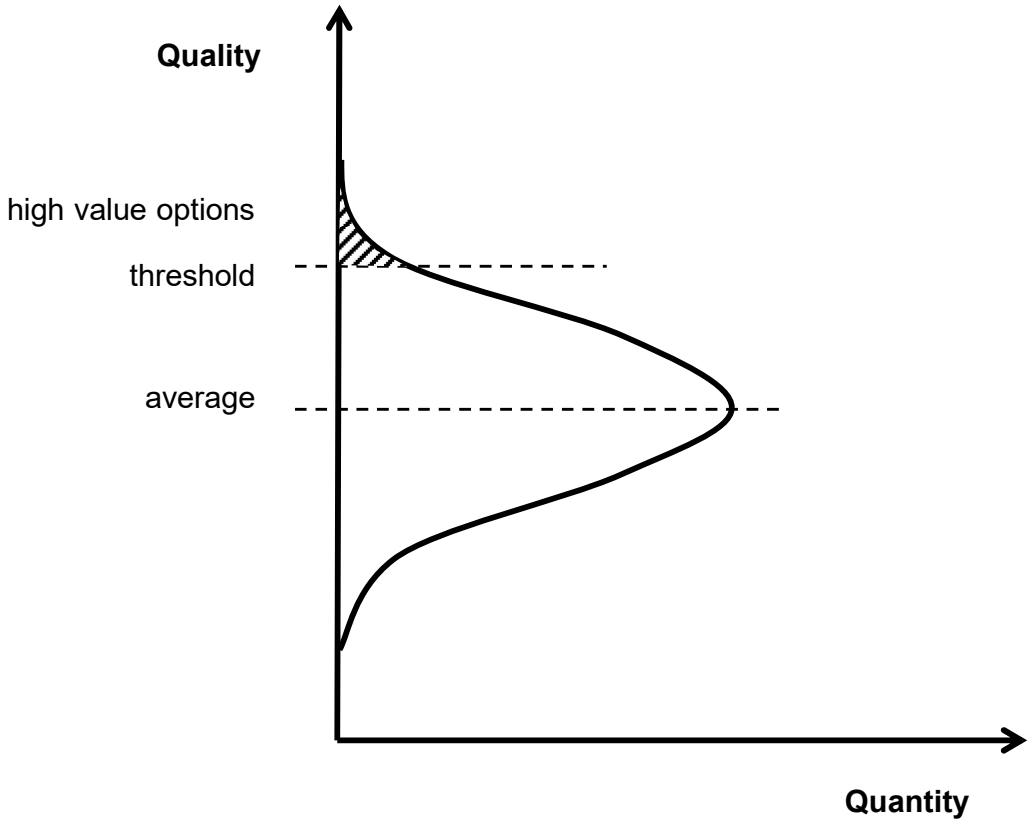
PHARMA

Merck and Nvidia team up on new drug discovery model

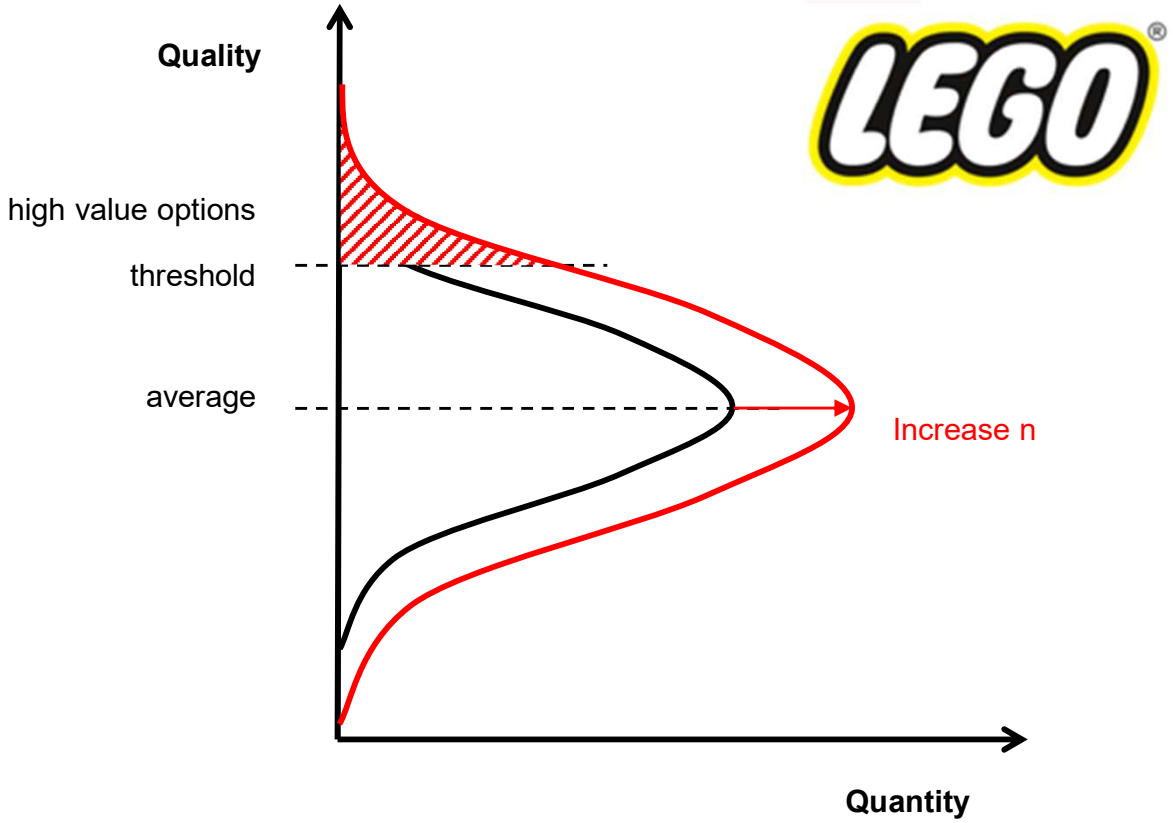
It's one of a growing number of pharma-tech partnerships.

How AI Changes the Innovation Landscape

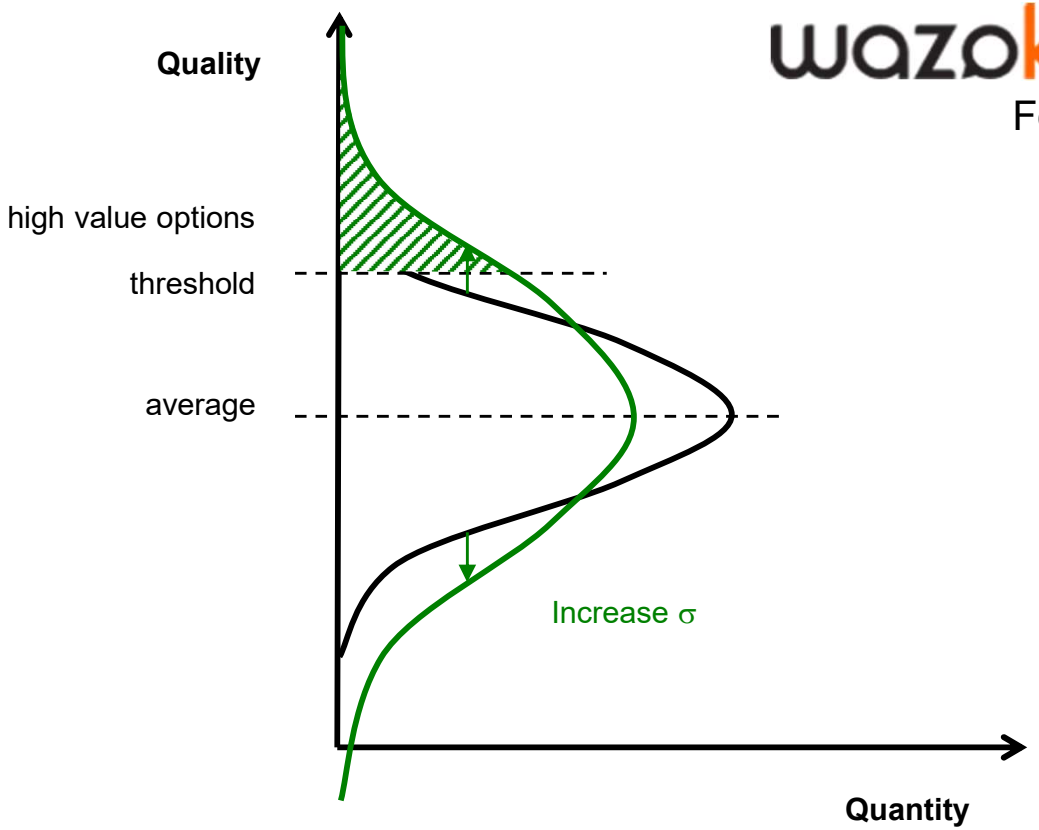
The Goal: High Quality Ideas



Innovation Distribution
Intervention 1: Increase idea volume

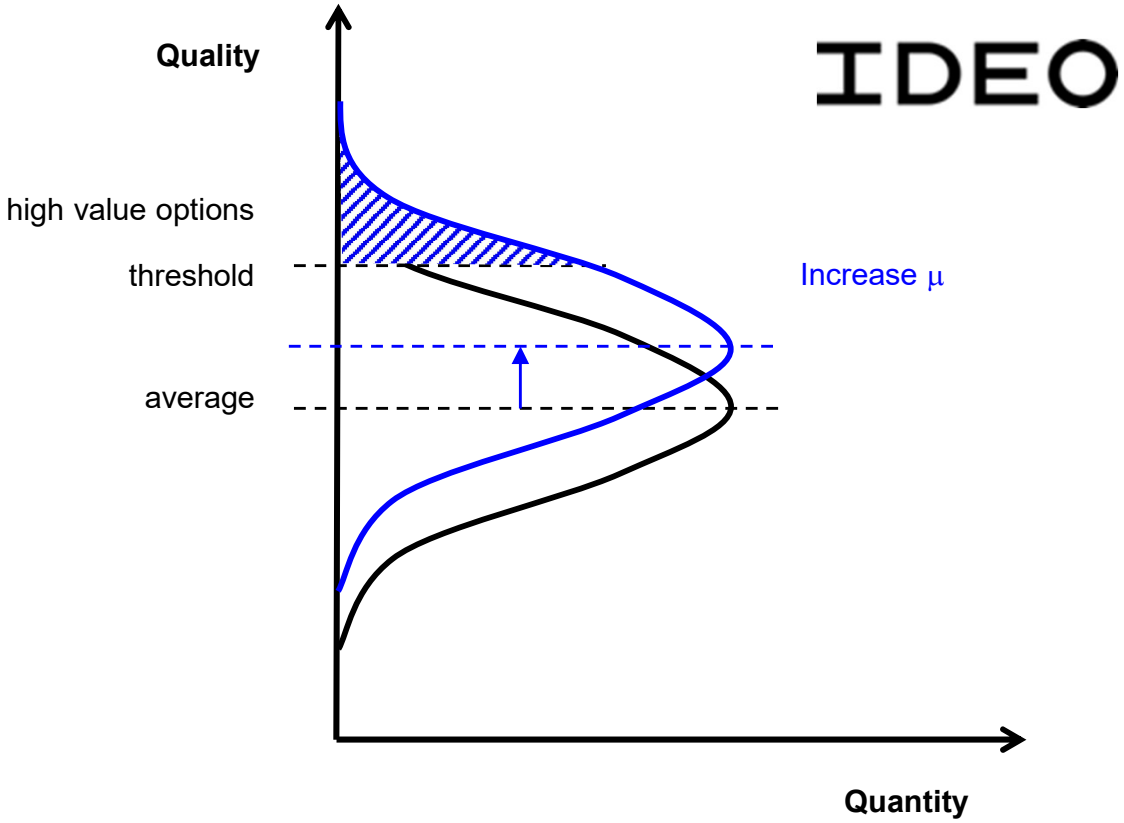


Innovation Distribution
Intervention 2: Increase idea diversity



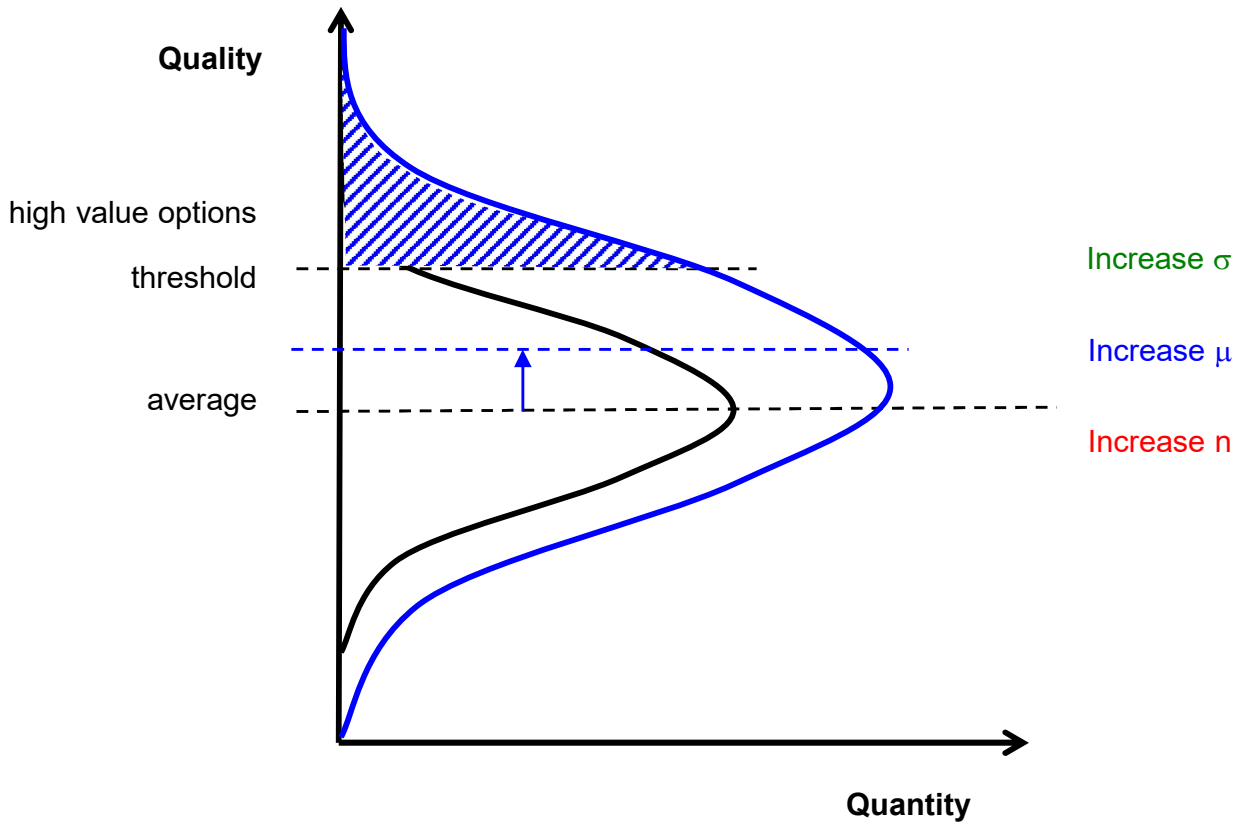
wazoku CROWD
Formerly InnoCentive

Innovation Distribution
Intervention 3: Increase average idea quality

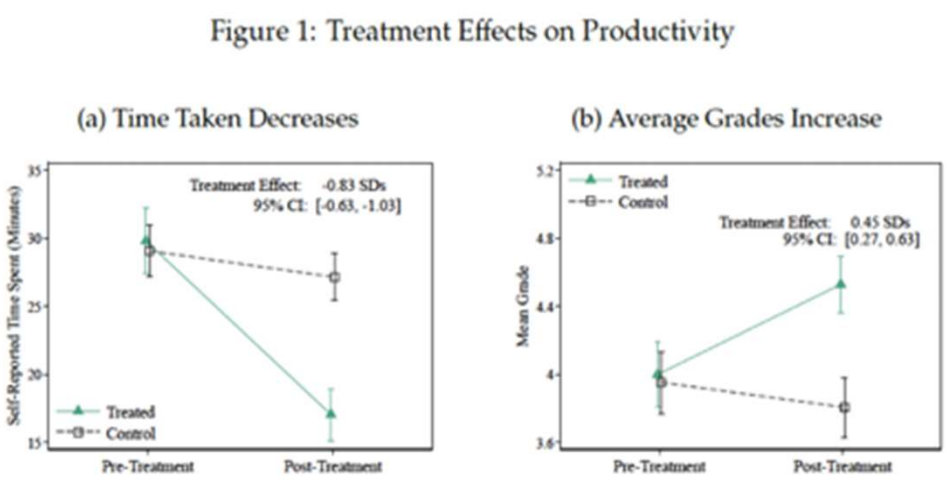


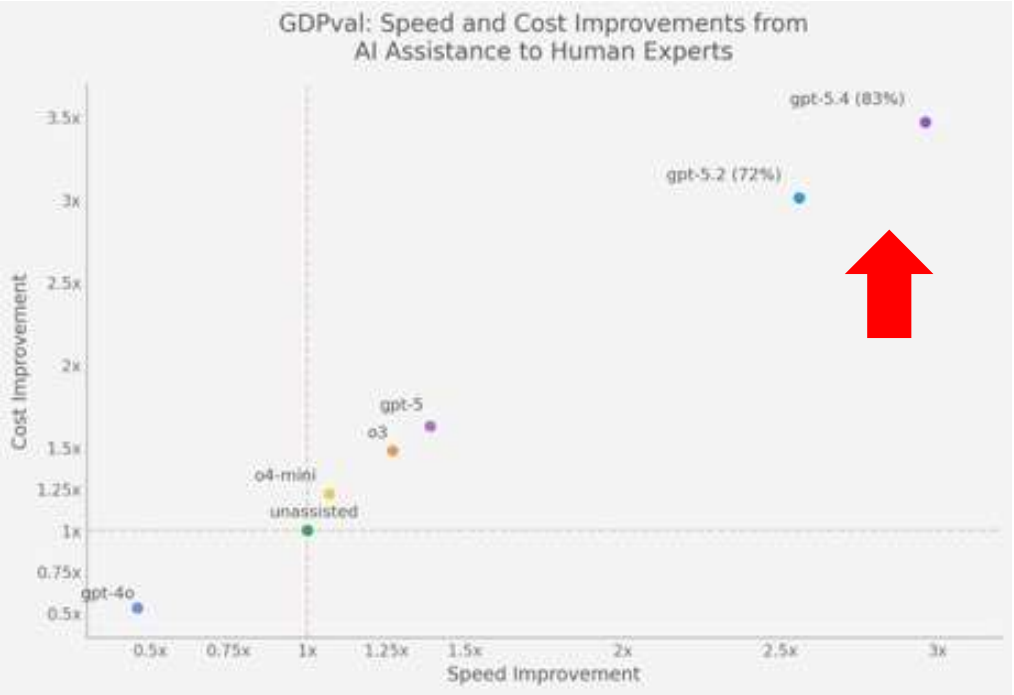
IDEO

AI Can Radically Alter the Innovation Distribution for All 3



How Will AI Influence the Innovation Process?

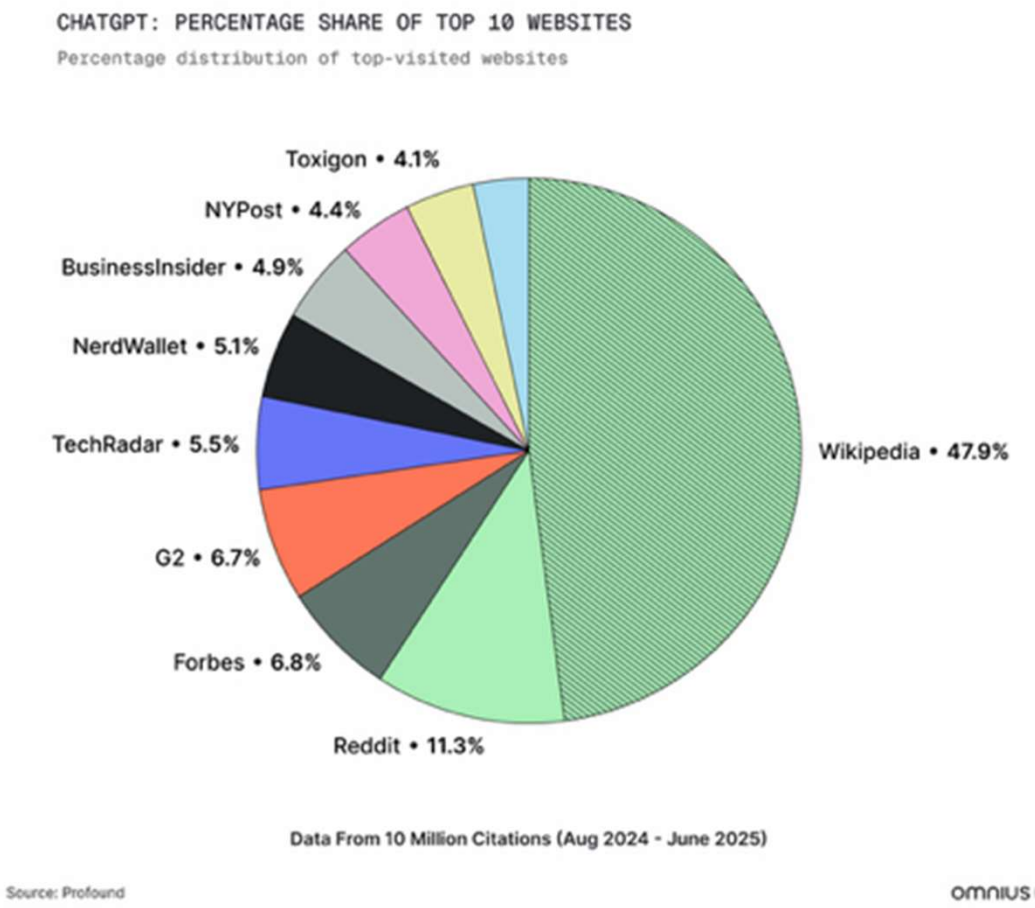




Mollick, 2026.

Noy and Zhang, 2023, Experimental Evidence on the Productivity Effects of Generative Artificial Intelligence, MIT Working Paper (not peer reviewed), March 10, 2023

But… how good is the underlying data?



https://www.tryprofound.com/blog/ai-platform-citation-patterns

And…

A.I. Can Write Poetry, but It Struggles With Math

A.I.'s math problem reflects how much the new technology is a break with computing's past.

https://www.nytimes.com/2024/07/23/technology/ai-chatbots-chatgpt-math.html

Listen to this article · 7:22 min Learn more

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Home News Tech Finance Leadership Well Recommends Fortune 500

TECH· A.I.

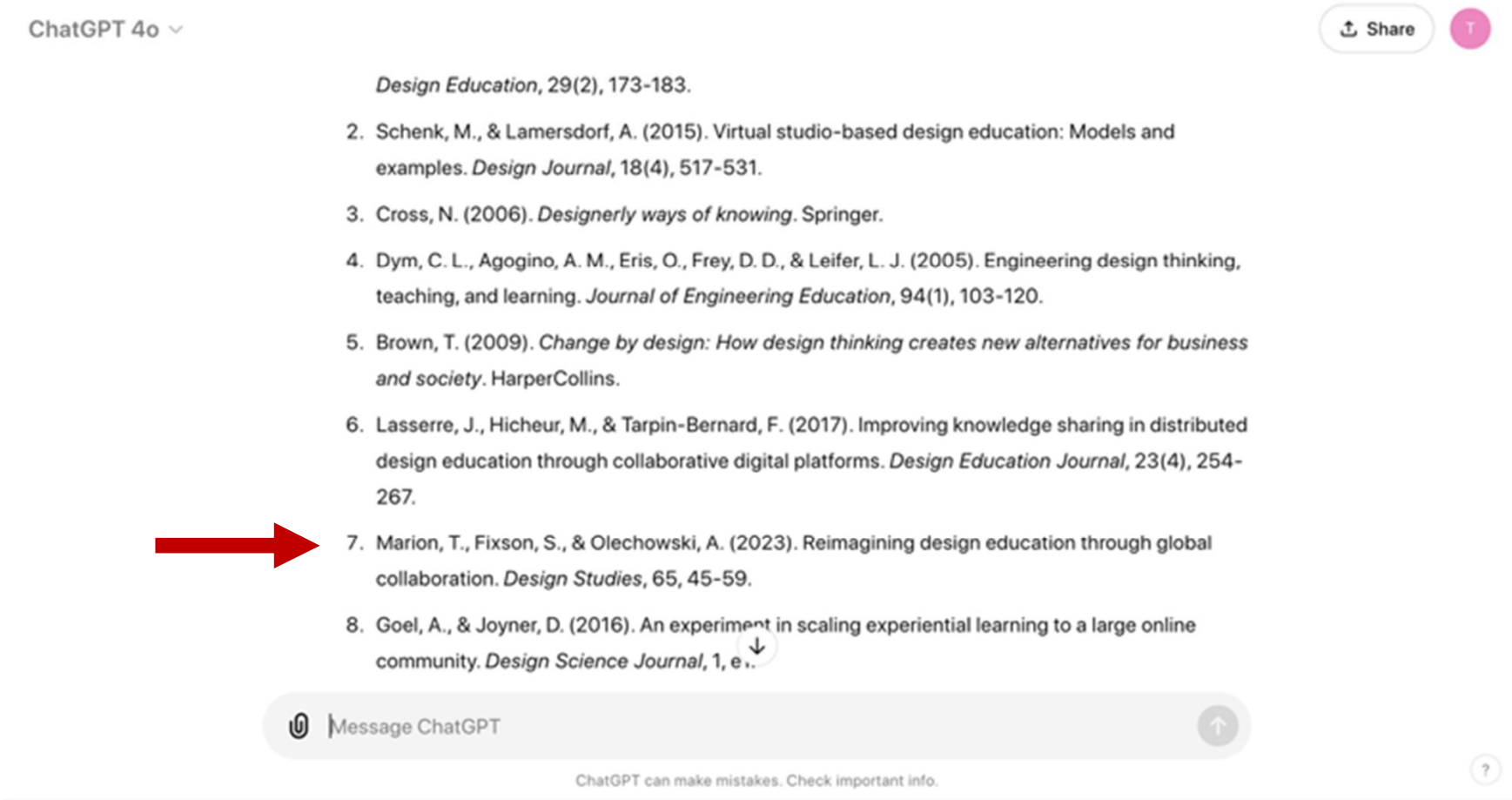
The cost of training AI could soon become too much to bear

BY DAVID MEYER

April 4, 2024 at 6:13 AM EDT

https://fortune.com/2024/04/04/ai-training-costs-how-much-is-too-much-openai-gpt-anthropic-microsoft/

LLMs are great at ideation…But….



The highlighted paper does not exist! But we can mitigate the risk!

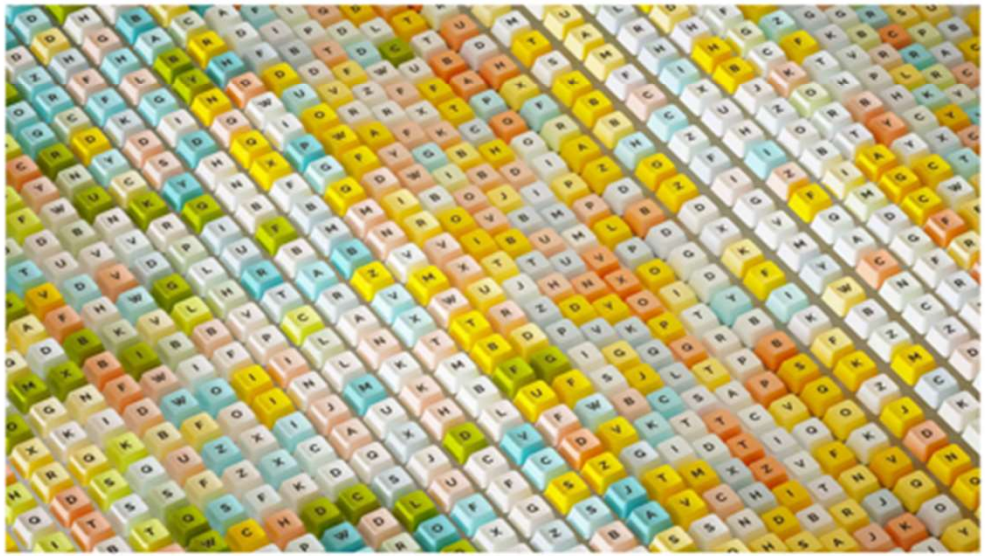
And ‘slop’ remains a serious issue for business...

AI And Machine Learning

Researchers Asked LLMs for Strategic Advice. They Got “Trendslop” in Return.

by Angelo Romasanta, Llewellyn D.W. Thomas and Natalia Levina

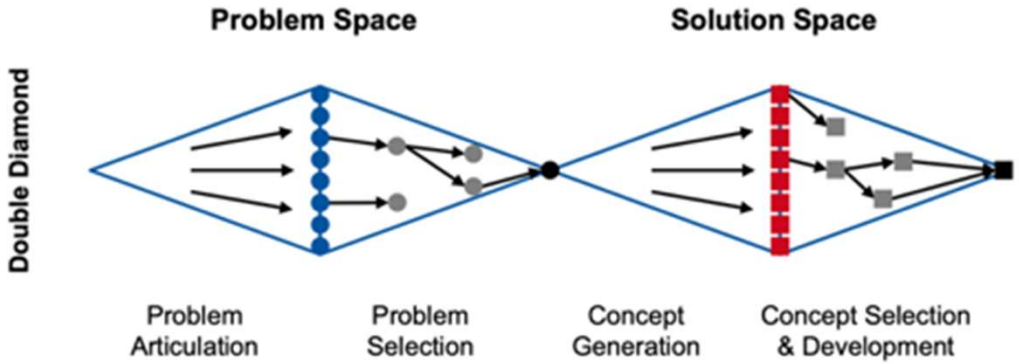
March 16, 2026



Andriy Onufriyenko/Getty Images

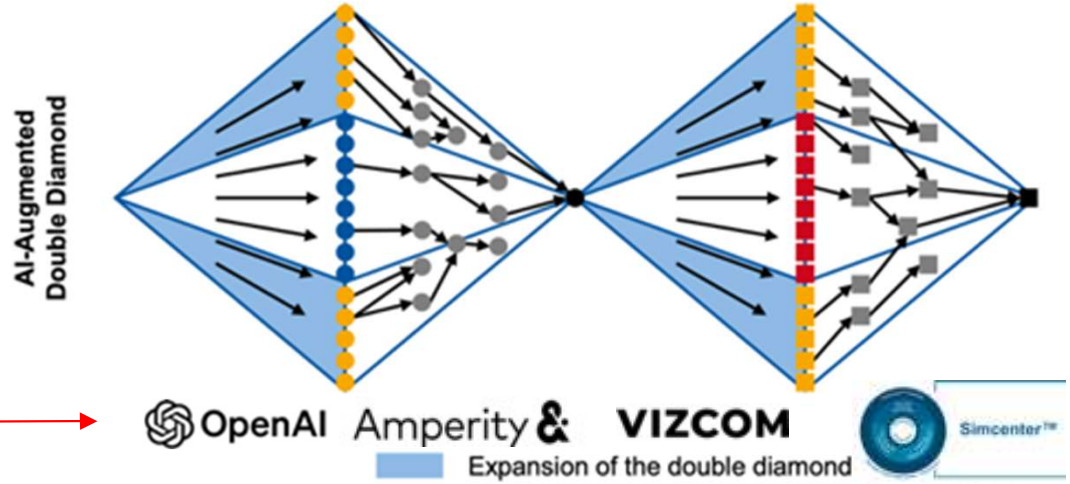
What is the best way to integrate AI into the innovation process?

Conventional Process



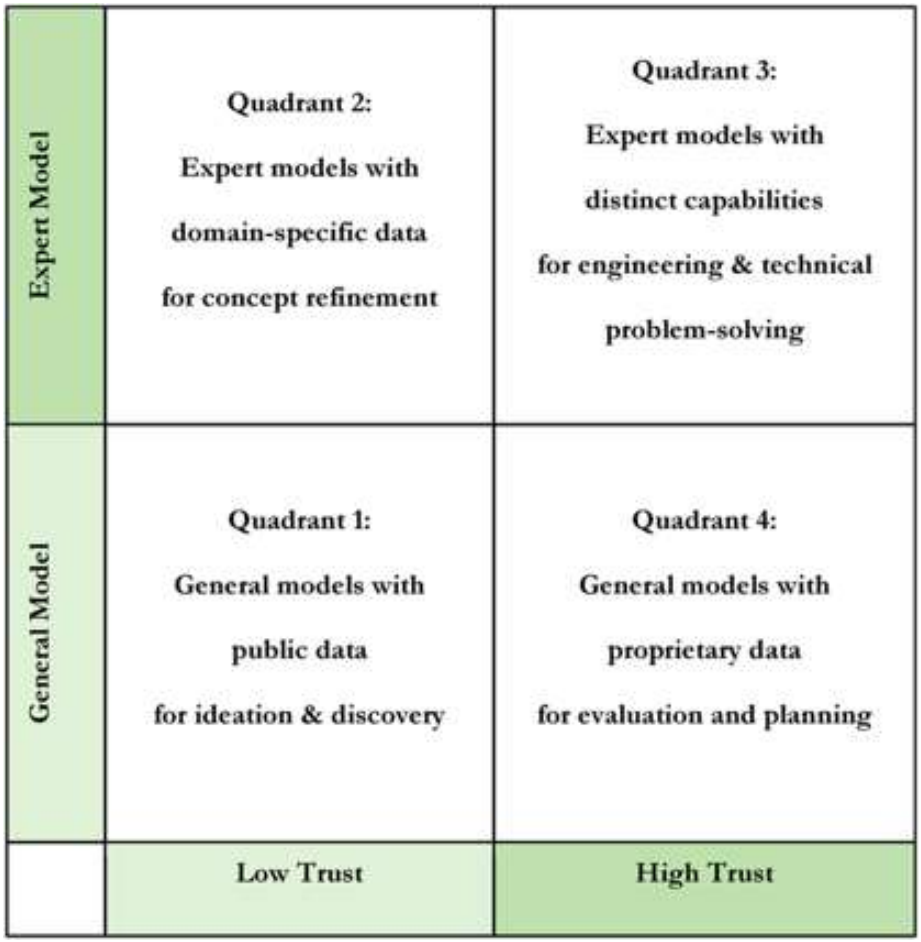
AI-Augmented

Rapid expansion of service providers



Piller, 2023; Marion, T. J., Moghaddam, M., Ciuccarelli, P., & Wang, L. (2023). AI for User-Centered New Product Development: From Large-Scale Need Elicitation to Generative Design. *The PDMA Handbook on Innovation and New Product Development*. **[Double diamond: Marion and Fixson, 2018. *The Innovation Navigator;* British Design Society]**

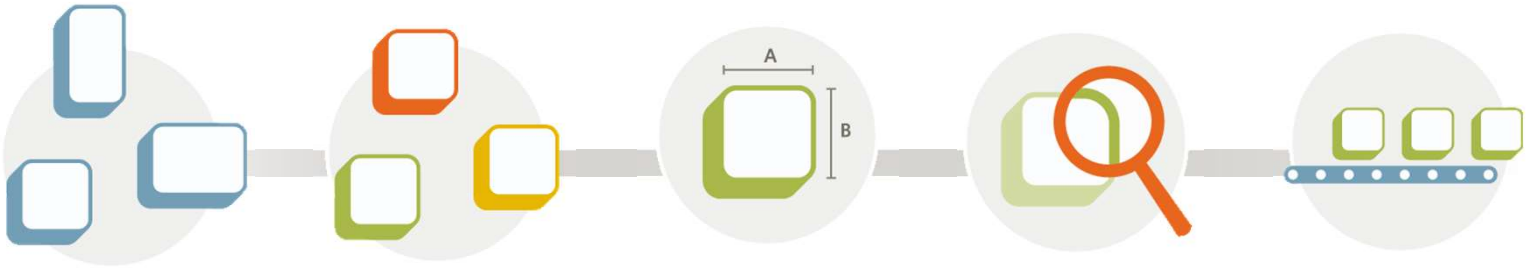
But we need to understand the AI landscape…



Piller, F. T., Srour, M., & Marion, T. J. (2024). Generative AI, Innovation, and Trust. *The Journal of Applied Behavioral Science*.

Tasks within the Fuzzy Front-End: Quadrant 1

EPAM Continuum



0	1	2	3	4
CONTEXT	**CONCEPT**	**DEVELOPMENT**	**PRE-PRODUCTION**	**ROLL-OUT**
Design criteria definition	Explore design language	Refine design & integrate all sub-systems	Production refinement	Tooling liaison
Use context understanding	Define enabling technologies	Breadboard/Test	Tooled prototyping	Production support
User needs understanding	Concept integration	Detailed engineering	Eng. database refinement	First article assessment
Experience mapping	Concept prototyping	Detailed eng. design database creation	Vendor Selection & Transition	Testing/Evaluation
Concept development	Consumer testing	Vendor identification	Design Release	Product refinement
Identify technology path	Define component configuration	Prototyping		Launch support
System architecture	Define subsystems			
Component configuration	Develop full design concepts			

Critical to Innovation Success

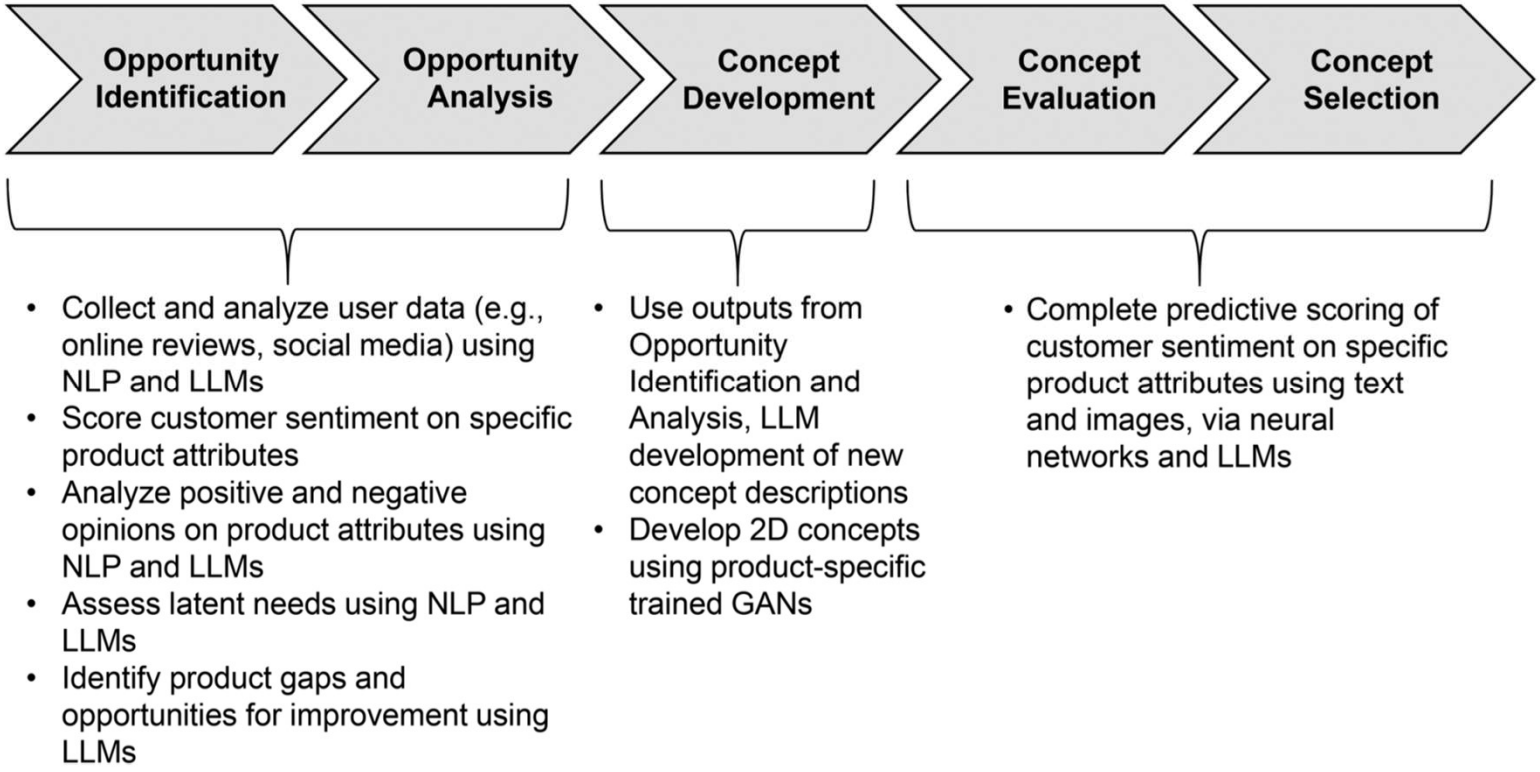
Design Thinking: Translating Observations Into Insights and Concepts

Photo courtesy of yahoo.com

Inspire

Discover and interpret the reason behind the behavior… ask 'why' for understanding latent needs

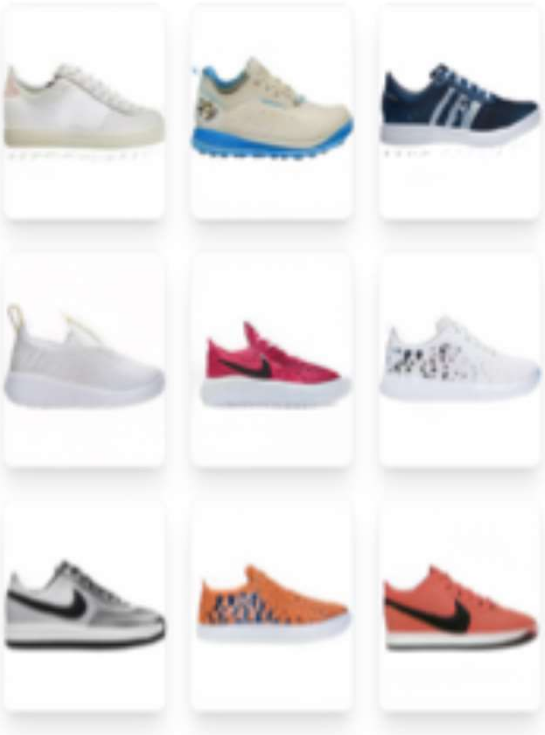
The LUCID Project: Developing AI for the FFE



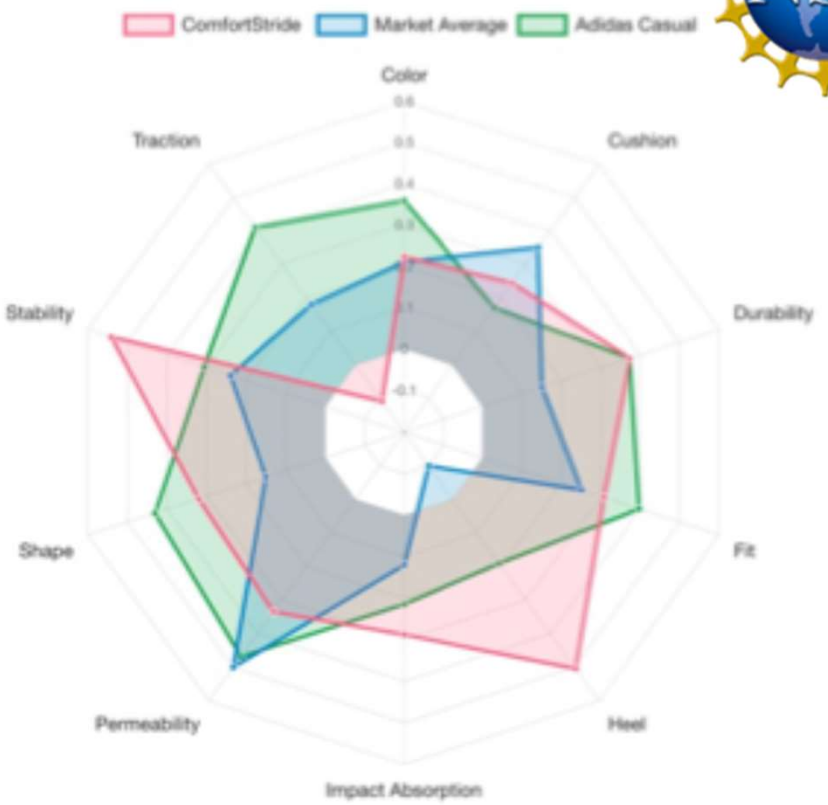
Marion, T., Yuan, C., & Moghaddam, M. (2025). Integrating AI into the Front End of New Product Development: A Case Comparison of Traditional and Augmented Processes. *Research-Technology Management*, *68*(2), 10-22.

Can we use AI to automate Design Thinking?

Bespoke AI Models for Specific Tasks



Introducing a new footwear concept designed to address common comfort issues while catering to both style and function: the "ComfortStride Nurse Shoe." This shoe features an adjustable toe box with expandable panels, allowing for increased roominess without compromising the shoe's appearance. The innovative lace system provides a secure fit that can be easily adjusted to accommodate varying foot widths, preventing heel slippage and reducing the "snaking" noise often associated with walking in less flexible shoes. The aesthetic design is sleek and professional, suitable for healthcare settings, yet stylish enough to wear outside the hospital. Enhanced cushioning in the heel and forefoot areas ensures lasting comfort during long shifts, making it an ideal choice for nurses and other healthcare professionals.



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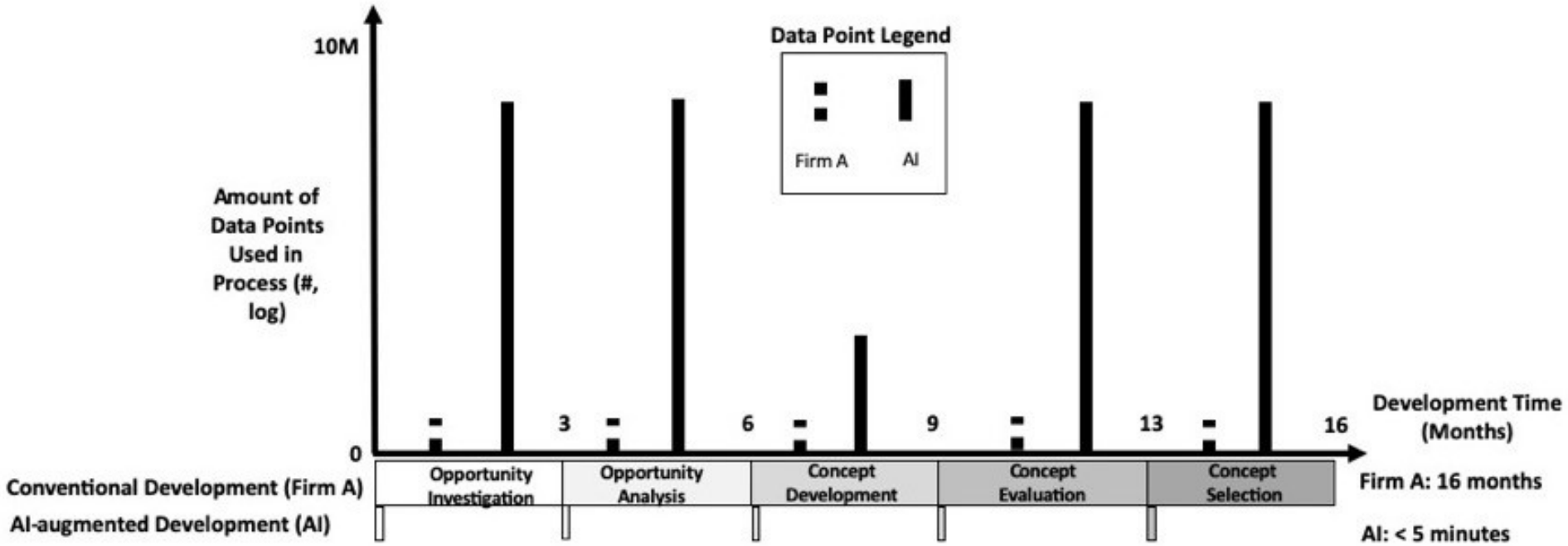
PDD step	Conventional development	AI-augmented development
Opportunity investigation	• Discussion with channel partners • Internal research on market and style trends • Multiple in-person store visits	• Fast natural language processing (NLP) analysis of 1 M + customer reviews • System retrieves a large amount of new customer information • Data-driven trend forecasting
Development time:	3 months	3 seconds
Opportunity analysis	• Input from channel partners • Internal designer ideation of new features • Internal designer ranking of attributes • Product manager writes product brief	• Attribute-level sentiment analysis • Automated analysis and categorization using machine learning (ML) • List of top needs compiled and synthesized into a large language model (LLM)-derived concept description
Development time:	3 months	Instantaneous
Concept development	• Designer ideation and sketching of several concepts • Collaborative software assists designer interaction and output	• AI simulates concept development with thousands of generated images • Connects multiple features based on user satisfaction and sentiment analysis
Development time:	3 months	2 seconds
Concept evaluation	• Discussions with channel partners • Limited focus groups with users • Socialization with product influencers • After human review and internal sales pitch, a prototype is constructed	• AI prediction of customer sentiment • Specific feature and attribute prediction of new concept potential using text and images
Development time:	4 months	2 seconds
Concept selection	• Design team ranking • Contains uncertainty factors • Subjective decision-making with some use of focus groups, channel feedback, and "merchandizing art"	• Automated design ranking with user-oriented evaluation based on concept scores
Development time:	3 months	Instantaneous
Total:	16 months	< 1 minute

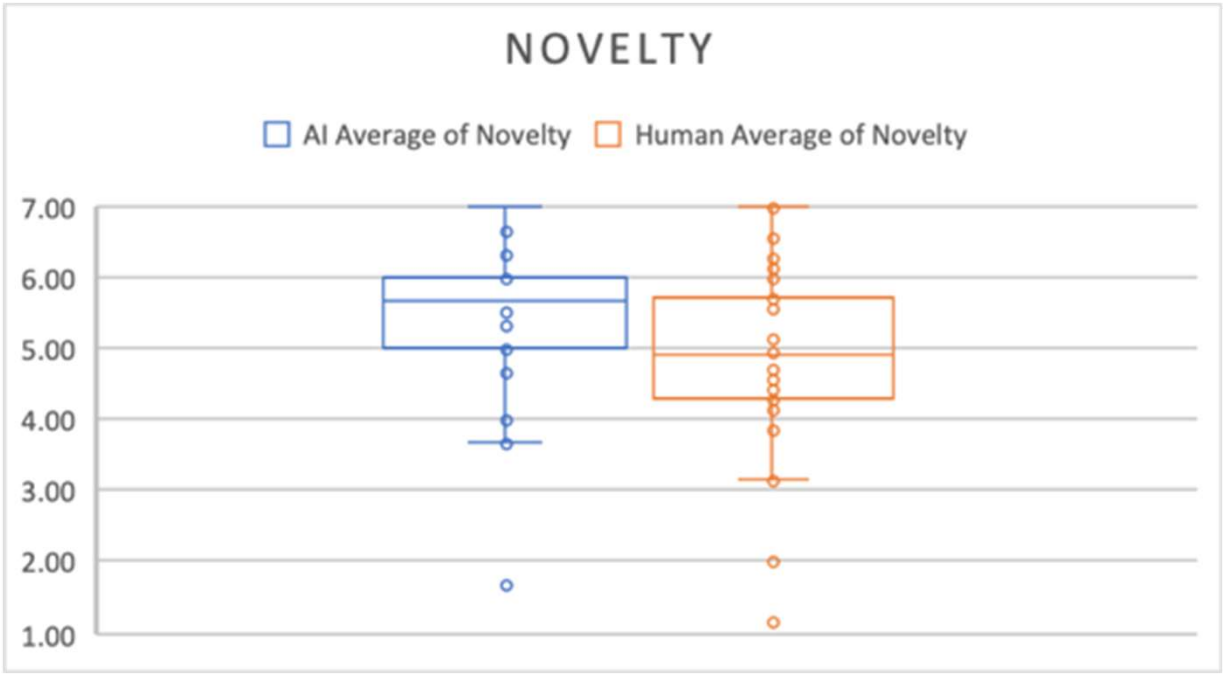
LUCID vs Traditional Workflows



Marion, T., Yuan, C., & Moghaddam, M. (2025). Integrating AI into the Front End of New Product Development: A Case Comparison of Traditional and Augmented Processes. *Research-Technology Management*, *68*(2), 10-22.

> 1,000X efficiency gain

The LUCID Project



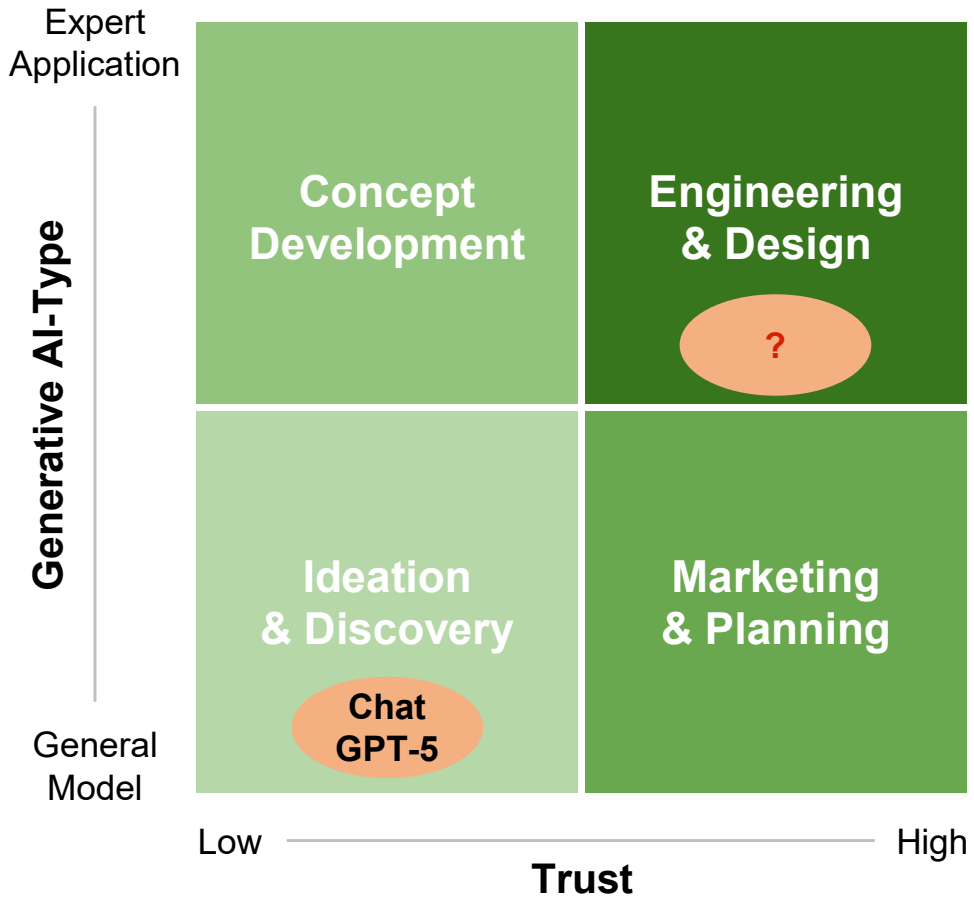
	Novelty	Quality	Desirability	Viability	Feasibility
ChatGPT-4o	5.50	5.63	5.80	5.67	5.50
DeepSeek	5.47	5.50	5.50	5.37	5.03
Gemini	5.55	5.38	5.59	4.93	5.03
AVE Human	4.93	4.72	4.73	4.98	5.25

Marion, T., Bruggeman, R., Ciuccarelli, P. 2025 Working paper.

Ideation: AI is Better than Humans

AI: The Current State

The AI Landscape and Innovation Phases



Very limited current capability!

Piller, F. T., Srour, M., & Marion, T. J. (2024). Generative AI, Innovation, and Trust. *The Journal of Applied Behavioral Science*.

Quadrant 1: Ideation and Discovery

OpenAI ChatGPT Answer

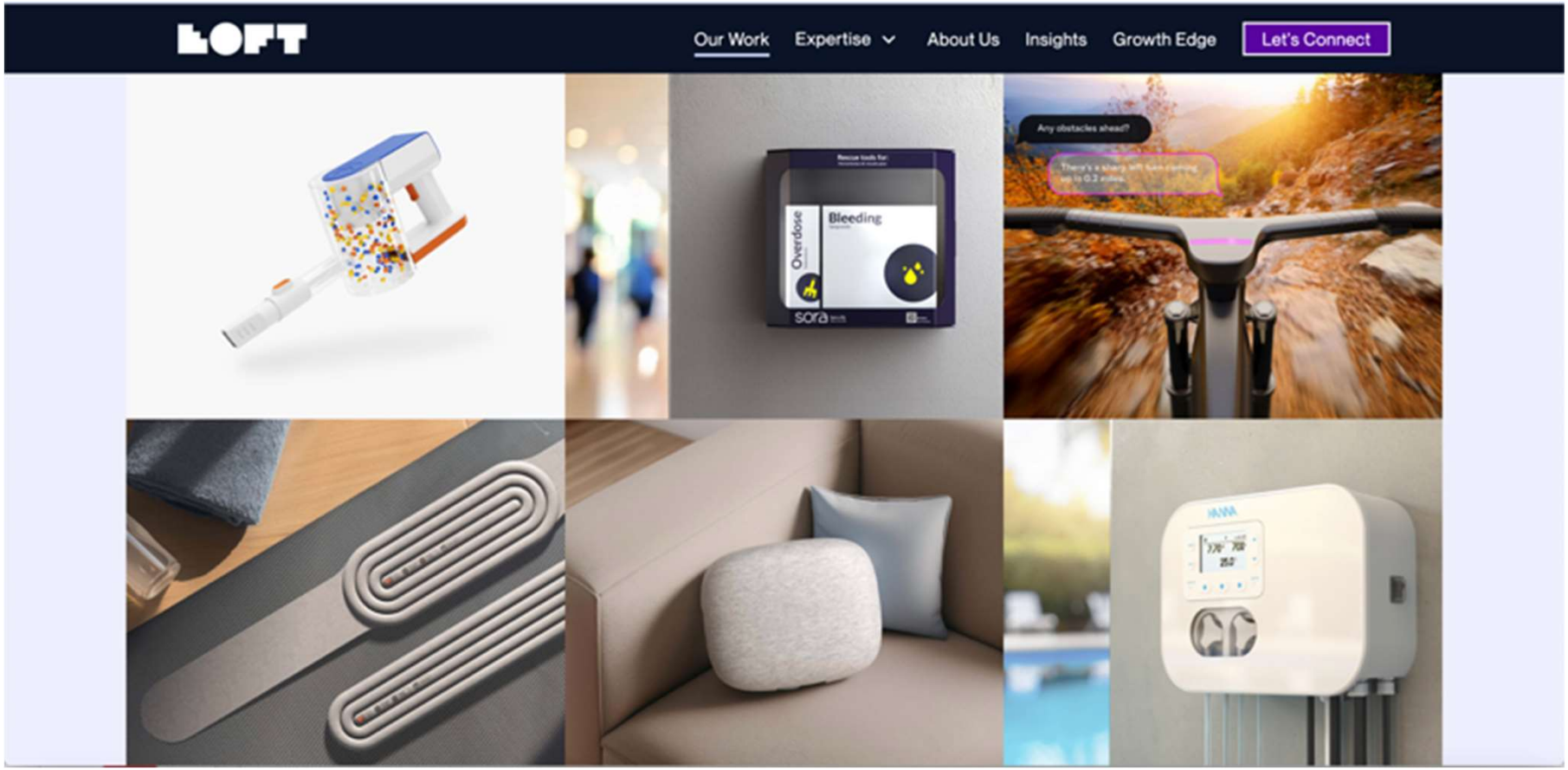
"A futuristic running shoe is an advanced sports footwear design that revolutionizes the running experience for athletes. It incorporates state-of-the-art materials like lightweight and breathable fabrics, advanced cushioning technology for energy return and reduced fatigue, and smart technology with embedded sensors to track various running metrics in real time. Some models explore energy-harvesting technologies to power smart features or other devices. The shoes feature adaptive fit and lacing systems for a secure and personalized fit, along with visually striking aesthetics. Customization options, sustainability initiatives, and enhanced traction and durability complete the innovative package. Overall, futuristic running shoes offer a high-performance, comfortable, and stylish solution for athletes and fitness enthusiasts."

DALL-E Concept

Marion, T. J., Srour, M., & Piller, F. (2024). When Generative AI meets product development. *MIT Sloan Management Review*, *66*(1), 14-15.

Low trust, general models

Current State-of-the-Art: Loft Design



www.loft.deisgn

Use of AI has improved efficiency by 50%

Current State-of-the-Art: GM and Design

https://www.autoblog.com/news/gm-uses-ai-to-turn-hand-sketches-into-car-designs-in-minutes-instead-of-months

Full concepts generated in minutes

Quadrant 2: Concept Development

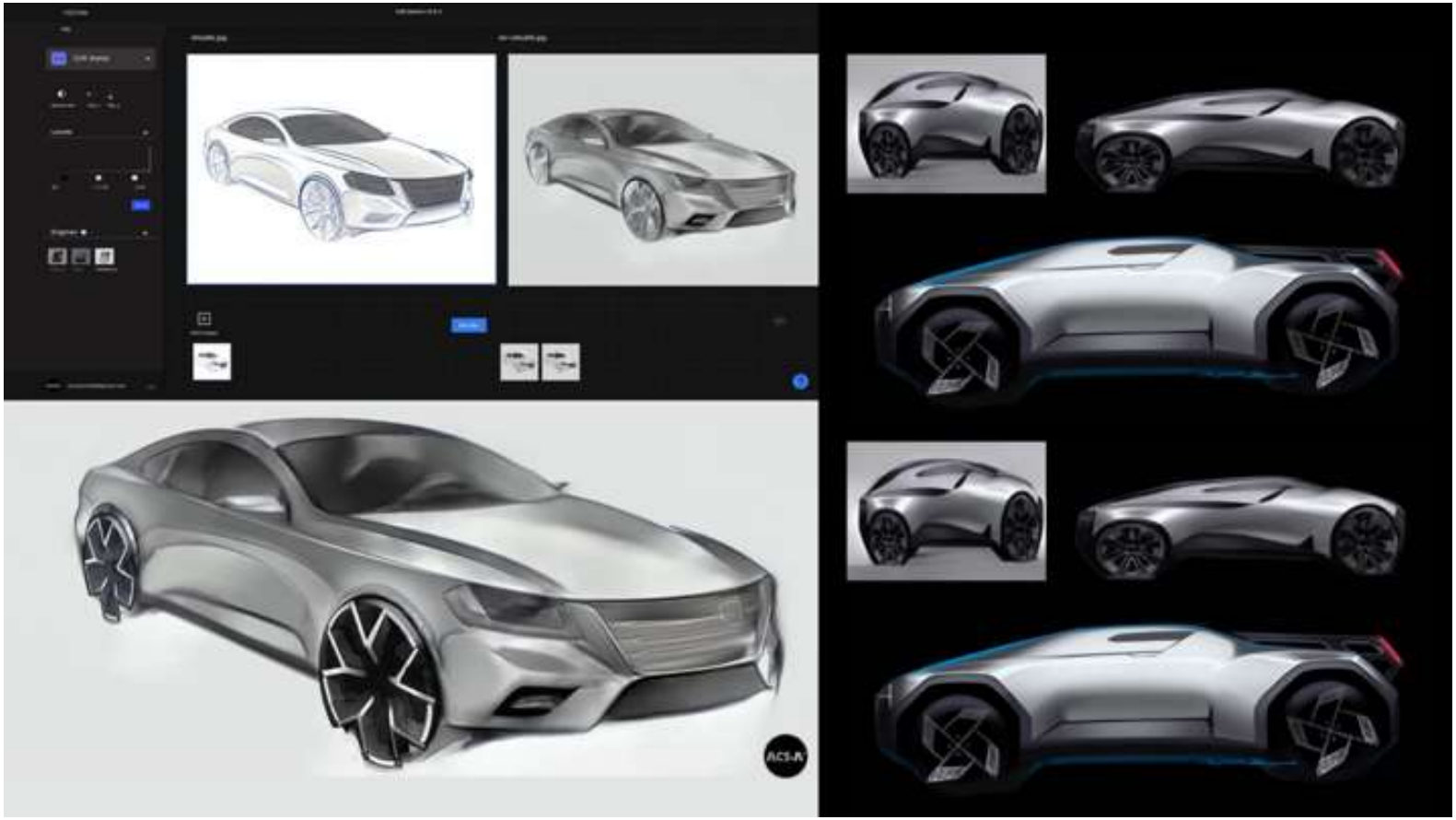
https://www.reddit.com/media?url=https%3A%2F%2Fpreview.redd.it%2Fthe-evolution-of-midjourney-via-capn-jack-sparrow-in-just-v0-xj1q6mxto1ab1.png%3Fwidth%3D3044%26format%3Dpng%26auto%3Dwebp%26s%3D1536e1575c8cfba1e269e3215c621ee7d23b3415

Higher expertise, general models

Midjourney's Evolution

Marion, T. J., Srour, M., & Piller, F. (2024). When Generative AI meets product development. *MIT Sloan Management Review*, *66*(1), 14-15.

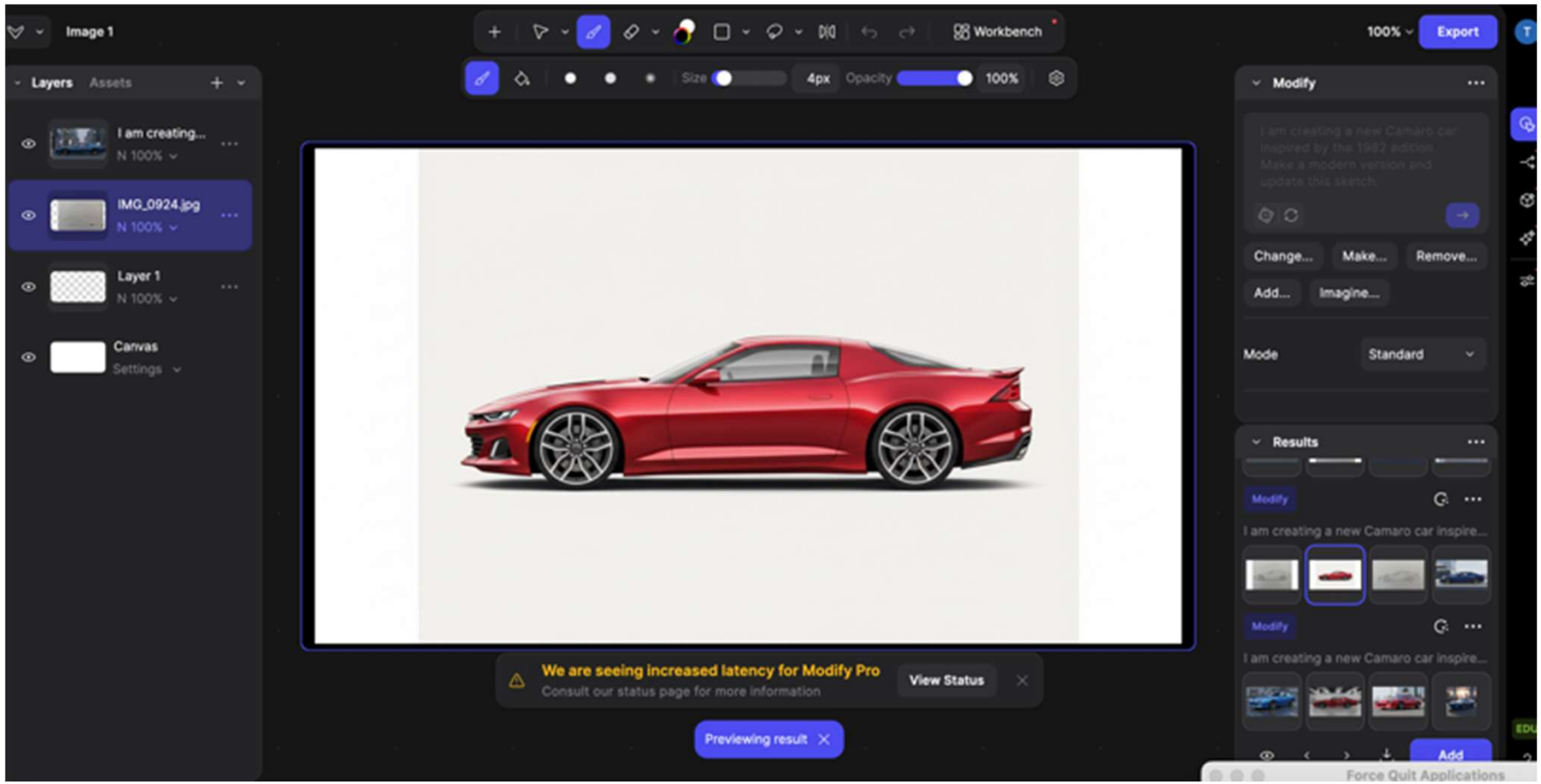
Current State-of-the-Art: Vizcom and Ford



www.vizcom.com

[AI and visual product design]

Lowering the Barriers to Entry



Quadrant 4: Marketing and Planning

Marion, T. J., Srour, M., & Piller, F. (2024). When Generative AI meets product development. *MIT Sloan Management Review*, *66*(1), 14-15.

High trust, general models with specific data

Current State-of-the-Art: Vibe IQ

vibeiq

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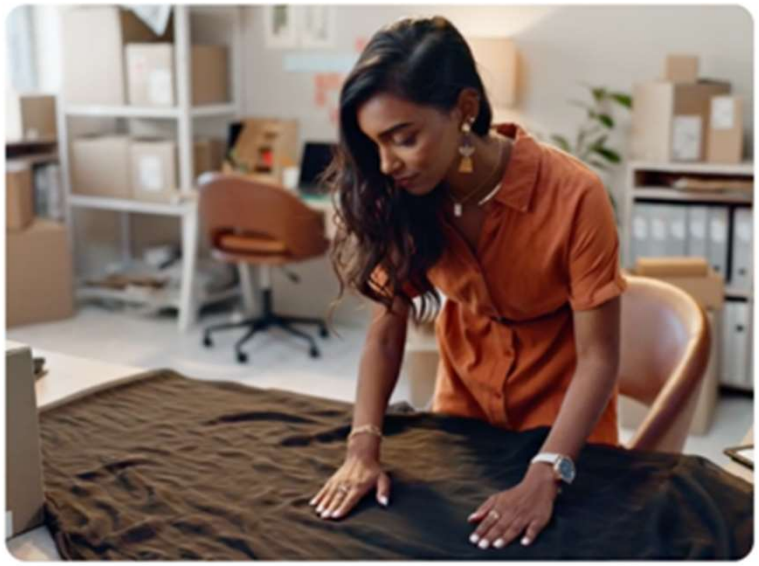
ASSORTMENT LIFECYCLE PLATFORM

Bring the right products to market, faster— with VibeIQ.

VibeIQ is the first and only assortment lifecycle platform where merchandising, design, and B2B sales teams collaborate to create and launch high-performing assortments.

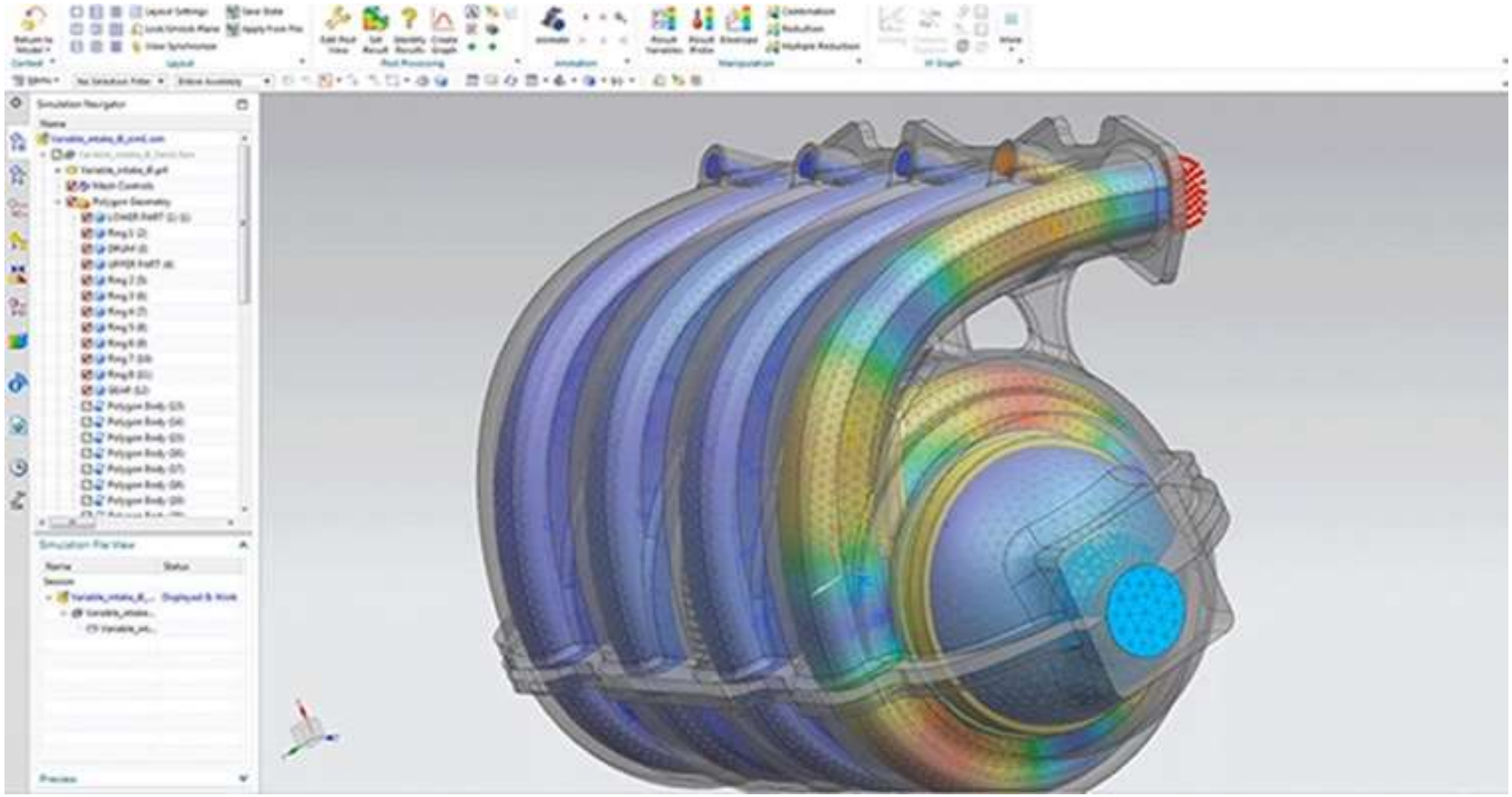
www.vibeiq.com



Workflow Management

Quadrant 4: Engineering and Design

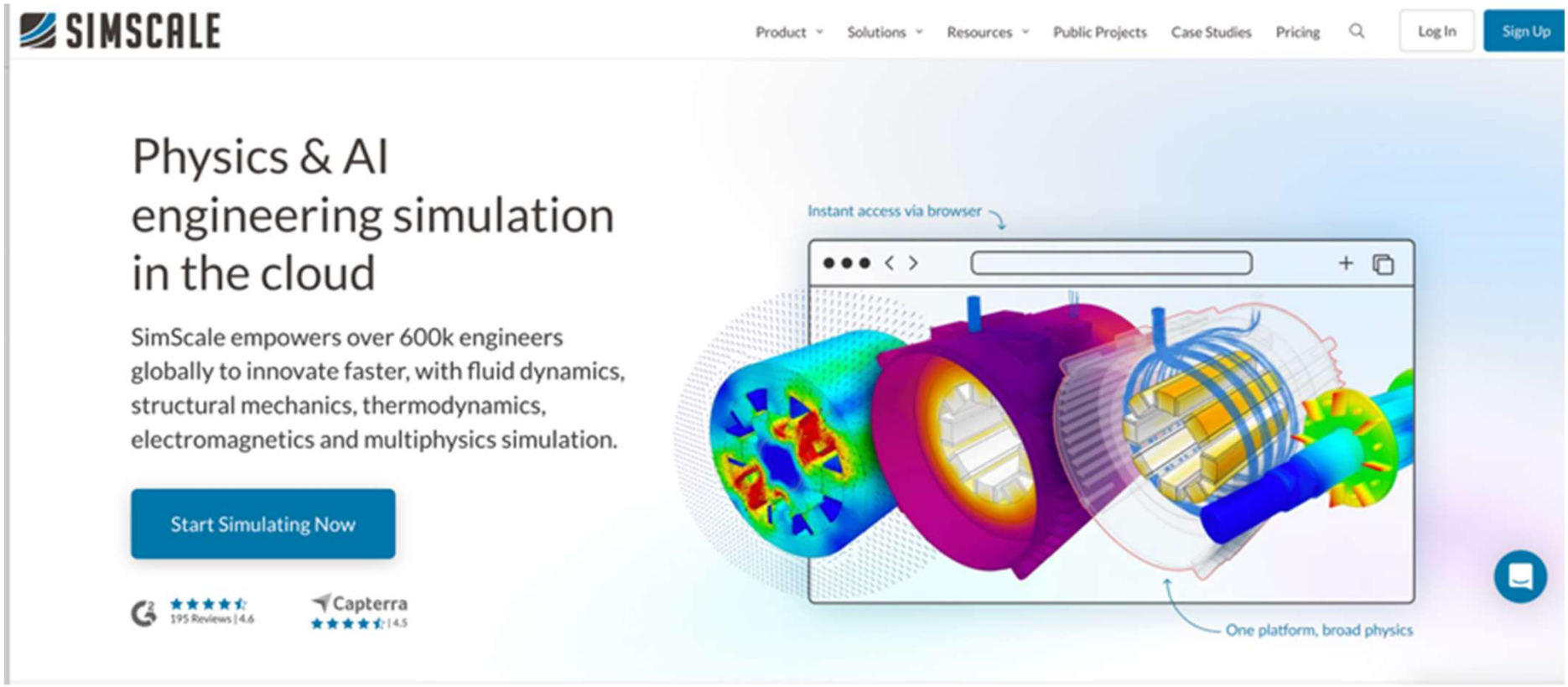
Siemen’s Simcenter



Marion, T. J., Srour, M., & Piller, F. (2024). When Generative AI meets product development. *MIT Sloan Management Review*, *66*(1), 14-15.

High trust, specifically trained expert models and data

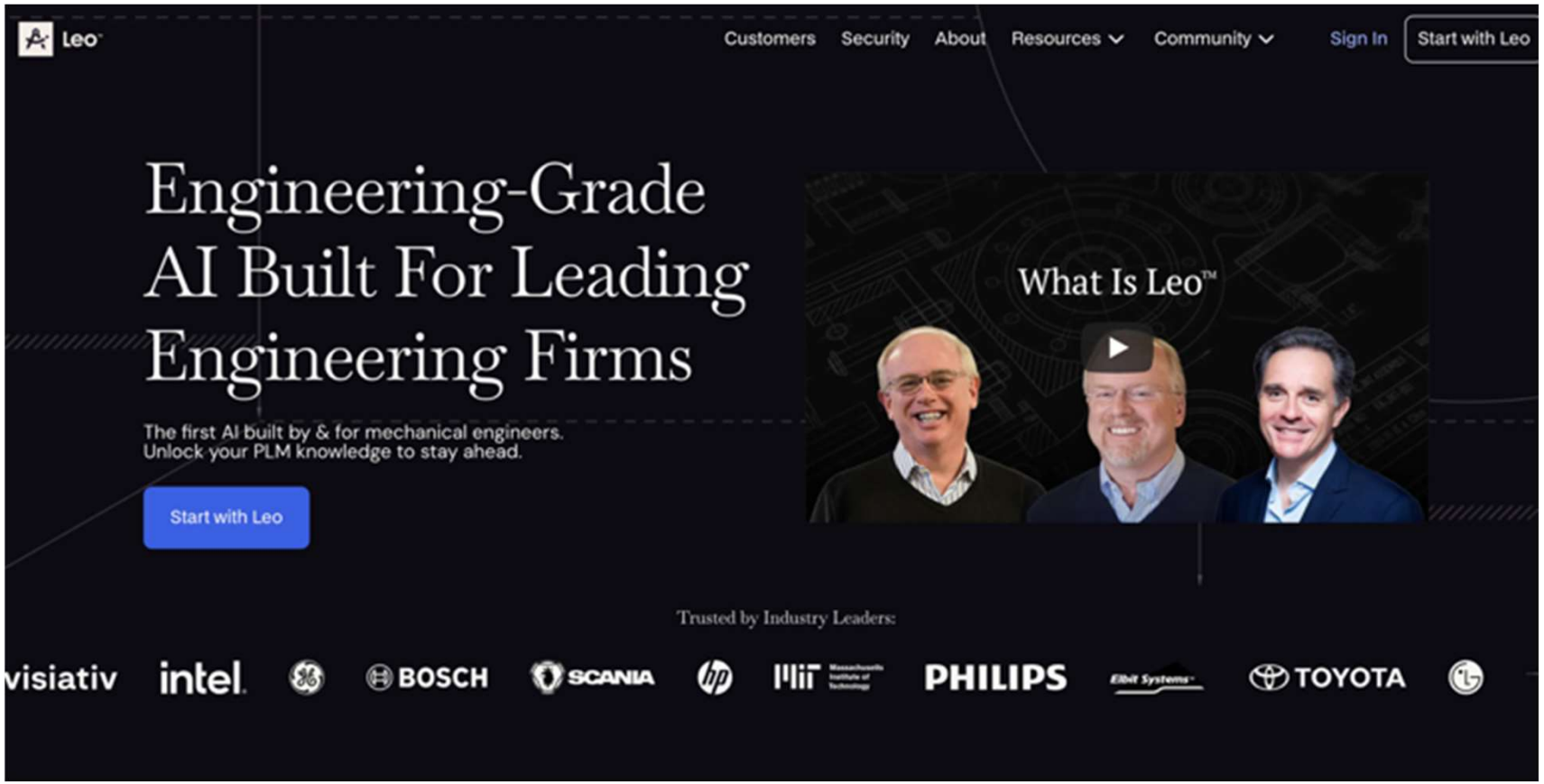
Current State-of-the-Art: SimScale



www.simscale.com

Simulation

Current State-of-the-Art: Leo



www.getleo.ai

AI-powered engineering resources

Current State-of-the-Art: Results

Loft Design cut its product development time by **50%**

CreativeDock 30% increase in technical development efficiency, a **40% efficiency gain** in graphic design, and tripled content creation speed.

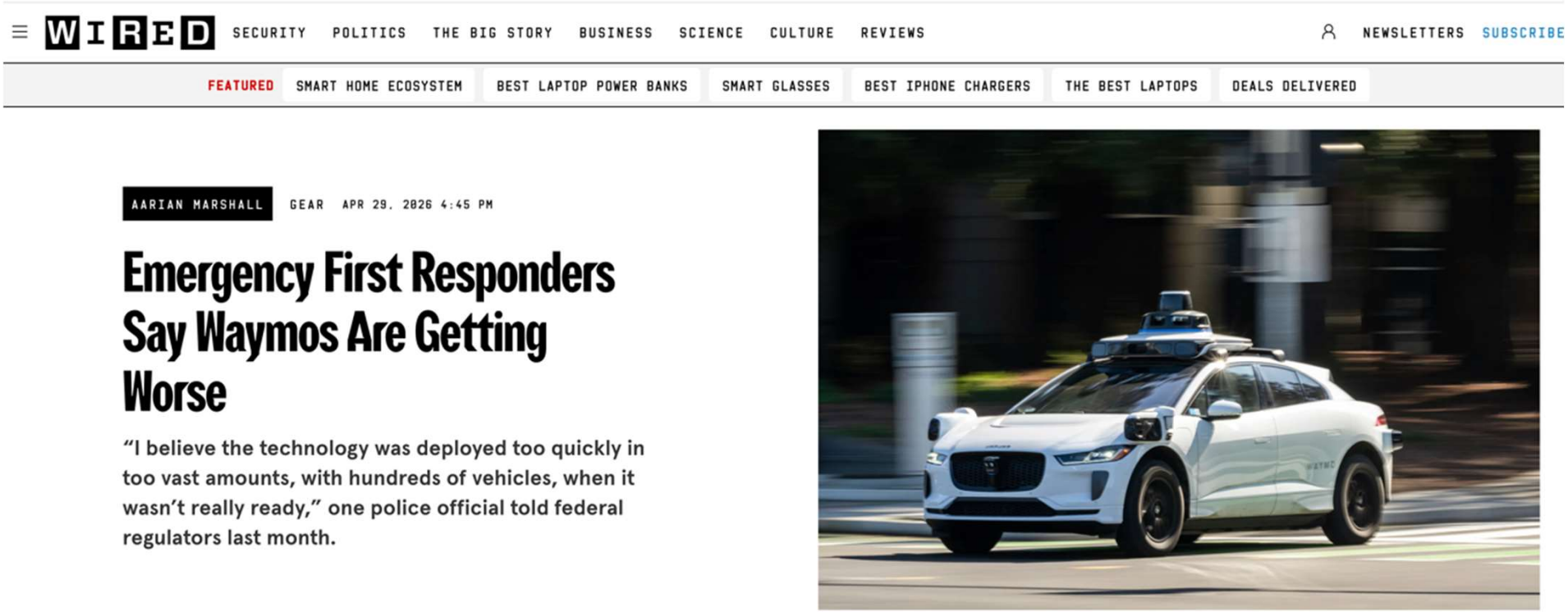
50% increase in modeling efficiency

Circuit board design reduced by an average of more than **80%**

Source: https://sloanreview.mit.edu/article/when-generative-ai-meets-product-development/

AI: The Future State

Understand the Current Limitations



WIRED SECURITY POLITICS THE BIG STORY BUSINESS SCIENCE CULTURE REVIEWS NEWSLETTERS SUBSCRIBE

FEATURED SMART HOME ECOSYSTEM BEST LAPTOP POWER BANKS SMART GLASSES BEST IPHONE CHARGERS THE BEST LAPTOPS DEALS DELIVERED

AARIAN MARSHALL GEAR APR 29, 2026 4:45 PM

Emergency First Responders Say Waymos Are Getting Worse

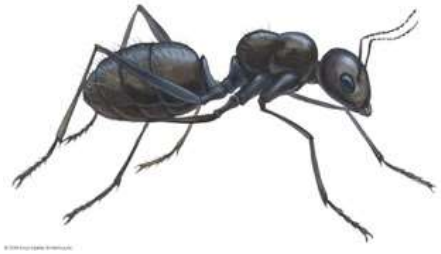
"I believe the technology was deployed too quickly in too vast amounts, with hundreds of vehicles, when it wasn't really ready," one police official told federal regulators last month.

April 29, 2026

Bleeding-edge models and applications are still flawed…

The Overarching Challenge

Black Ant



# of neurons:

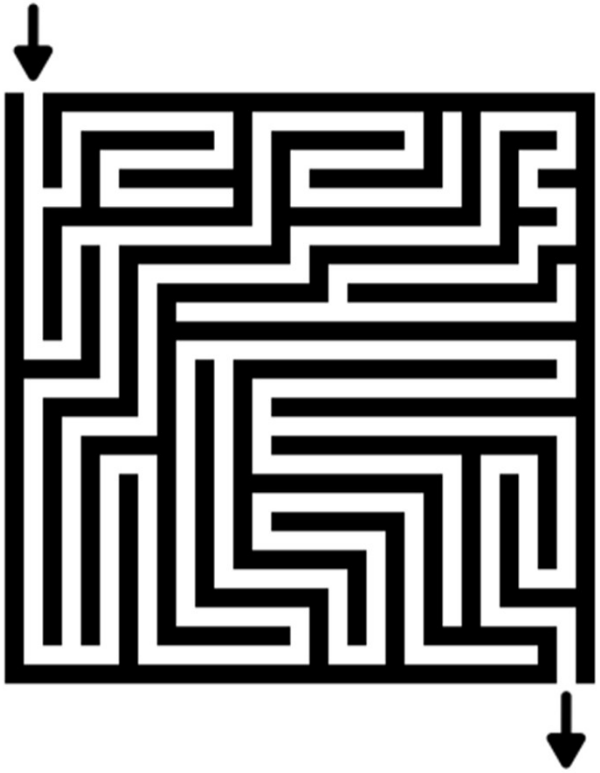
250,000

Power to complete:

~80 mW

Cost ($ of power usage):

$0.0000012



Delta = 8,333x

Large LLM

# of neural nodes:

500,000,000+

Power to complete:

~0.001 Wh

Cost ($ of power usage):

$0.01

Difficulty with unstructured problems and high processing needs…

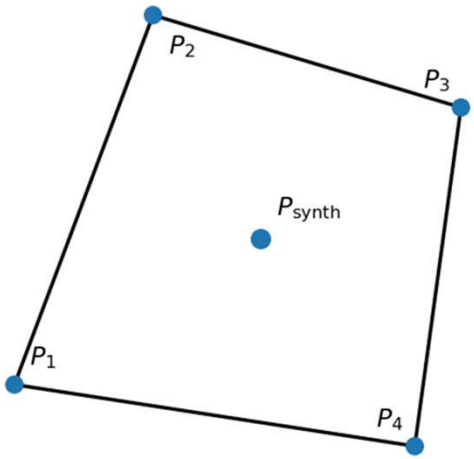
The Processor: Affine Theory of Design Reasoning

The goal is to provide reasoning with human-inspired cognition.

Convex combination

All coefficients nonnegative

$\varpi_1, \varpi_2, \varpi_3, \varpi_4 \geq 0$



Interpolation

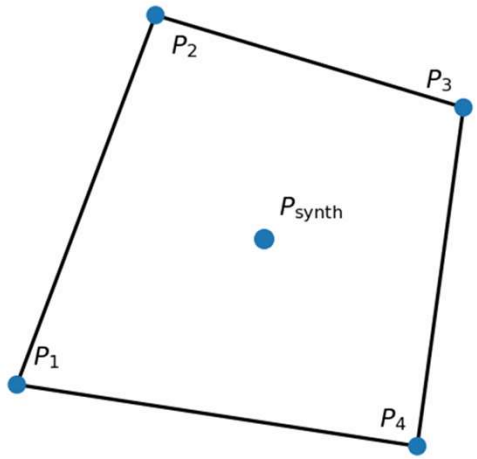
Stays within the hull

Current knowledge hull

Affine combination

At least one coefficient negative

$\exists j: \varpi_j < 0$



Extrapolation

Can move beyond the hull

Current knowledge hull

Key Formalism

States → points in A

Operations → vectors in V

Synthesis → affine combination

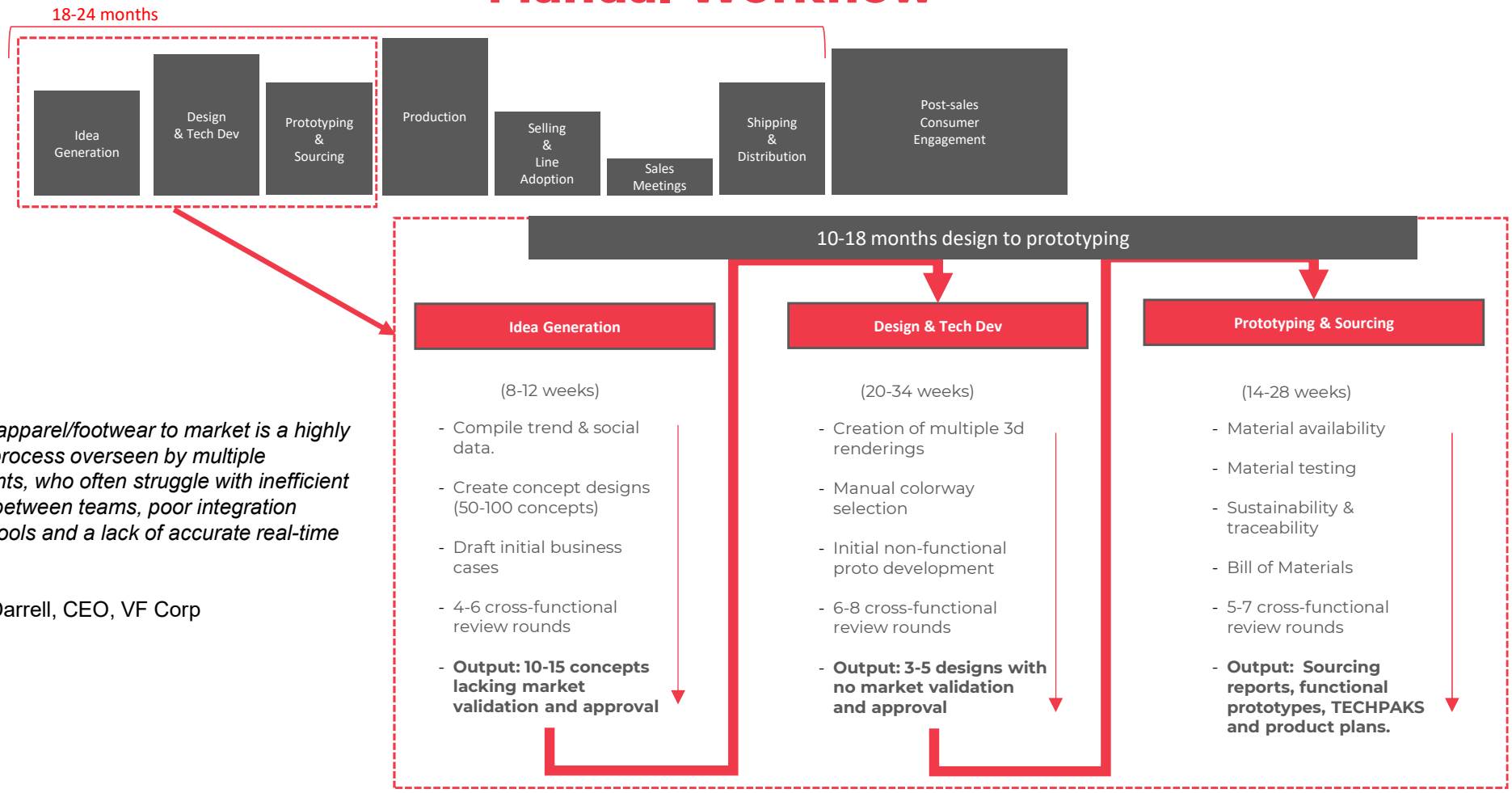
$$P_{synth} = \Sigma\, \varpi_j\, P_j$$

$$\Sigma\, \varpi_j = 1$$

The sign of the coefficients determines whether the system interpolates or extrapolates.

Bruggeman, 2026 **New architectures will reduce training $ and increase efficiency**

Current Footwear Product Development Manual Workflow

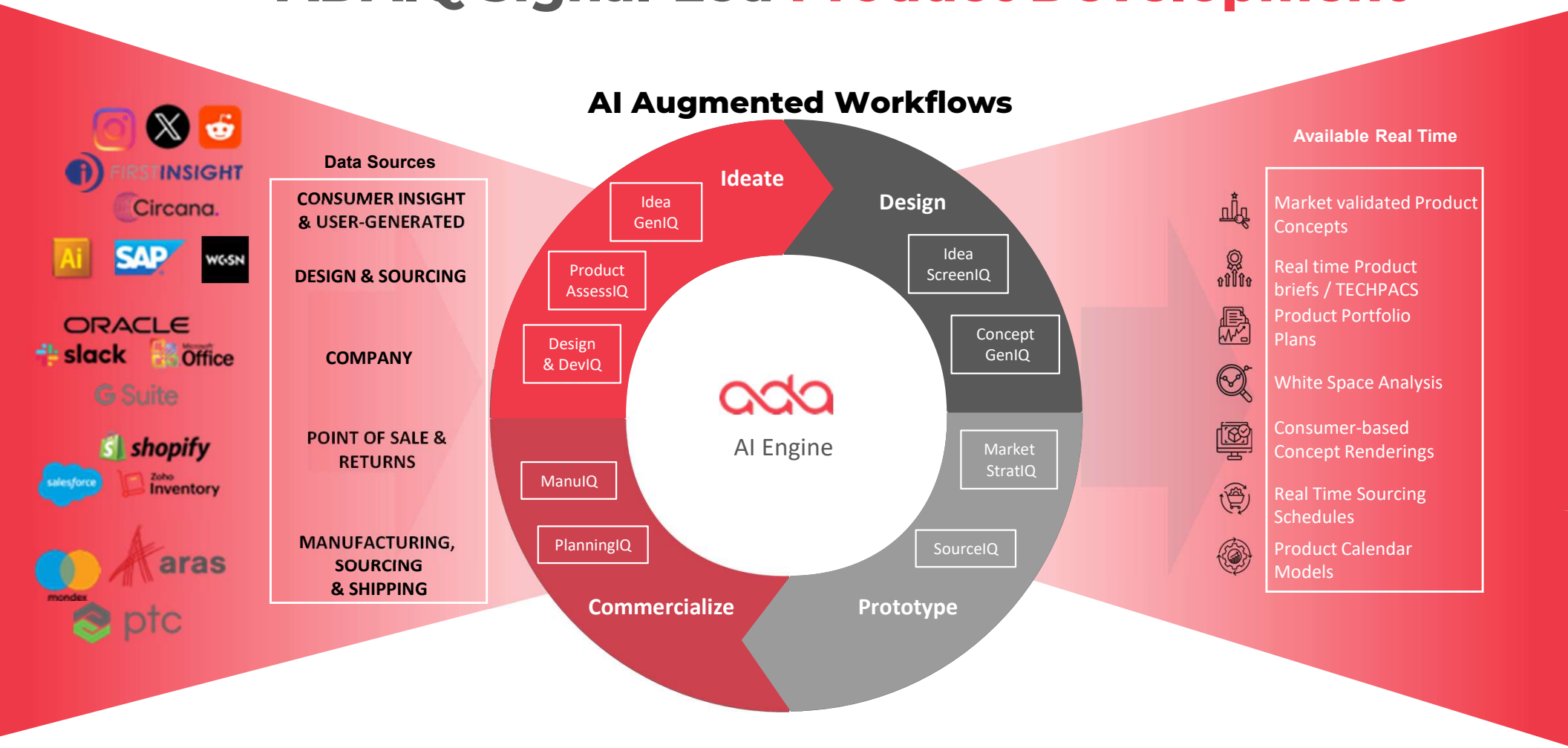


"Bringing apparel/footwear to market is a highly complex process overseen by multiple departments, who often struggle with inefficient handoffs between teams, poor integration between tools and a lack of accurate real-time data."

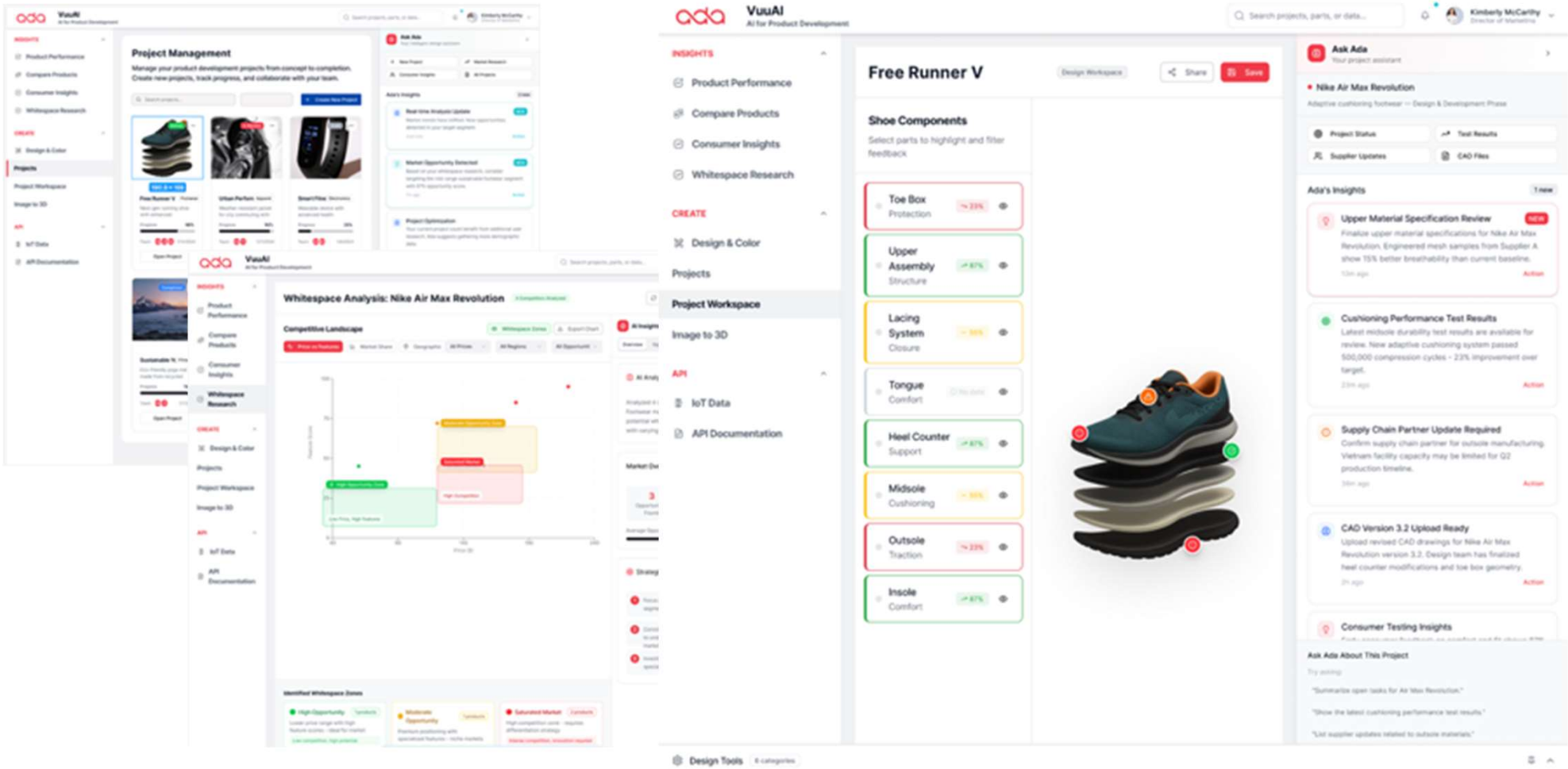
Bracken Darrell, CEO, VF Corp

Current Data Systems of a $150M Sporting Goods company

ADAIQ Signal-Led Product Development

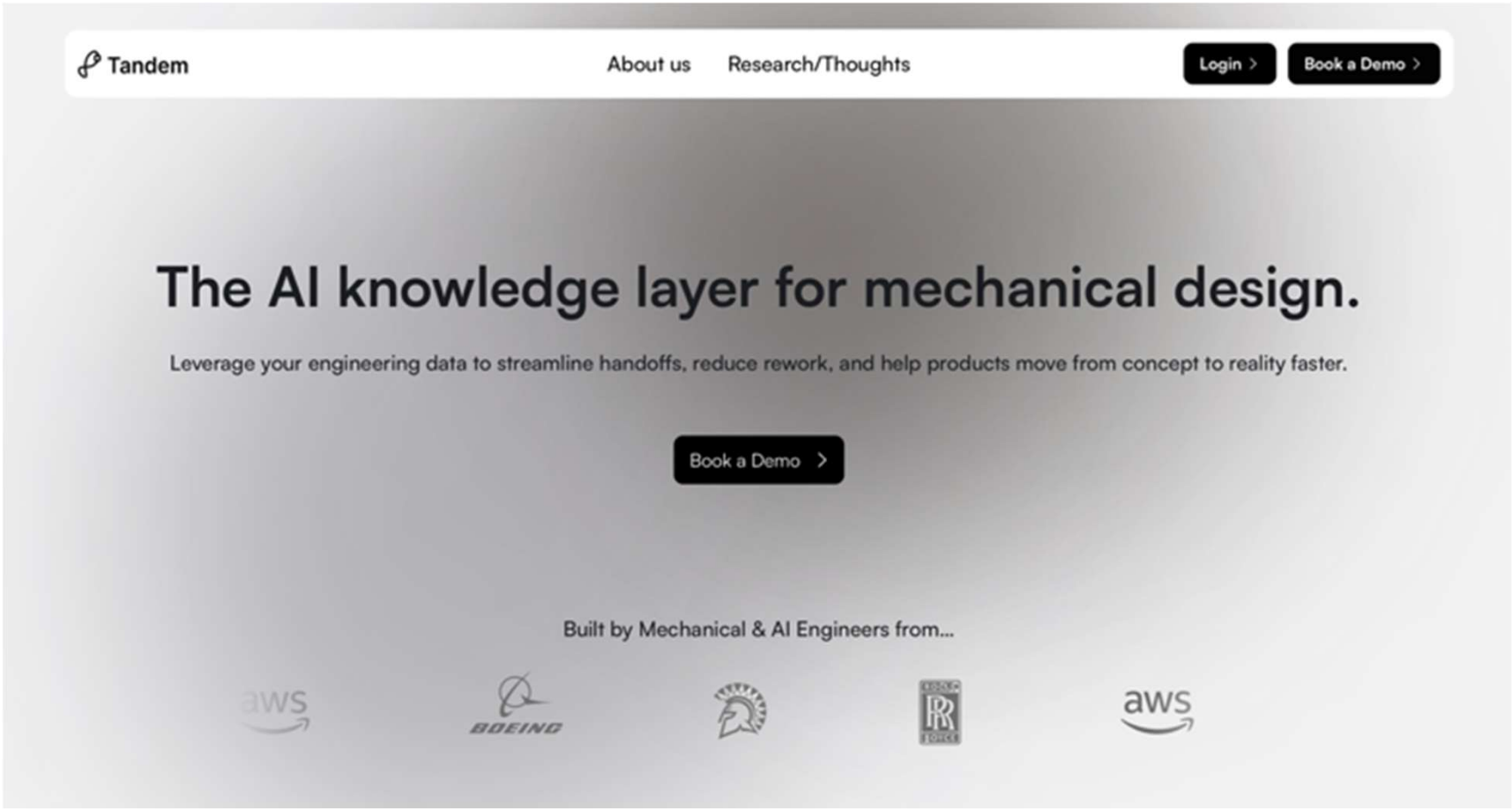


ADAIQ Real-Time Agentic Workflows



Multi-modal, RAG 2.0, new architectures and ‘SLMs’

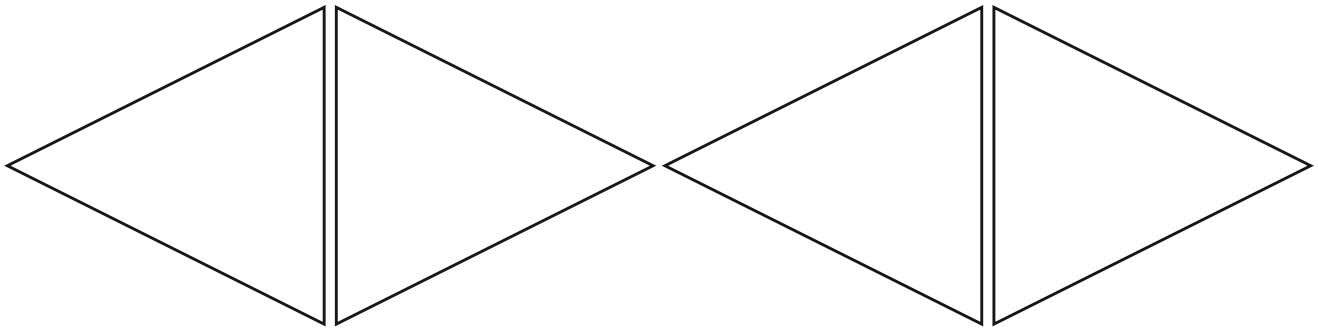
The Future State: Tandem



www.tandemai.io

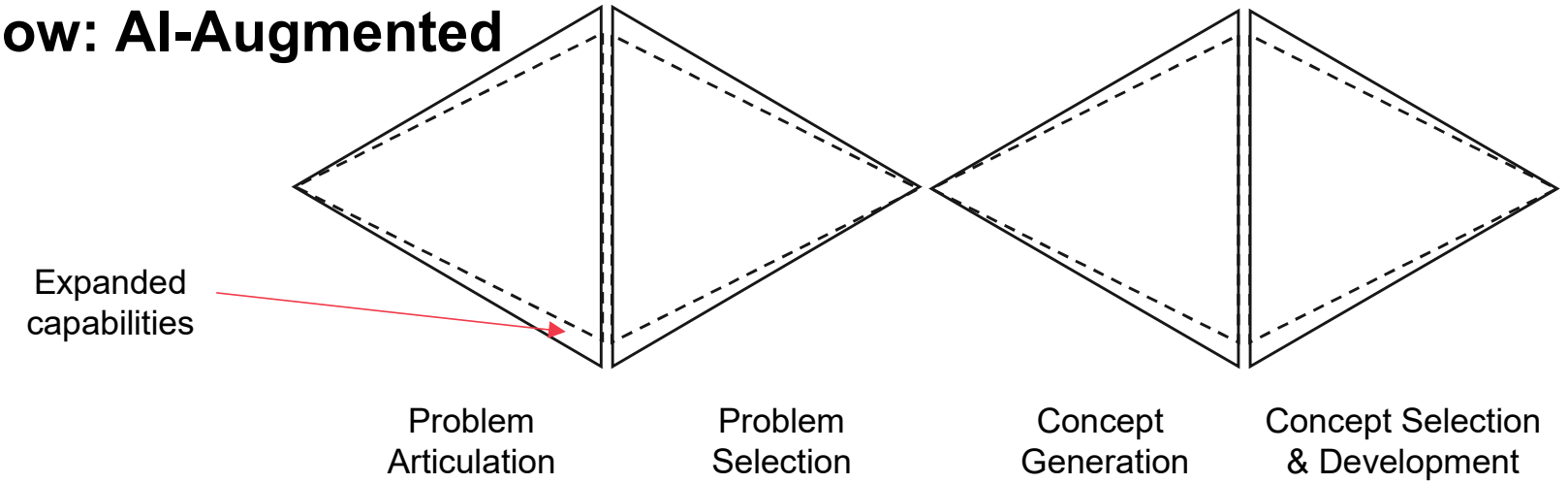
AI-powered engineering workflows

Revisiting the Traditional Double Diamond



Problem Articulation | Problem Selection | Concept Generation | Concept Selection & Development

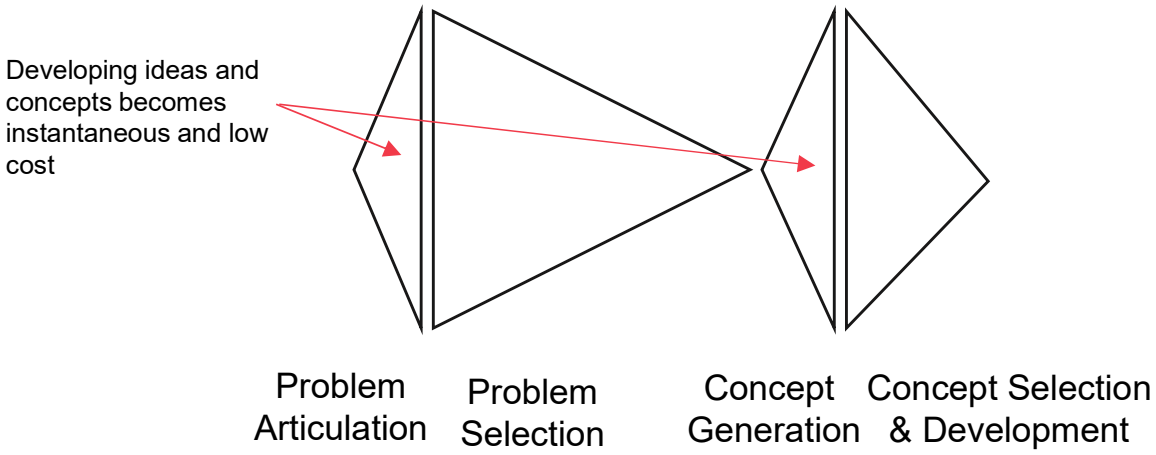
Now: AI-Augmented



Problem Articulation | Problem Selection | Concept Generation | Concept Selection & Development

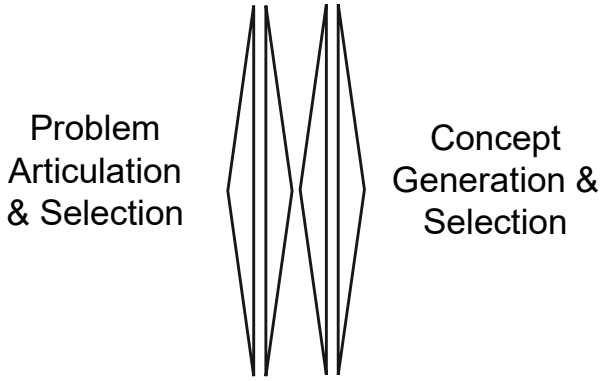
Piller, 2023; Marion, T. J., Moghaddam, M., Ciuccarelli, P., & Wang, L. (2023). AI for User-Centered New Product Development: From Large-Scale Need Elicitation to Generative Design. *The PDMA Handbook on Innovation and New Product Development*. **[Double diamond: Marion and Fixson, 2018. *The Innovation Navigator;* British Design Society]**

Near Future Double Diamond



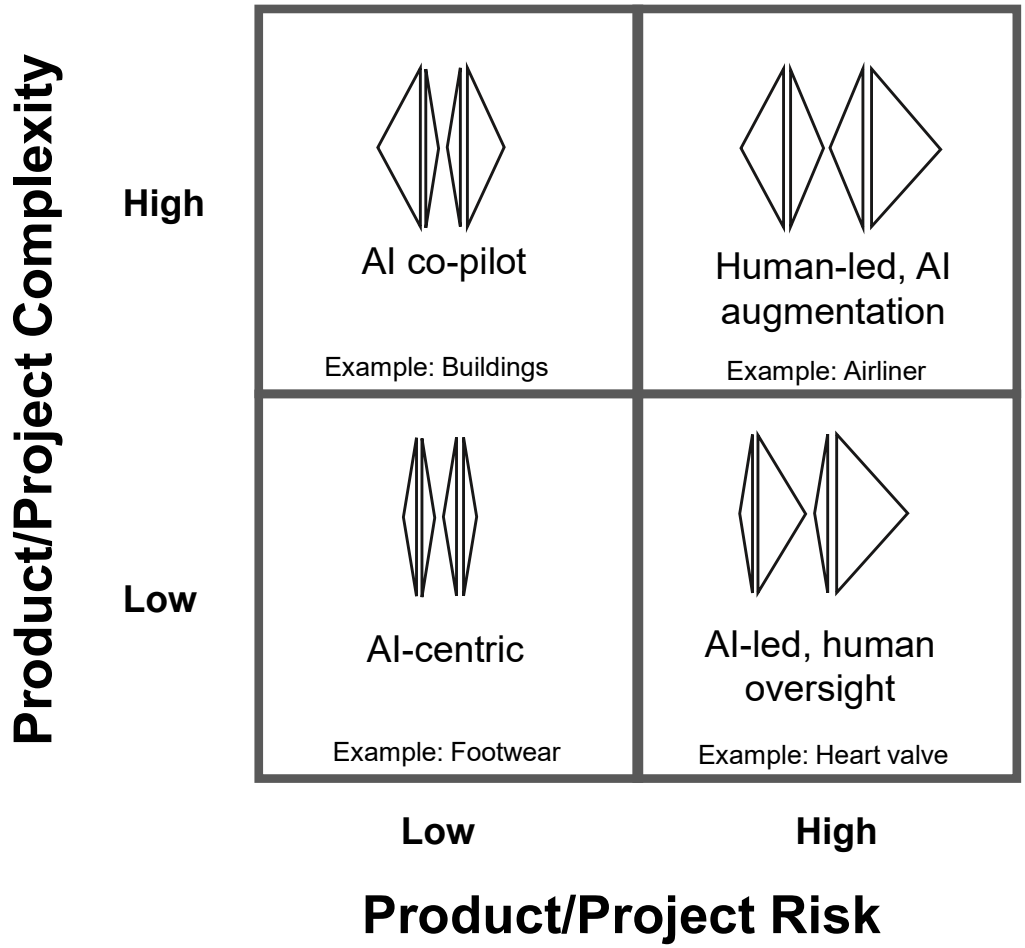
Humans still have a role in decisions and selection

AI's Ultimate Potential State?

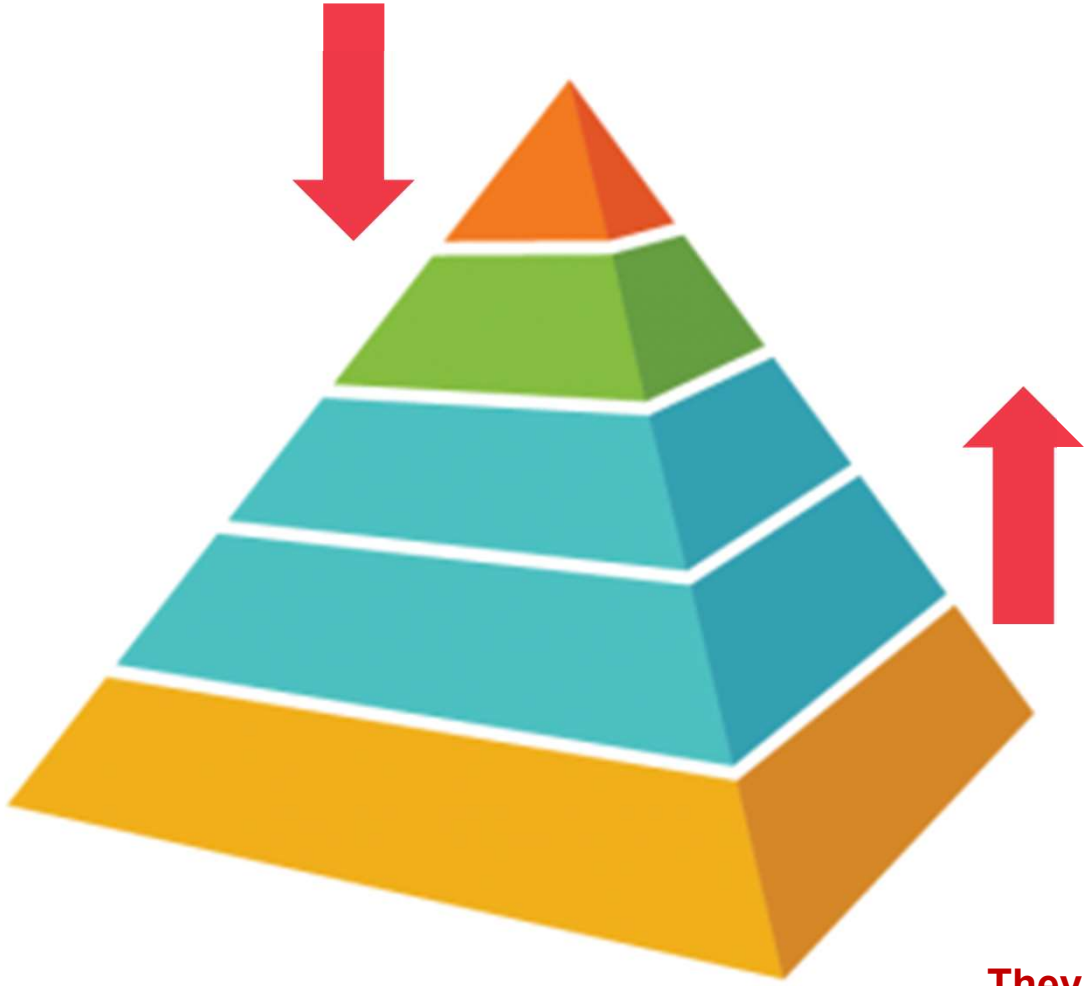


What role with humans have if all phases collapse? What are the appropriate innovation measures if cost and timing are near zero?

Consider the Complexity-Risk Landscape



AI Strategy: Top-Down or Bottom-Up?



They are not mutually exclusive!

Final Thoughts

AI Boosts Innovation:

• AI can supercharge idea generation and design.
• It increases the volume, variety, and quality of ideas.

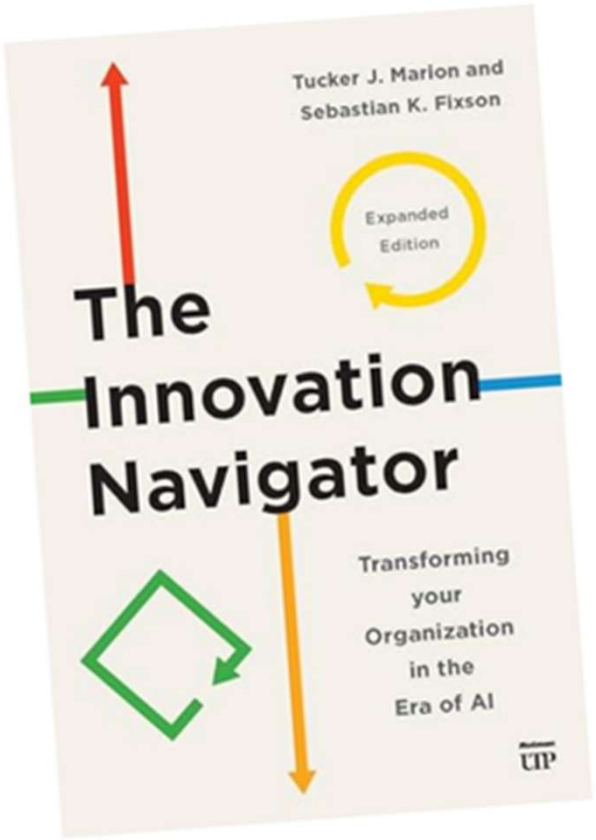
From Today to Tomorrow:

• AI's impact is real - expect even more powerful tools across the innovation landscape continuously.
• It will help make smarter, quicker product, design, and commercialization decisions.
• AI tools for high-trust, high-risk engineering tasks will take time to develop due to the requirement of certainty in outputs.

What You Can Do Now:

• Start using and creating AI tools and agents in your projects.
Allow Bottom-up experimentation!
• Understand it's strengths and **limitations**.
• Try, test, and measure AI's impact on your workflows with new ventures.
Take risks with new ventures and a multi-prong Top-down approach!

Q&A



https://tinyurl.com/2vyws3r6

Thank you!

Tucker Marion

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