



Transforming America's Industries

Industrial Skill Needs for the Future

September 2025

Topics for Discus

- US Labor Market
- Industrial Metaverse & Industry 5.0
- Speed of Change
- Industrial Skills for the Future
- How Siemens Works with Schools
- Q&A





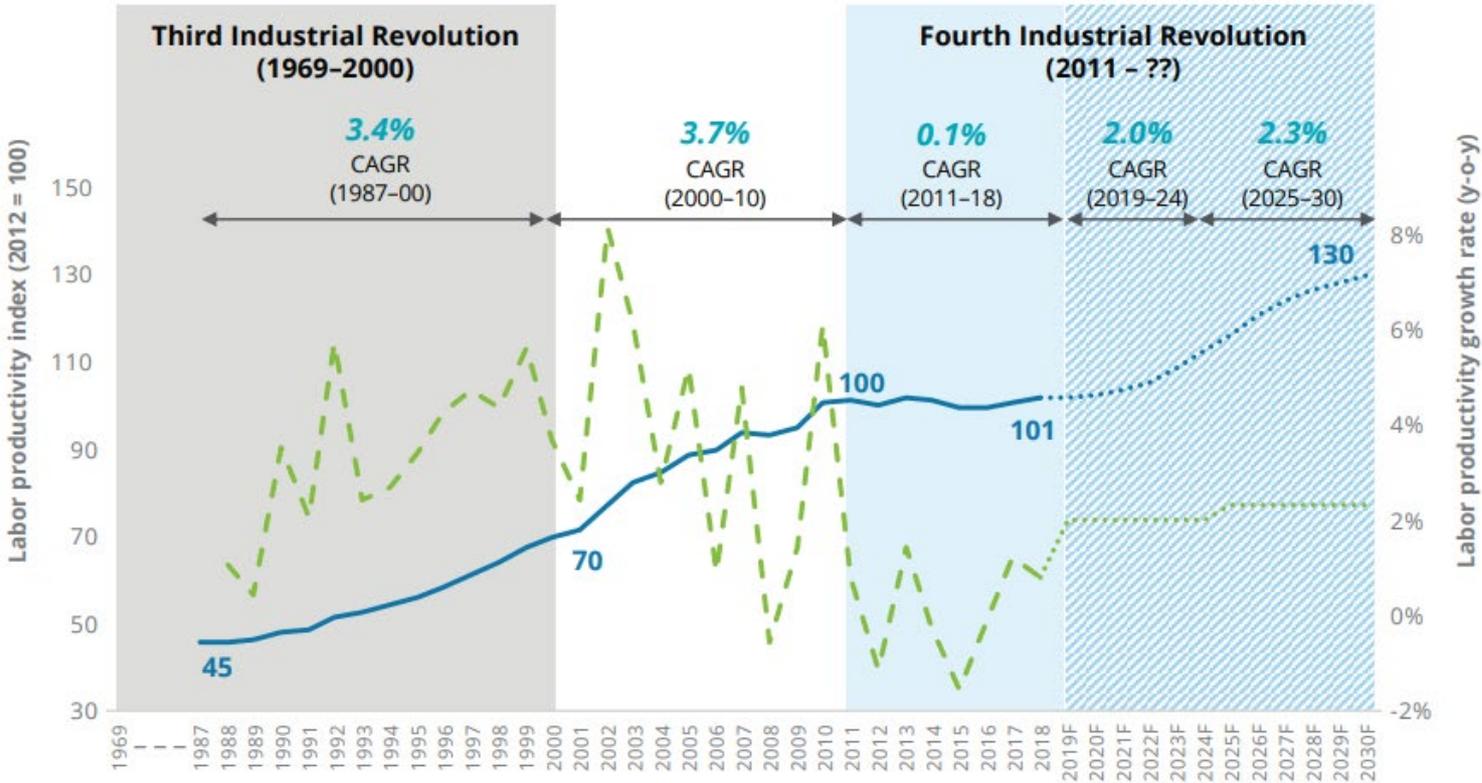
US Labor Market Trends

- Boomer, Women exits → Jones, Gen X, Y Z, Alpha
- 'Worker Market' → Employer Market
- Hybrid Work → RTO
- Market Tension → Global, Glocal, Local
- Flexible Benefits → Higher Cost
- 'Work for Purpose' → + Comp
- Speed of Change → Accelerating Annually

Labor Productivity Trendline

Manufacturing labor productivity, forecast, 1987-2030 (2012 index = 100)

— Labor productivity index (2012 = 100) - - - Labor productivity year-on-year growth rate



Productivity flatlined since 2010

Sources: Data from Bureau of Labor Statistics, Deloitte and MAPI Smart Factory Survey, and Deloitte Analysis.



McKinsey: Future of Work, 2023

By 2030

- Occupational changeout:
 - 100 million people
- STEM / skills primary job growth
- Job Category growth varies
- Some Job Categories eliminated

Broad Trends

- Remote work / RTO
- E-Commerce Growth
- Digital Adoption

Workforce of the Future

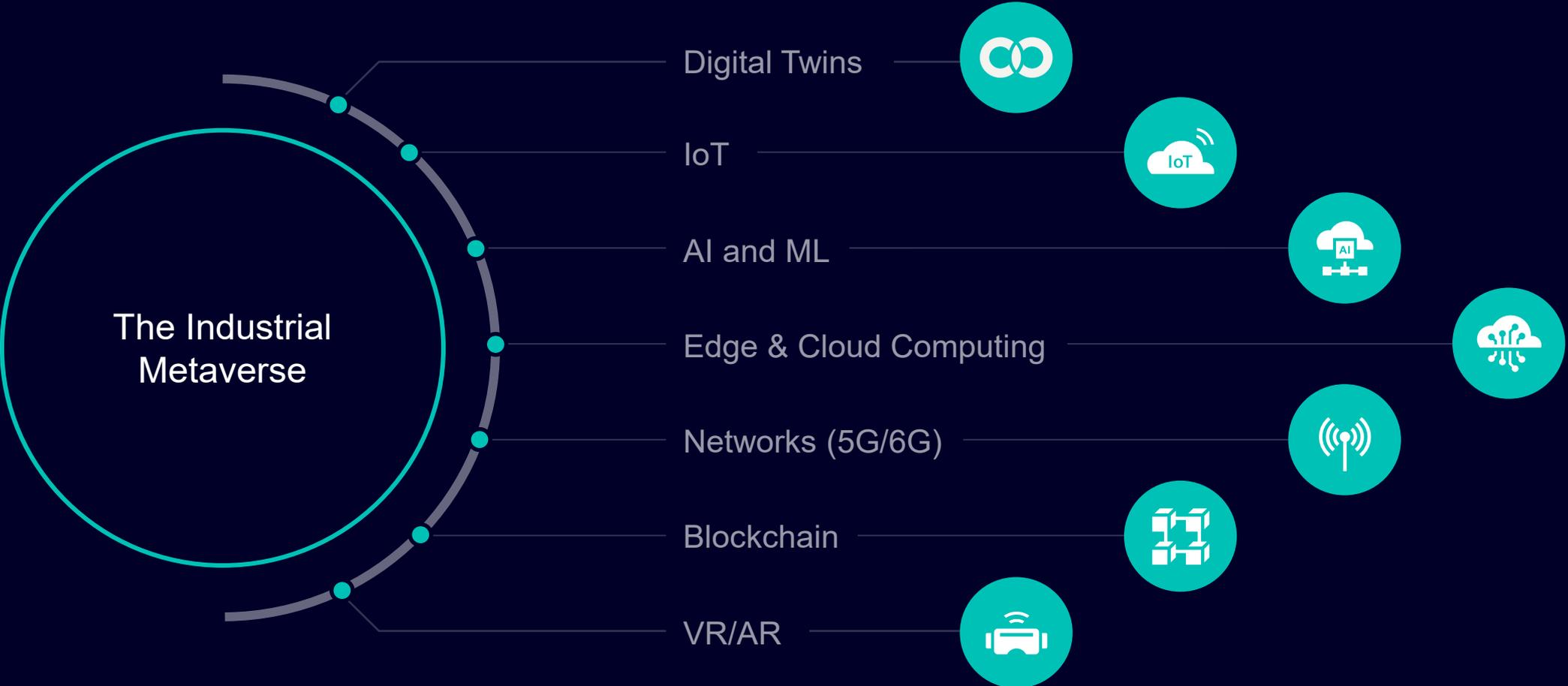
- Nature of Work
- Workforce Planning
- Take Work to the Workforce



The Industrial Metaverse

What is It?

Evolution and convergence of key technologies will enable the industrial metaverse



2025 Gartner Top 10 Strategic Technology Trends

Gartner carefully selected these 10 trends based on their potential to disrupt traditional business models, enable new forms of innovation and address the most pressing challenges facing enterprises today.

They represent strategic imperatives that require thoughtful consideration and decisive action.



AI imperatives and risks

- **Agentic AI**
- **AI Governance Platforms**
- **Disinformation Security**



New frontiers of computing

- **Post-Quantum Cryptography**
- **Ambient Invisible Intelligence**
- **Energy-Efficient Computing**
- **Hybrid Computing**



Human-machine synergy

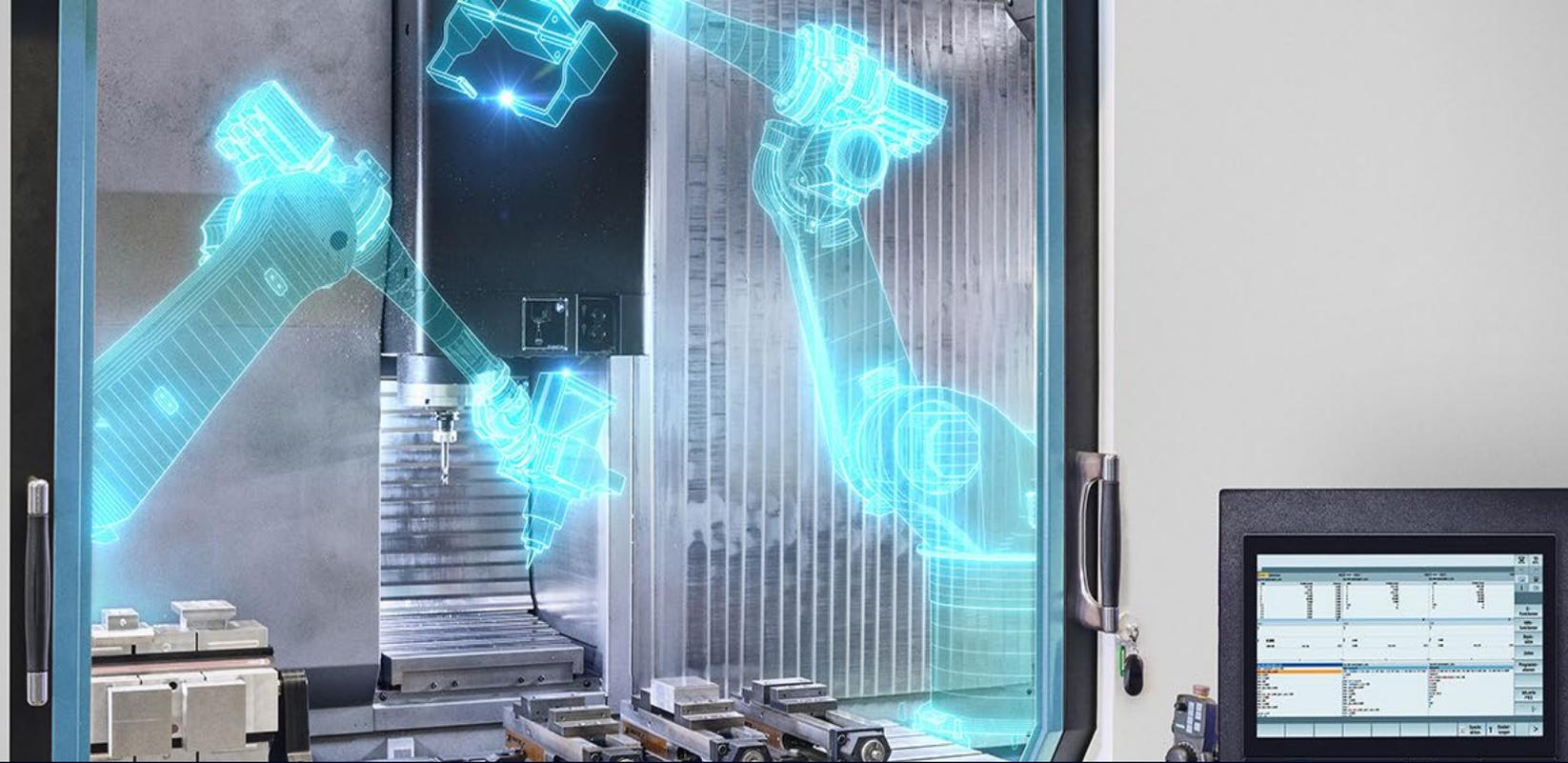
- **Spatial Computing**
- **Polyfunctional Robots**
- **Neurological Enhancement**

Some of the Technology Terms for the Future

- ML
- NLP
- Application Layer
- Integration/Tooling Layer
- Foundation Models
- Reasoning Models
- Observability Tools
- Programming Frameworks
- Physical Infrastructure
- Digital Infrastructure
- Explainable AI
- Computer Vision
- Deep-Reinforcement Learning
- Custom AI Accelerators
- HBM

- Machine Learning
- Natural Language Processing
- HMI for AI
- Between Application and Foundation Model
- Deep learning models with quantities of data
- Trained foundation models
- Monitor for AI model
- AI software toolkits
- AI hardware (data centers, chips)
- Digital abstraction of Physical infrastructure
- AI increasing interpretability of inputs for ML
- ML that works with visual data
- ML trained by neural networks
- AI tailored for specific tasks
- High Bandwidth Memory

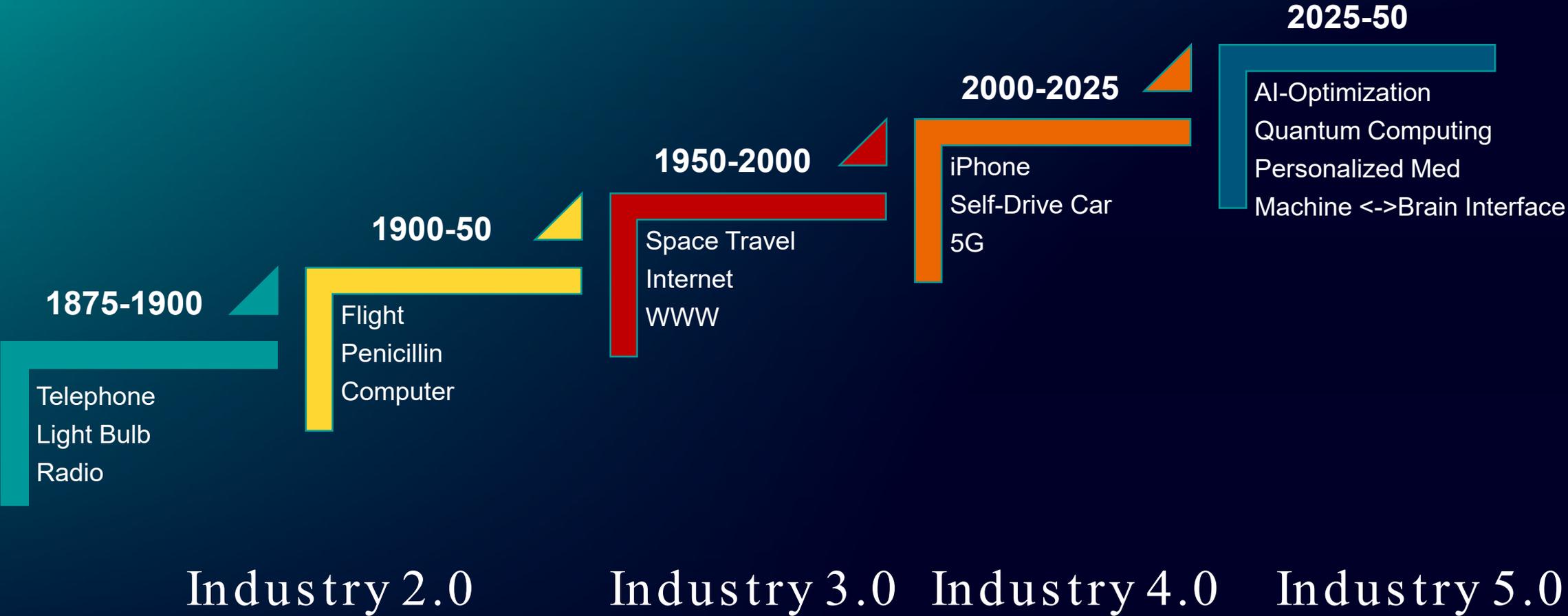
Source: Technology Trends Outlook 2025
McKinsey & Company, July 2025



Technology Change:

Impact on Skills for Future

Technology Trends over Time



Significant Industrial Impacts 2000-2025

2000-2005

- China granted Most-Favored-Nation Status
- 9/11 Security impacts Supply Chains
- Toyota Publishes 'The Toyota Way'
- Apple iPod
- Ethercat impacts manufacturing Automation
- Ford Re-engineering begins

2011-2015

- Toyota offers Musk Fremont site for Tesla
- 'Shale Gale' leads to Fracking and export of US NG
- China overtakes US in Manufacturing Output
- Industry 4.0 officially 'born'
- 'Manufacturing Day' launched
- Space-X launches

2006-2010

- Millennials enter workforce
- Cobots introduced
- 'Great Recession' impacts US manufacturing
- Government bailouts of Auto/Banks/Investment firms

2016-2020

- Paris Climate Agreement
- Global Trade Agreements Re-Negotiated
- GE mainstreams Additive Manufacturing
- Boeing impact on Manufacturing Culture

2021-2025

- COVID
- GE Re-engineering
- Supply Chain Crises
- Union Re-vitalization
- ChatGPT launches

Source: Industry Week Series:
The Events that Changed Manufacturing, 2025



Skill Change:

What Industry is Seeking in Next 3 Years

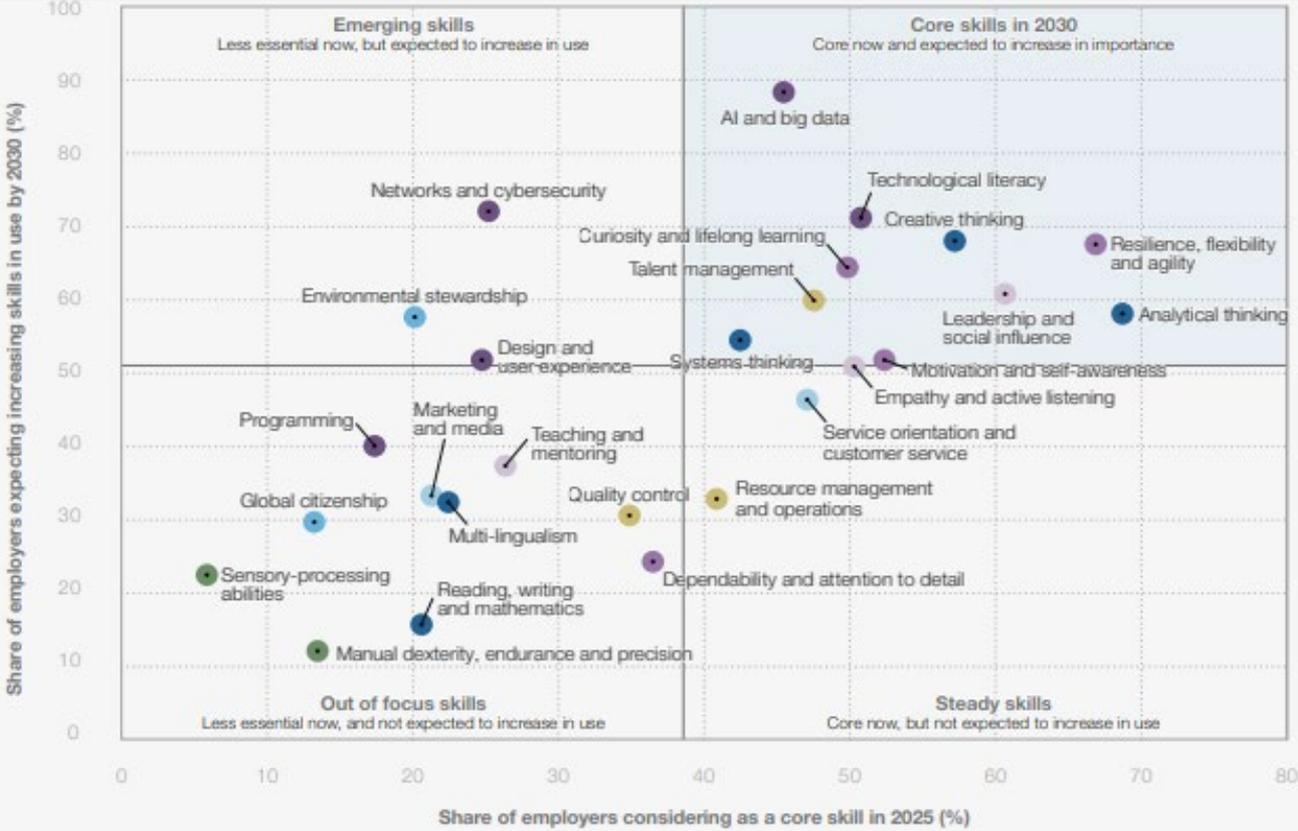
Transforming 'CORE' Skill Sets Over Time

Top 10 Skills

...in 1970	...in 2015	...in 2025	...in 2030
Writing	Complex Problem Solving	Analytical thinking and innovation	Creative thinking
Computational Skills	Coordinating with Others	Active learning and learning strategies	Resilience, flexibility and agility
Reading Skills	People Management	Complex Problem Solving	Curiosity and lifelong learning
Oral Communications	Critical Thinking	Critical Thinking and Analysis	Leadership and social influence
Listening Skills	Negotiation	Creativity, originality and initiative	Analytical thinking
Personal Career Development	Quality Control	Leadership and social influence	Systems thinking
Creative Thinking	Service Orientation	Technology use/procedure/control	Motivation and self-awareness
Leadership	Judgment and Decision Making	Technology design and programming	Empathy and active listening
Goal Setting/Motivation	Active Listening	Resilience/stress tolerance/flexibility	Service orientation and customer service
Teamwork	Creativity	Reasoning/problem solving/ideation	Dependability and attention to detail

Source: Fortune 500 Most Valued Skills; Future of Jobs Survey, World Economic Forum.

Skills Demand and Change

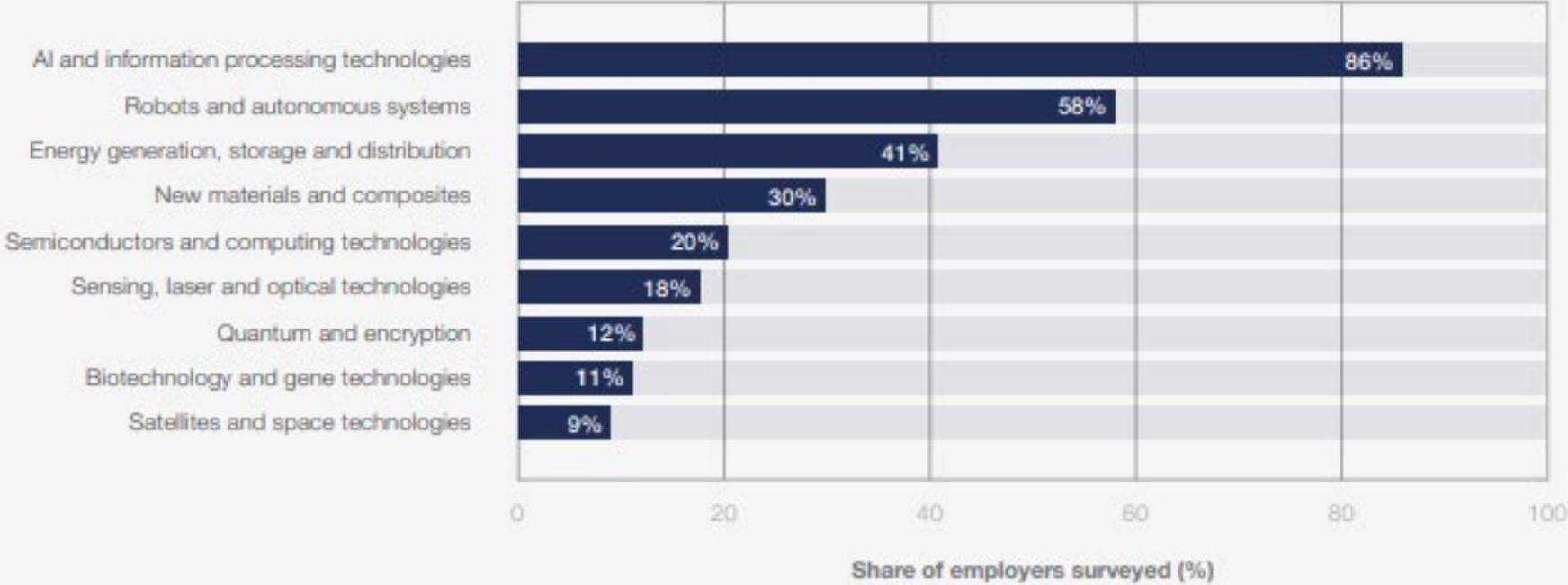


- Tech Literacy
- Learning Agility
- Resilience
- Persistence

Source
World Economic Forum, Future of Jobs Survey 2024.

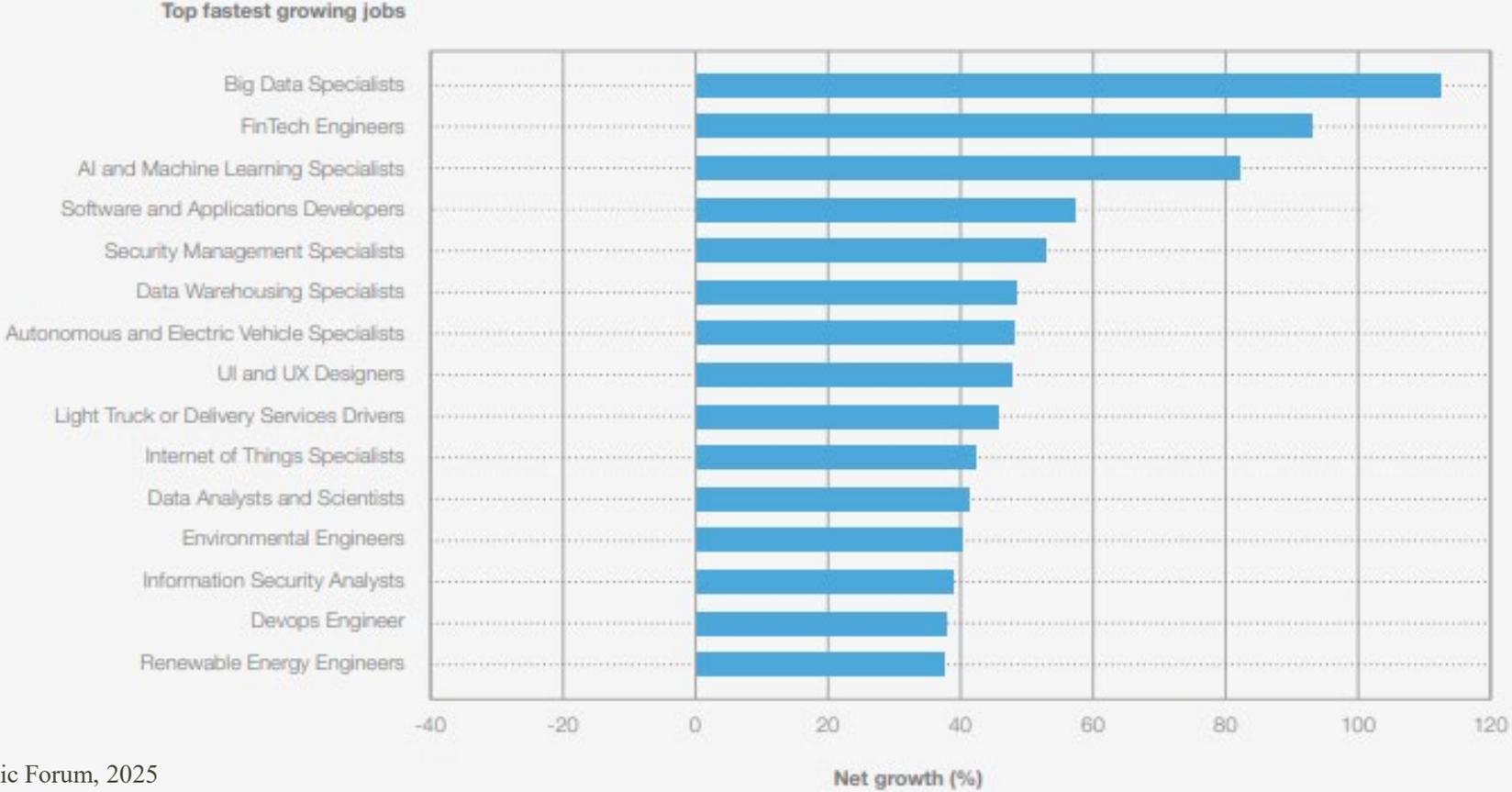
Note
The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.
Bold lines represent the median values across all skills.

Technology Driving Business Today: Business Transformation Impacts, 2025-30



Source
World Economic Forum, Future of Jobs Survey 2024.

Top Fastest Growing Jobs, 2025-30



AI Impact on Productivity

MIT recently completed the first brain-scan study on ChatGPT users—and the results are deeply revealing.

Rather than boosting brain function, prolonged AI use may be dulling it.

Over four months of cognitive data suggest we might be measuring productivity all wrong ↴

In MIT's study, participants had their brains scanned while using ChatGPT.

→ 83.3% of users couldn't recall a single sentence they'd written just minutes earlier.

→ In contrast, those writing without AI had no trouble remembering. MIT recently completed the first brain-scan study on ChatGPT users—and the results are deeply revealing.

Rather than boosting brain function, prolonged AI use may be dulling it.

Impact of Use

Here's the paradox:

→ ChatGPT makes you 60% faster at completing tasks...

→ But it reduces the mental effort required for learning by 32%.

Brain Connectivity dropped sharply – from 79 to 42 points

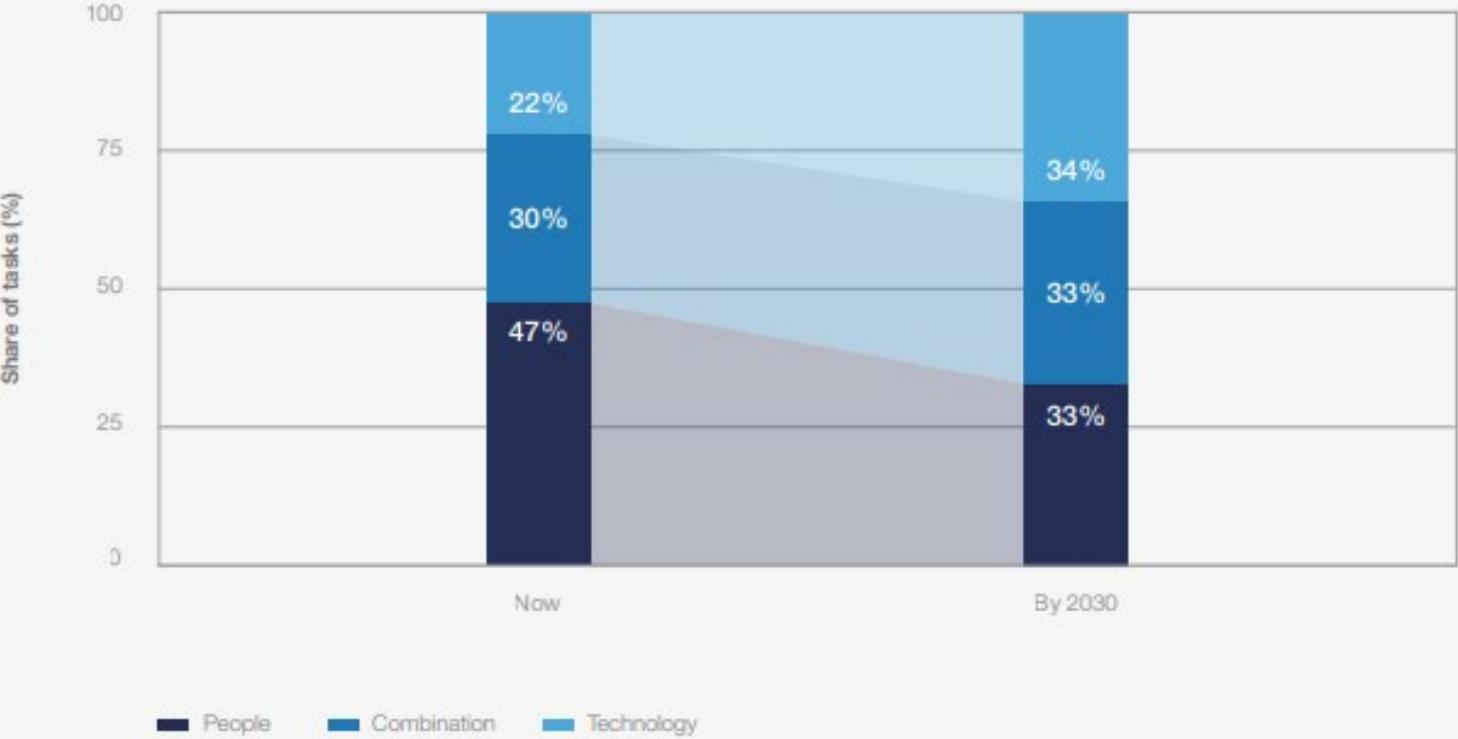
47% drop in neural engagement.

Even after stopping ChatGPT use, users continued to show under-engagement

This suggests more than dependency – its cognitive weakening.

Source: <https://www.media.mit.edu/publications/your-brain-on-chatgpt/>

Shifting Human-Machine Workload: Automation vs Augmentation, 2025-30



- Cobots
- Agentic AI

Source
World Economic Forum, Future of Jobs Survey 2024.

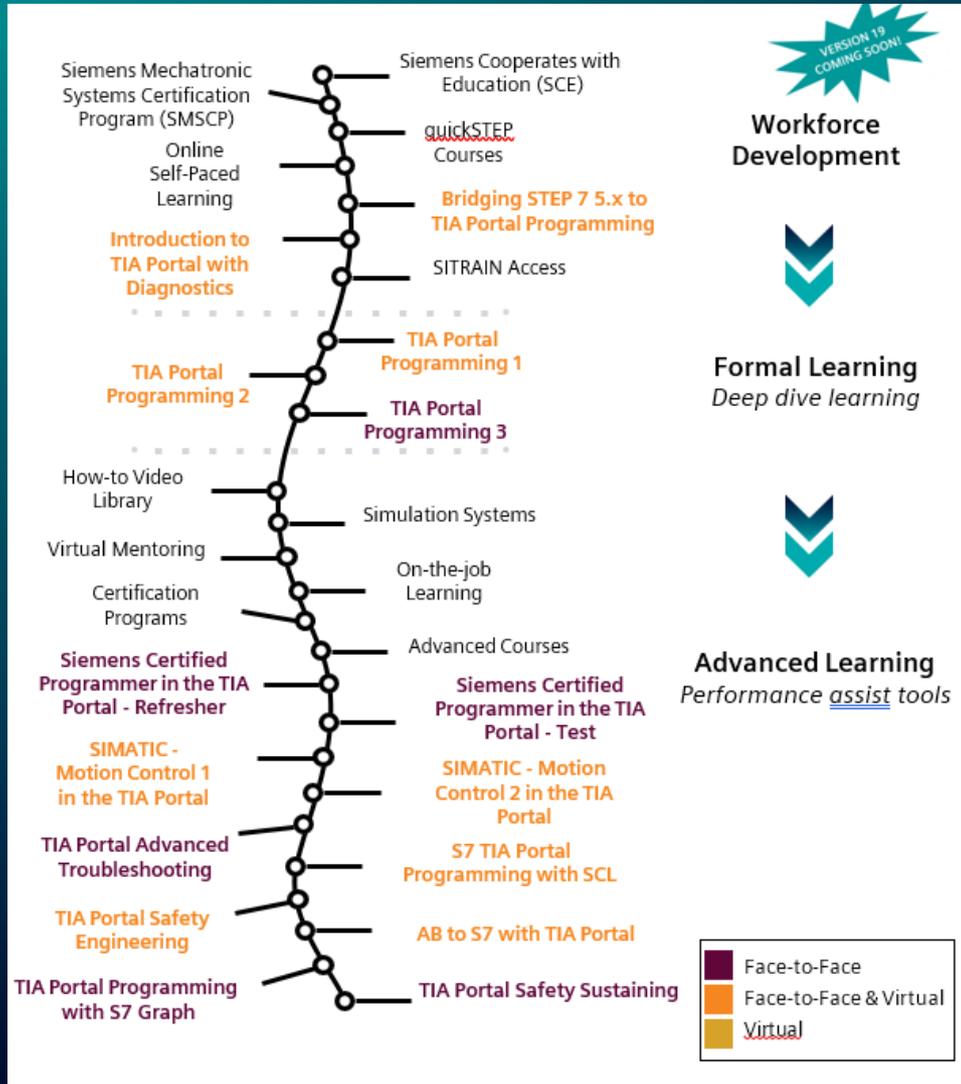


SKILL

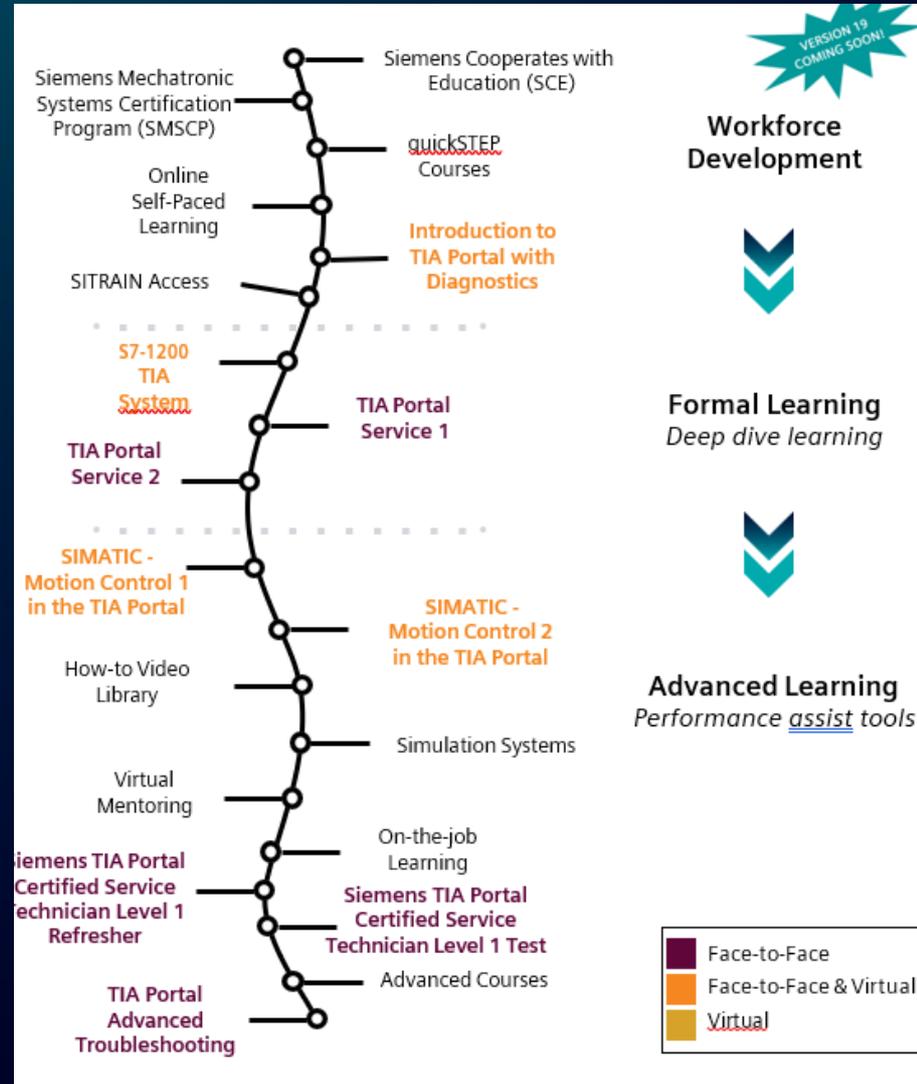
Skills Hiring: Siemens Approach

Learning Paths for Siemens DI Technologies – Portal

Engineering



Maintenance Technician



- Begin with school partnerships
- Provide digital badges for skill acquisition
- Direct towards Global Industry Certification

Service Delivery US Core Skills Needs



Knowledge and Skill Assessment for Entry Level

What are WE looking for?

Cognitive Flexibility

Shift across multiple roles
Remain agile
Maximize changing resources

Customer Focus

Create and curate training materials
Deliver knowledge transfer
Discover new service opportunities

Problem Solving

Develop system analysis and evaluation techniques
Apply critical thinking to assess information
Recommend solutions and guide specialists



Active Learning

Ongoing development
Apply learning strategies
Enrich internal and external interactions

Complex Systems Thinking

Broad perspective
Explore structures, patterns, cycles
Systems approach to analysis

Communication

Technical writing
Effective information transfer

The Future is Ours

How do we make it real and impactful together?

Q&A



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