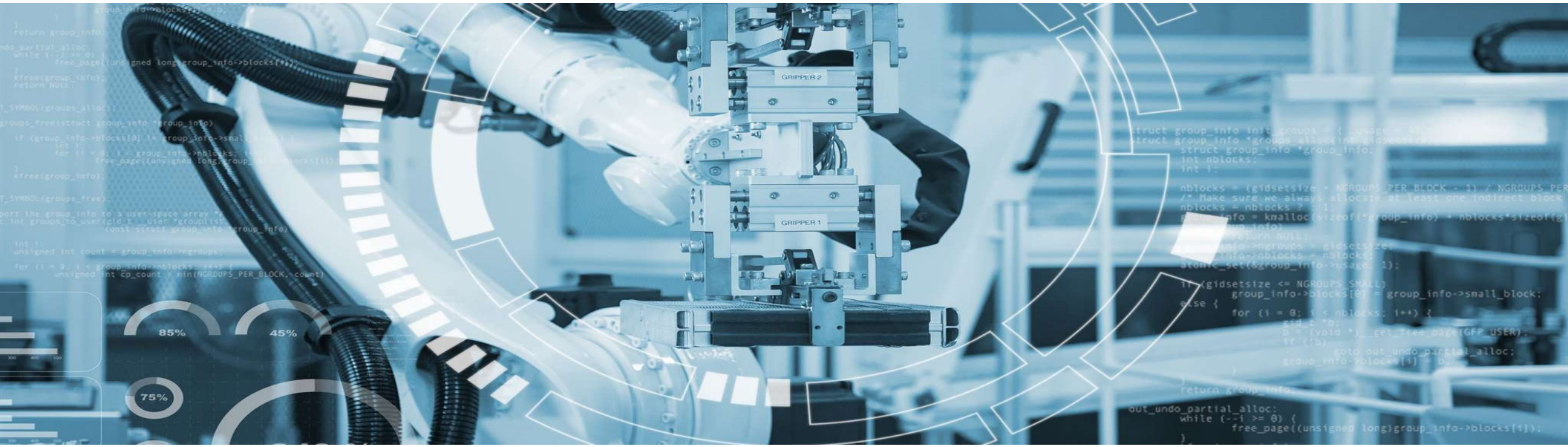


Advancing R&D innovation and commercialization through collaboration.

Catalyzing and Scaling Generative AI in Manufacturing

CATALYST CONNECTION
WE GROW MANUFACTURING

NIST

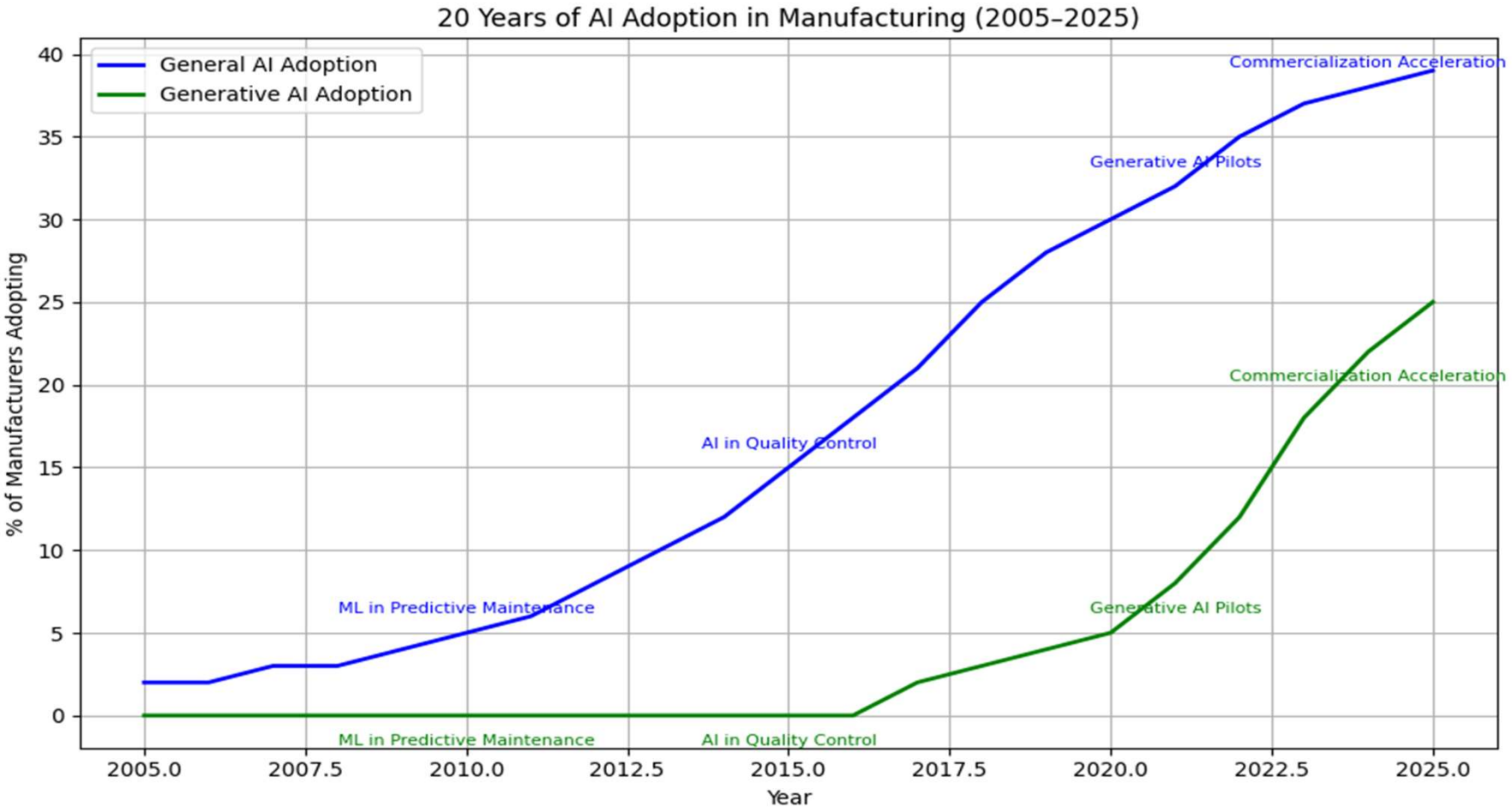
PA MEP
PENNSYLVANIA MANUFACTURING
EXTENSION PARTNERSHIP

Carnegie Mellon University

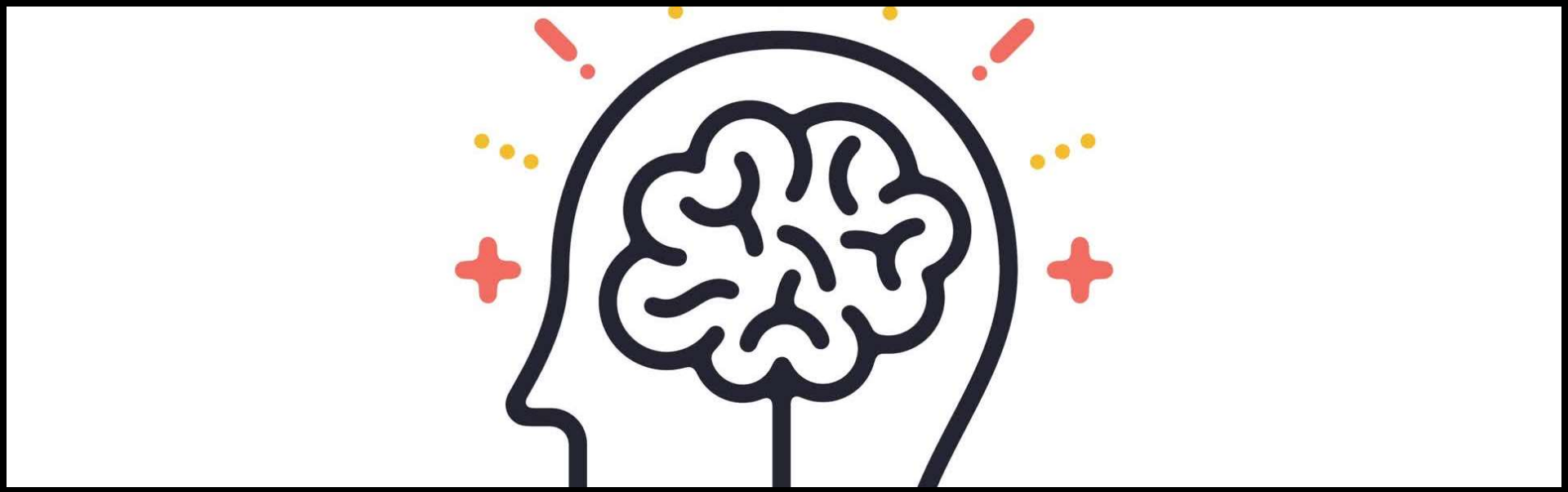
CSL CORPORATE STARTUP LAB
A CMU SWARTZ | TEPPER INITIATIVE

INNOVATION RESEARCH
INTERCHANGE
Accelerating Value Creation

AI vs Generative AI Adoption



Defining AI



Sort Cluster Predict

CREATE

Generative AI Explained

Generative AI models produce text, images, and media based on trained data and statistical methods. Data first strategies are being established.

Agentic AI Features

Agentic AI systems act autonomously with goal-directed behavior without constant human control.

Relevance in Manufacturing

Gen AI technologies are accelerating the packaging and transfer of R&D ideas into commercial products, process automation and new business models creation and testing.

GenAI Adoption Trends

Adoption in Manufacturing

Both large corporations and small-medium manufacturers are increasingly adopting Gen AI technologies in R&D and commercialization using trail and error methods. Data first strategies and practices are being established.

AI Is Mature

Predictive Ai is mature while generative and agentic AI systems are embryonic and the primary technologies currently driving innovation spending and automation in manufacturing including a new generation of lab robotics and cobots.

Collaboration Drives Innovation

Manufacturers are collaborating with technology providers and academic institutions to better manage risk, move faster and find new talent.

Change Agents Role

Corporate entrepreneurs, R&D managers and commercial venturing leaders are acting as change agents driving Gen AI adoption within organizations.

Research Design and Timeline

Project Overview & Partners

Collaborative Research Initiative

The project involves collaboration among industry, academia, and government to understand Gen AI adoption and scaling in manufacturing with a focus on R&D and commercialization..

Timeline and Scope

The initiative runs from Summer 2025 to Fall – Winter 2026

Key Partners

IRI Members, NIST (National Institute Standards & Technology) Catalyst Connection MEP National Network. Carnegie Mellon University form the project core.

Overall Goals

The initiative aims to develop actionable insights and strategies for Gen Ai technology adoption in **Fortune 500** companies **middle market manufacturers**

Research Objectives

AI Adoption Patterns

Research will identify how manufacturers adopt and scale generative AI and related AI agents.

Growth Strategies Framework

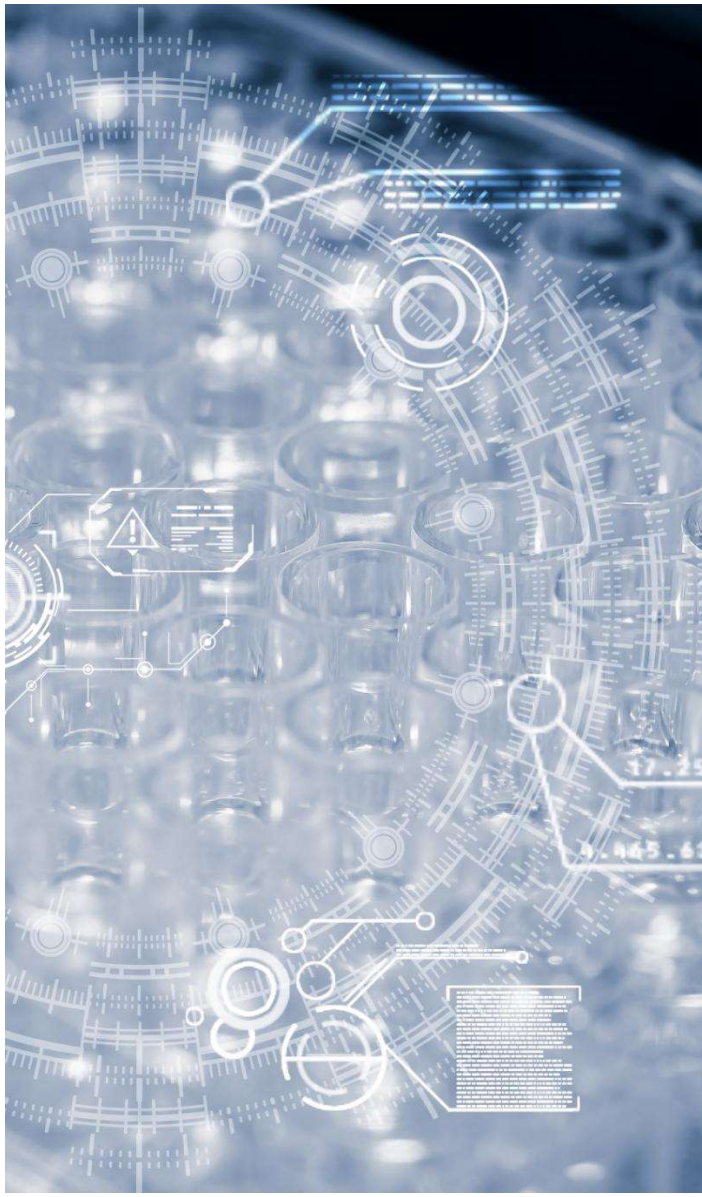
Analysis will surface selection and scaling strategies (Build, Buy, Partner and Invest, Create, Perform) Gen AI and agent technologies.

Impact of Agentic AI

Evaluates how GenAI and agentic AI influence R&D and commercialization policies and practices within manufacturing sectors.

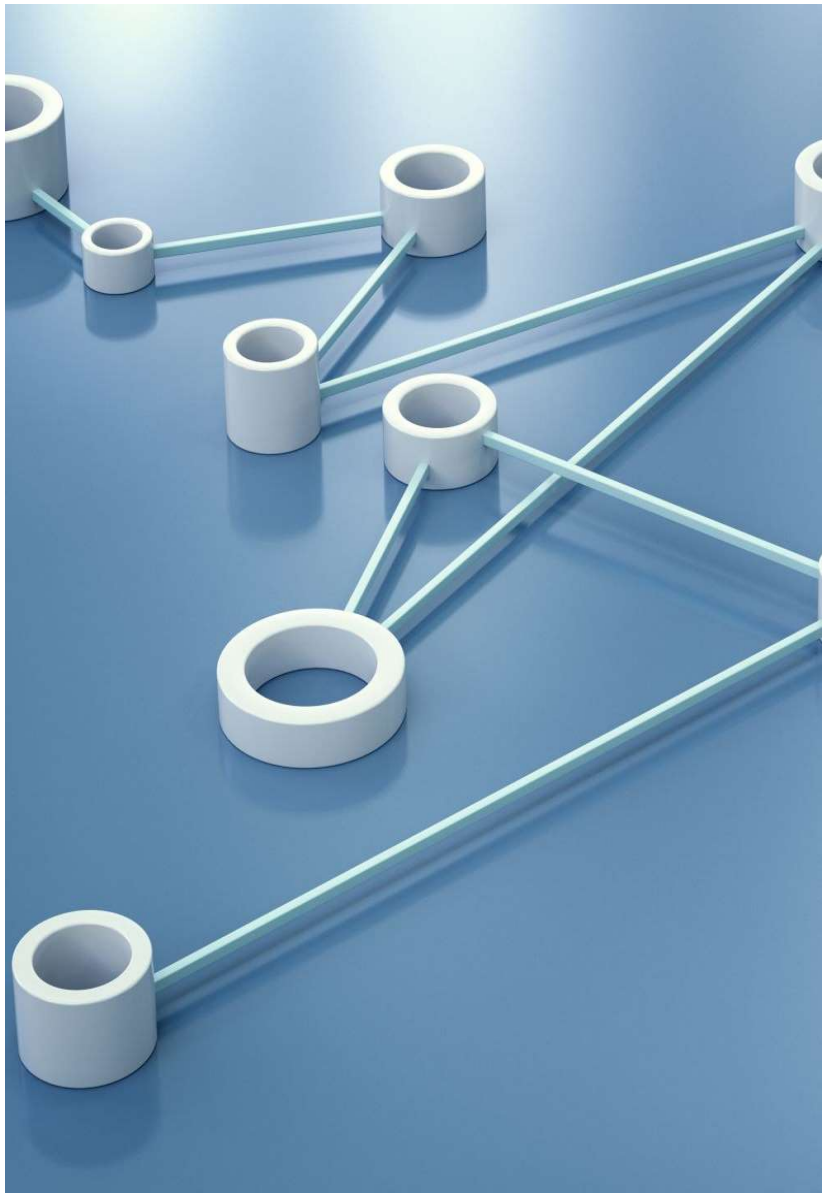
Collaborative Knowledge Sharing

Identifies external partnerships and feedback loops emerging within IRI Gen AI communities and their intersections with universities and small and medium manufacturers within their supply chain networks.



Research Questions

1) What is the current adoption of AI adoption in manufacturing?
2) For those adopting AI, who are the key change agents?
3) Which pathways (Build, Buy, Partner; Invest, Create, Perform) are most effective for AI-enabled innovation and business growth?
4) Is generative AI or agentic AI used more by SMMs (small-medium) versus larger manufacturers?
5) Where is AI used more by manufacturers in Research and Development or commercialization?
6) How does AI facilitate access to new knowledge and capabilities for SMMs and for larger manufacturers?



Research Hypotheses

Hypothesis #1 Gen AI is a technology that will help level the playing field between SMM supply chain partners and larger organizations in terms of R&D and commercialization activities and outputs.

Hypothesis #2 Manufacturers that leverage Gen AI will increase inside-out innovation outputs in new products, new technical services, and new market development.

Deliverables

Business Model Insights

The research will provide evidence on *adoption and innovation strategies* focusing on Gen AI and agentic AI and the **WHY** ... their impact on business.

Inventory of AI Applications

Our *inventory* identifies agentic AI applications with their benefits, challenges**, and** relevant technology suppliers.

Best Practices for AI Adoption

The study outlines *best practices* for screening, adopting, and scaling AI solutions emphasizing collaboration among stakeholders**.** Goal is a ***RTM Journal publication.***

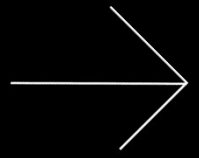
Supporting Informed Decisions

Deliverables help manufacturers make informed policy decisions to navigate technological transformation, competitively and safely.

Gen AI Players Focused on Manufacturing

GrowthSignals.io

Next Steps and Engagement



Call to Action for IRI Members

Shadowing or Active Participation

Members can engage actively in facilitated bi-monthly webinars and events or shadow asynchronously to peer discussions and garner insights and ideas on adoption and scaling..

lmusante@andrew.cmu.edu

rick.stachel@gmail.com

Appendix


CATALYST CONNECTION
WE GROW MANUFACTURING
NIST
PA MEP
PENNSYLVANIA MANUFACTURING
EXTENSION PARTNERSHIP
Carnegie
Mellon
University
CSL
CORPORATE STARTUP LAB
A CMU SWARTZ | TEPPER INITIATIVE
INNOVATION RESEARCH
INTERCHANGE
Accelerating Value Creation

References

1. **AI Statistics in Manufacturing:** https://www.allaboutai.com/resources/ai-statistics/manufacturing/

2. **KPMG Generative AI Survey**: https://kpmg.com/kpmg-us/content/dam/kpmg/pdf/2023/kpmg-generative-ai-survey-report-industrial-manufacturing1.pdf

3. **LTIMindtree Generative AI Report**: https://www.ltimindtree.com/wp-content/uploads/2024/08/Manufaturing.pdf