



# Advancing the State of Manufacturing Technology: A *U.S.* *Perspective on Global Trends*

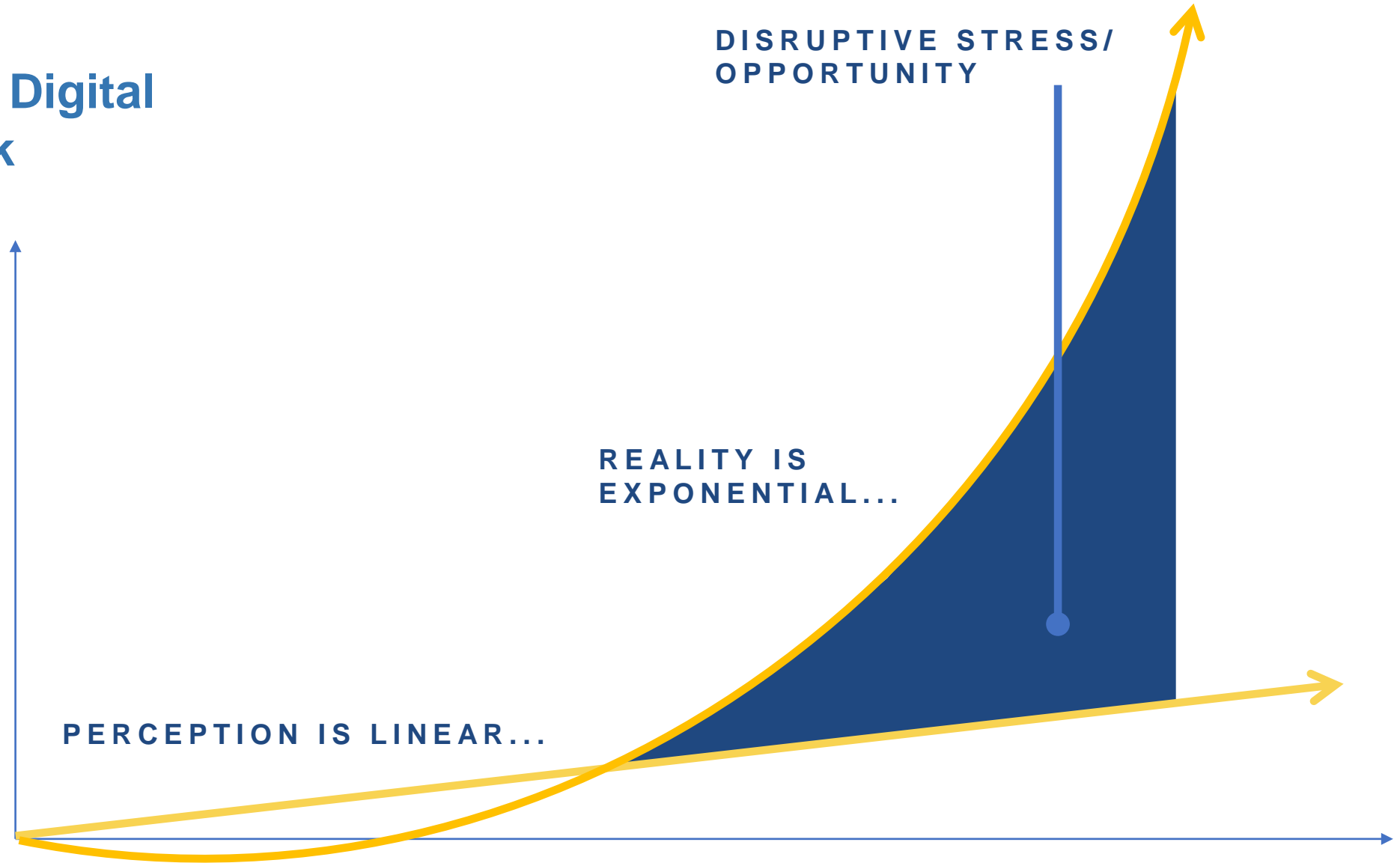
Timothy J. Shinbara

VP & CTO

AMT – The Association for Manufacturing Technology



# The Rise of the Digital Supply Network



Sources: Deloitte Insights



# Transformative Technologies

MACHINE LEARNING  
AUGMENTED REALITY  
OPEN SOURCE SOFTWARE  
GENERATIVE DESIGN 57.2  
ADDITIVE MANUFACTURING  
SYNTHETIC BIOLOGY  
NANOTECHNOLOGY  
ADVANCED ROBOTICS  
METAMATERIAL  
BLOCKCHAIN  
ARTIFICIAL INTELLIGENCE  
MACHINE LEARNING  
AUGMENTED REALITY  
OPEN SOURCE SOFTWARE  
GENERATIVE DESIGN  
ADDITIVE MANUFACTURING  
SYNTHETIC BIOLOGY  
NANOTECHNOLOGY  
ADVANCED ROBOTICS



# Tech Advancing the Global State of Manufacturing:

AM/3DP<sup>1,3</sup>

Automation<sup>1,3</sup>

AR/VR<sup>1</sup> & AI/ML<sup>3</sup>

Generative Design<sup>4</sup>

Digitization & Connectivity<sup>2</sup>

Source<sup>1</sup>: <https://www.morphomfg.com/5-china-manufacturing-trends-to-watch-for-in-2018/>

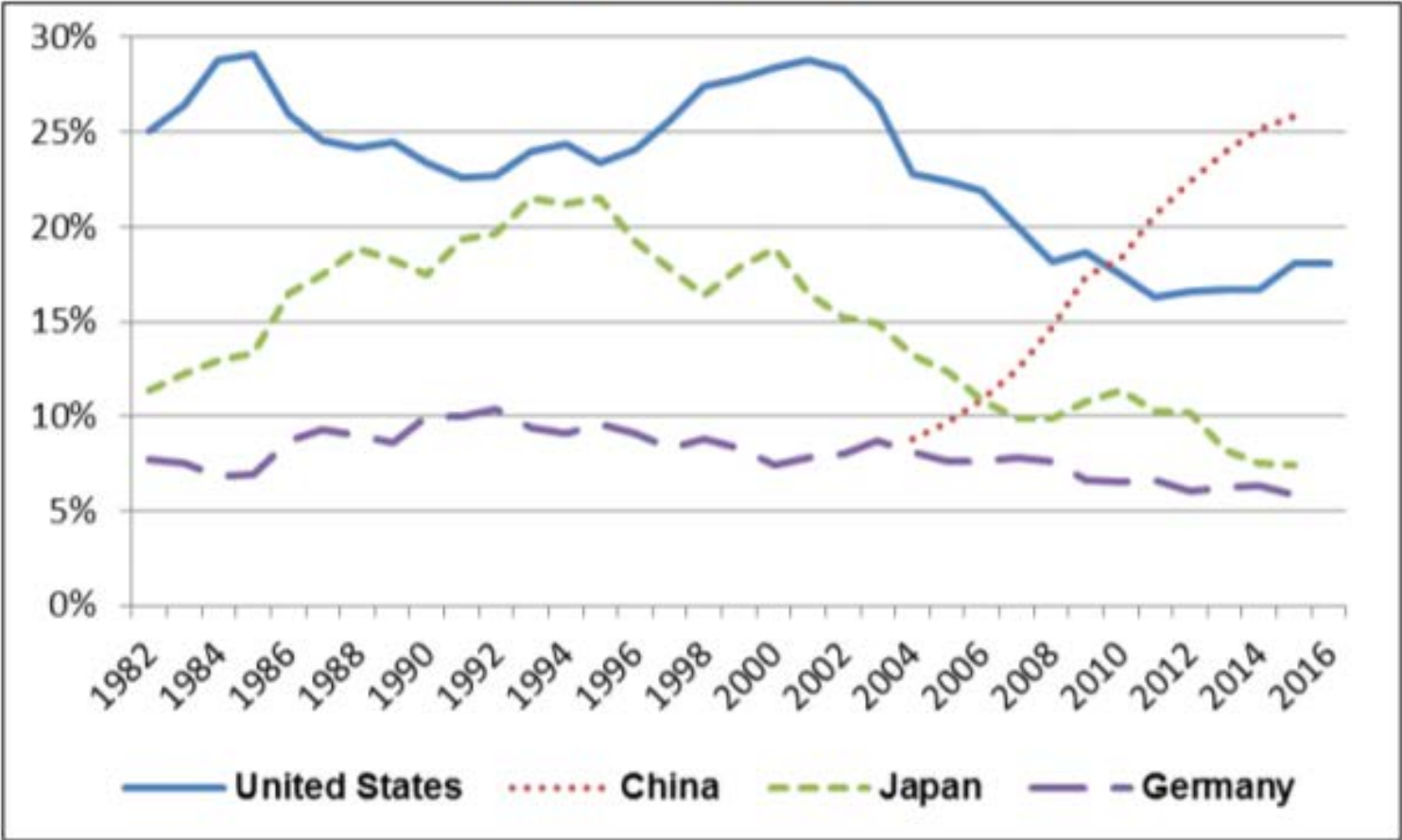
Source<sup>2</sup>: <https://www.strategyand.pwc.com/trend/2018-manufacturing> | [https://gmisummit.com/wp-content/uploads/2018/07/PwCGMIS-Germany-Report-2018\\_vF.pdf](https://gmisummit.com/wp-content/uploads/2018/07/PwCGMIS-Germany-Report-2018_vF.pdf)

Source<sup>3</sup>: <https://www.nist.gov/blogs/manufacturing-innovation-blog/5-manufacturing-technology-trends-watch-2019-0>

Source<sup>4</sup>: <https://www.prnewswire.com/news-releases/the-global-generative-design-market-to-grow-from-usd-111-million-in-2018-to-usd-275-million-by-2023--at-a-cagr-of-19-9-300804389.html>

**Figure 2. Selected Countries' Shares of Global Manufacturing Value Added**

Calculated in current U.S. dollars



**Source:** U.N. National Accounts Main Aggregates Database, value added by economic activity, at current prices—U.S. dollars.

# Global Focus on (National) Manufacturing

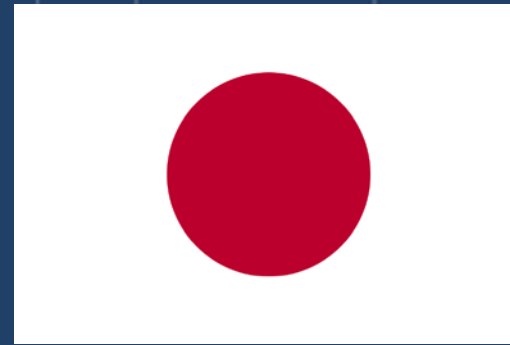
(mfg. value-add as %GDP | % change from '08 – '16)



12% | +3%



29% | +94%



20% | +2%



9% | -3%



15%



27% | +38%



10% - 15% | - ~4%



21% | +12%



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# Additive Manufacturing



# materials. applications.



**SANDVIK INVESTS \$25 MILLION  
IN MATERIALS FOR METAL  
3D PRINTERS**



**IS 3D PRINTED BACTERIA THE  
FUTURE OF ELECTRONICS?**



**3D PRINTING 10 TIMES CHEAPER  
THAN MACHINING FOR MOOG  
AIRCRAFT GROUP**



**FEDEX LAUNCHES 3D PRINTING  
INVENTORY AND REPAIR  
FORWARD DEPOTS**



**3D PRINTED CAMPER "THE WAVE"  
SET TO BREAK WORLD RECORD  
FOR SIZE**



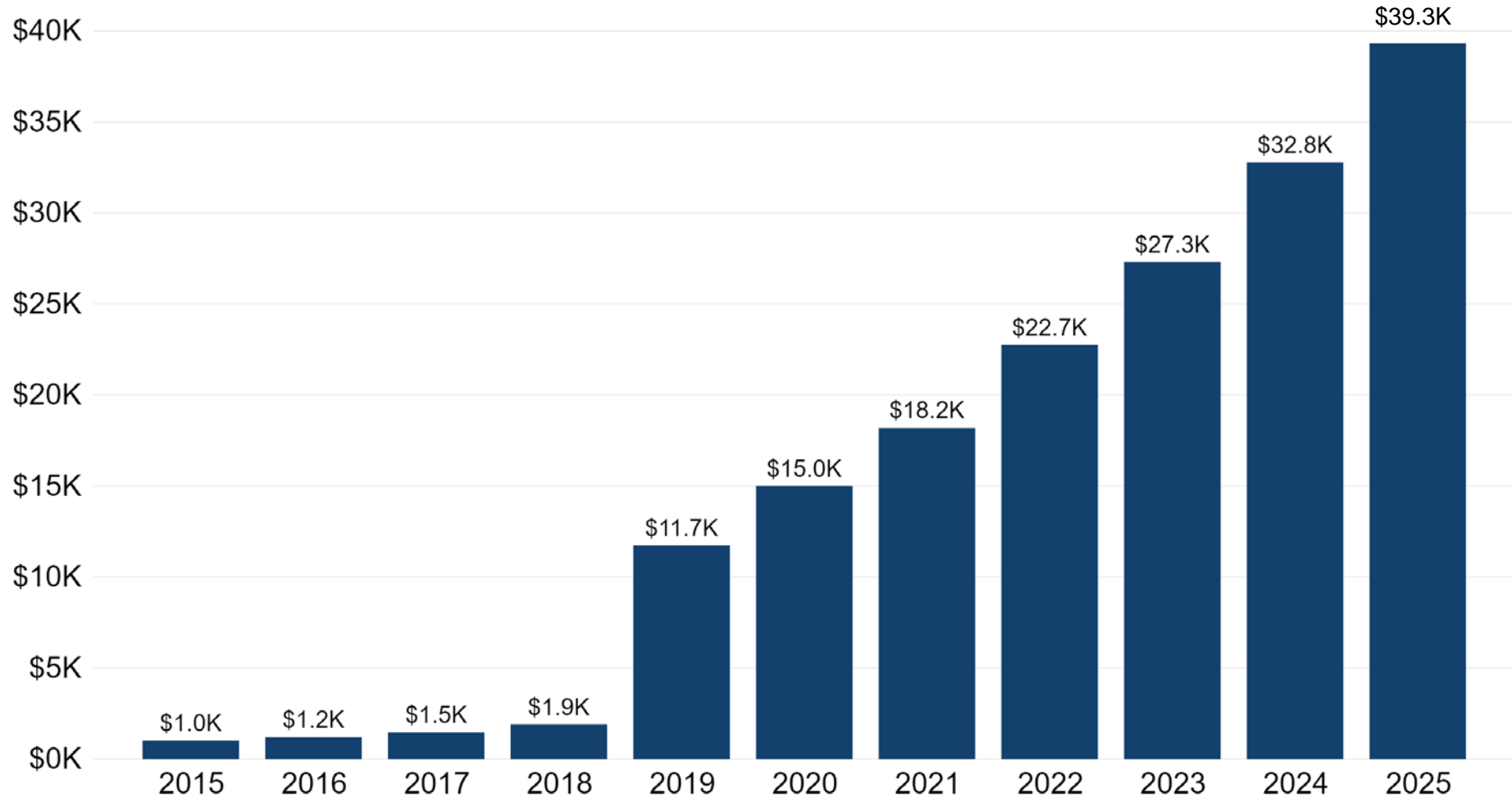
**POSTNORD ADDS ON DEMAND  
3D PRINTING DELIVERY SERVICE  
WITH STRATASYS**



ADDITIVE MANUFACTURING

# US Additive Market Revenue

(IN MILLIONS USD)



Sources: Markets Watch & AMT

ADDITIVE MANUFACTURING

# Industry Examples



# Advanced Robotics & Cognitive Automation



## Basic Process Automation

- Transactional activities
- Rules-based and primarily repetitive

## Enhanced Process Automation

- Recognition of unstructured data
- Aids in adapting to the business environment

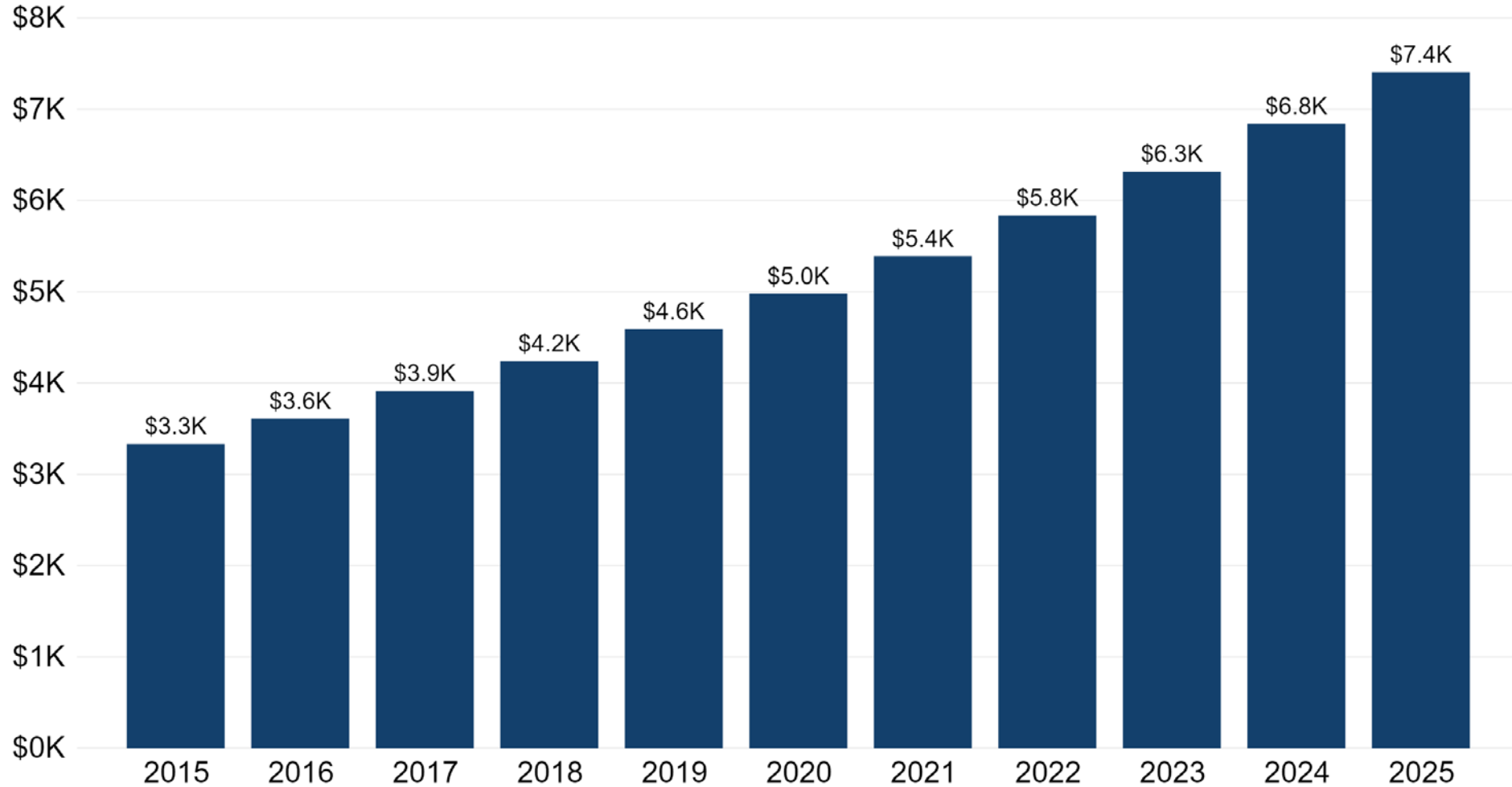
## Cognitive Automation

- Decision support
- Advanced decision algorithms
- Interlinked with artificial intelligence, natural language processing & big data analytics



# US Robotics & Advanced Robots Market Revenue

(IN MILLIONS USD)



ADVANCED ROBOTICS & COGNITIVE AUTOMATION

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## Industry Examples

The logo for FANUC Robotics is centered within a white circular border. It features the word "FANUC" in a bold, red, sans-serif font, with "ROBOTICS" in a smaller, white, sans-serif font directly below it.

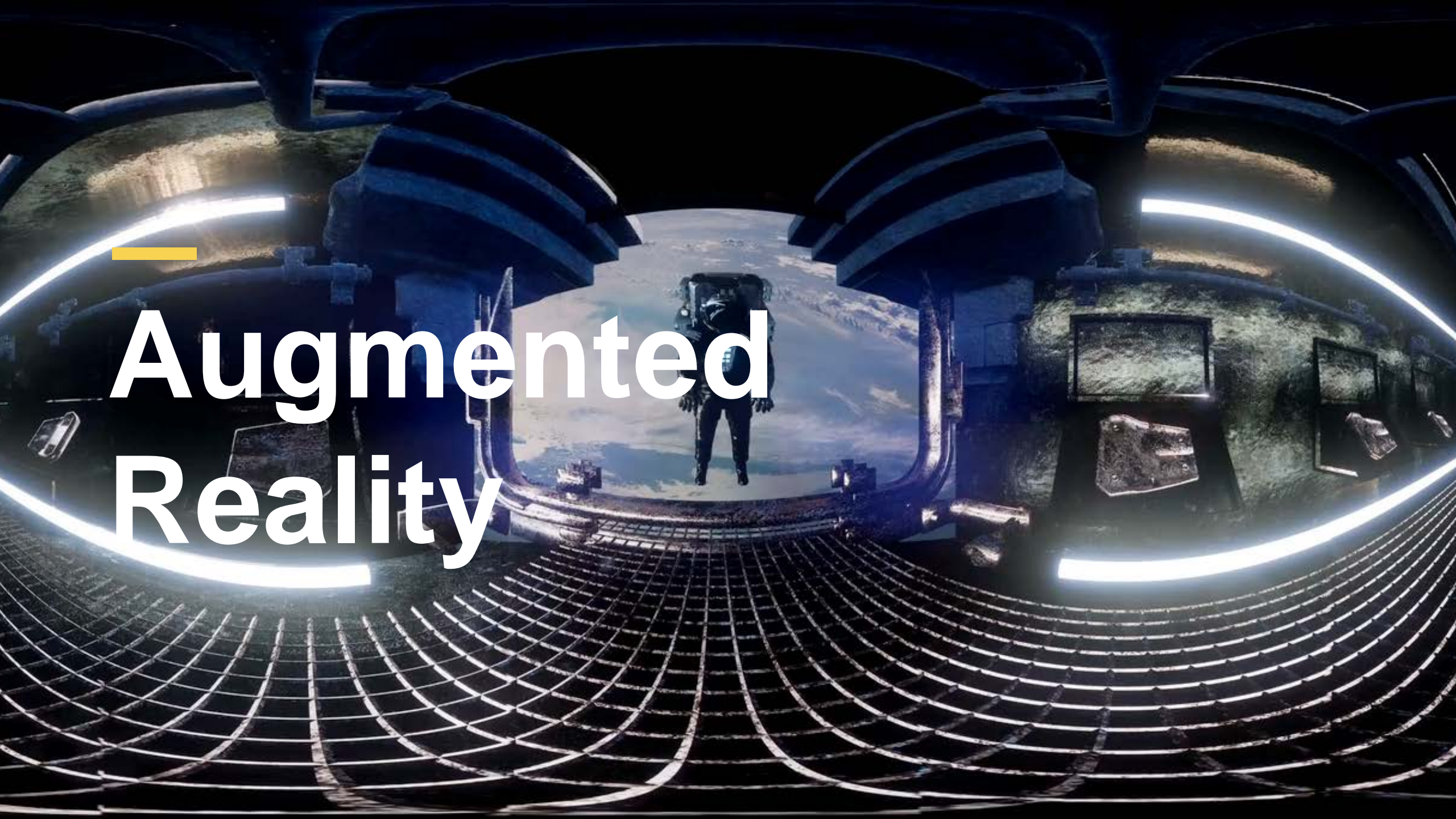
**FANUC**  
ROBOTICS

The logo for OSARO is centered within a white circular border. The letters "O", "S", and "A" are in a light green color, while "R" and "O" are in a yellow color.

OSARO

The logo for CloudMinds is centered within a white circular border. It consists of a 3D cube icon with green, blue, and orange faces, followed by the text "CloudMinds" in a white, sans-serif font.

 CloudMinds

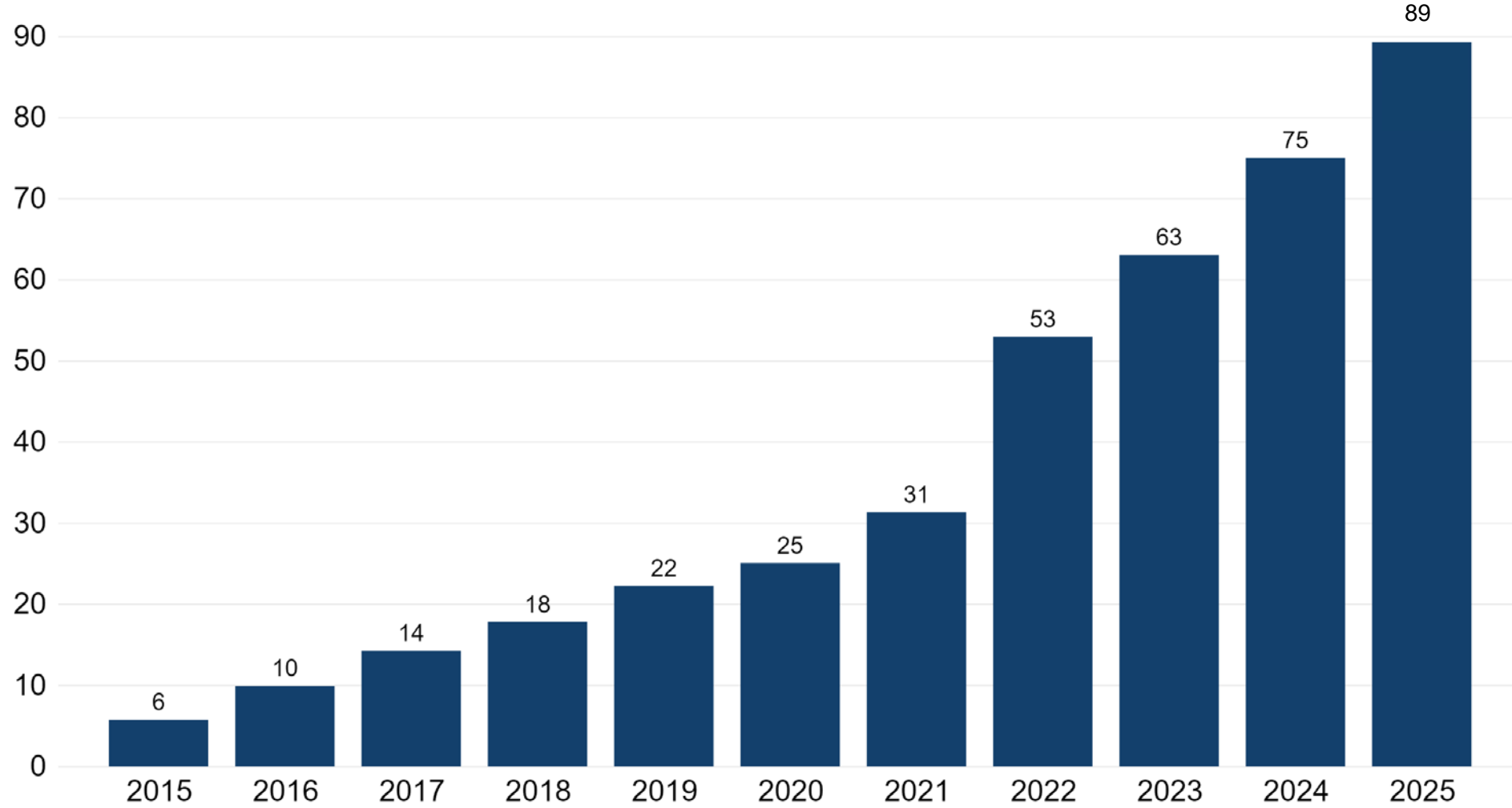


# Augmented Reality

AUGMENTED REALITY

# US AR & VR Growth Rate

(IN MILLIONS USD)



Sources: Markets & Research



AUGMENTED REALITY

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# Industry Examples

The logo for UP SKILL is centered within a white circular border. It features the word "UP" in white, followed by two blue diamonds, and the word "SKILL" in white.

UP SKILL

The logo for VUZIX is centered within a white circular border. It features a stylized white wave graphic above the word "VUZIX" in white, with a registered trademark symbol (®) to the right.

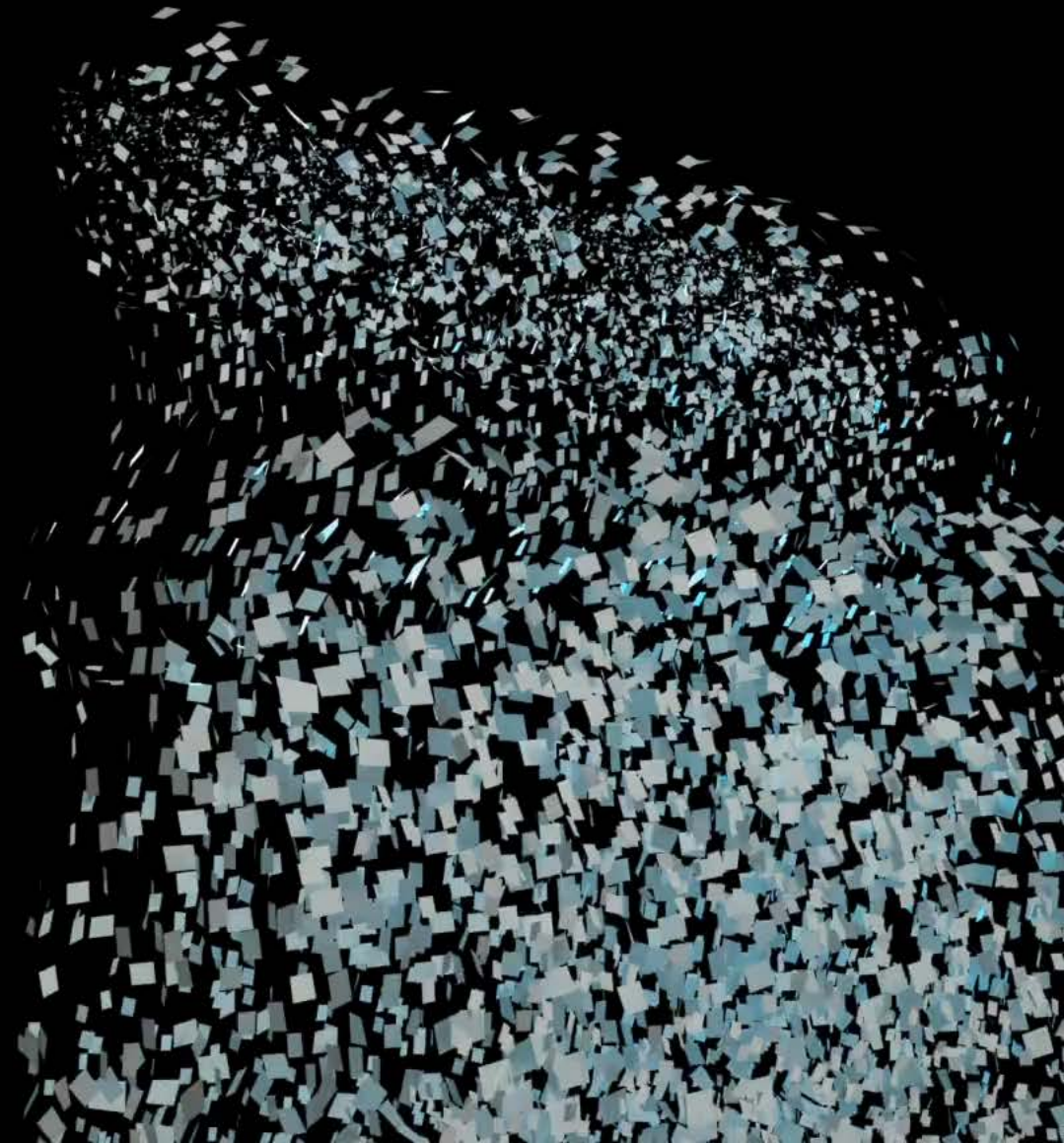
VUZIX®

The logo for ATHEER is centered within a white circular border. It features a green stylized 'A' icon followed by a vertical bar and the word "ATHEER" in green.

ATHEER

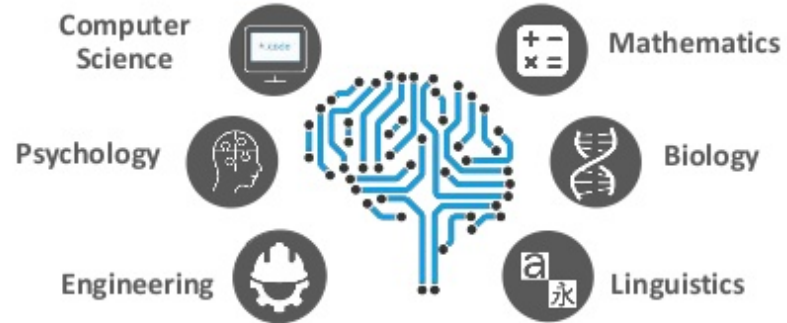
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# Artificial Intelligence/ Machine Learning

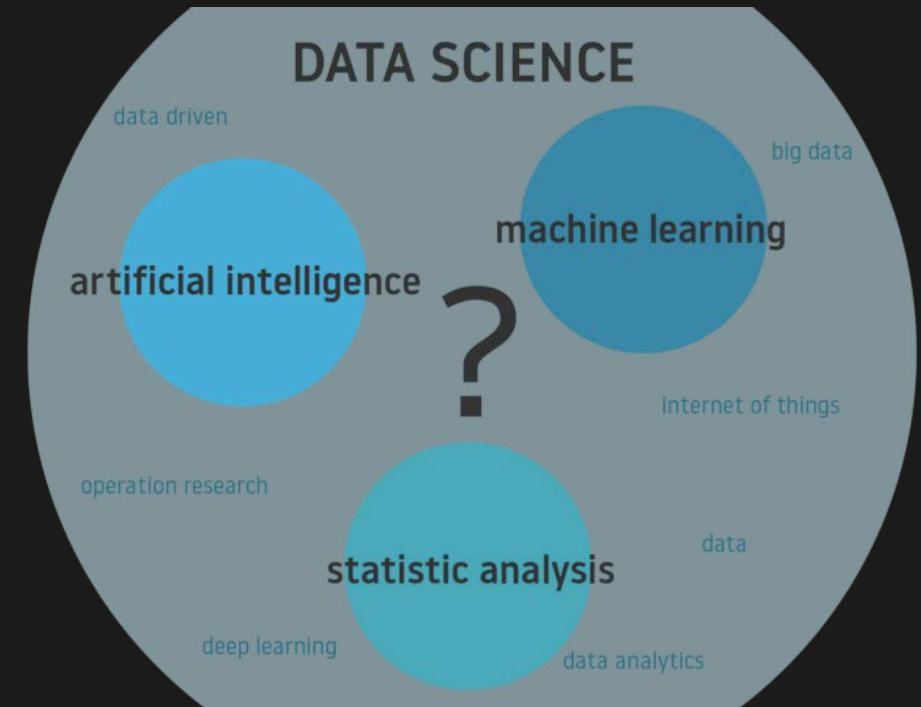


## ARTIFICIAL INTELLIGENCE DECODED

AI is based on various disciplines

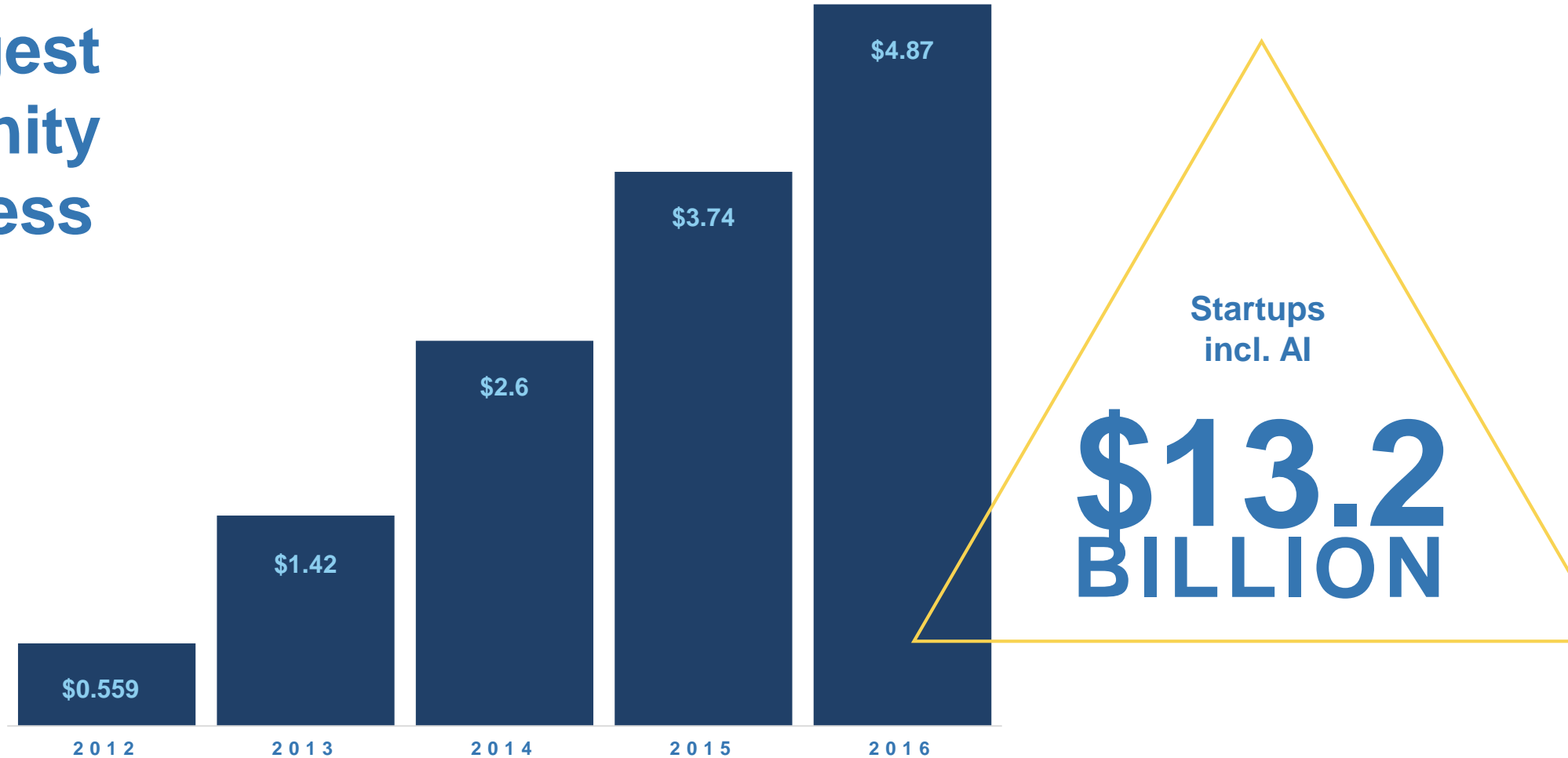


AI is all about **making machines intelligent** using advanced computer intelligence.



# AI IS NOT A SINGLE DISCIPLINE

# The Biggest Opportunity in Business



Adapted from "The Great AI War of 2018" by Harry McCracken; Fast Company Dec. 2017



AI/MACHINE LEARNING

# Industry Examples



**FOGHORN**



**Preferred  
Networks**



**SIGHT  
MACHINE**  
Manufacturing Analytics

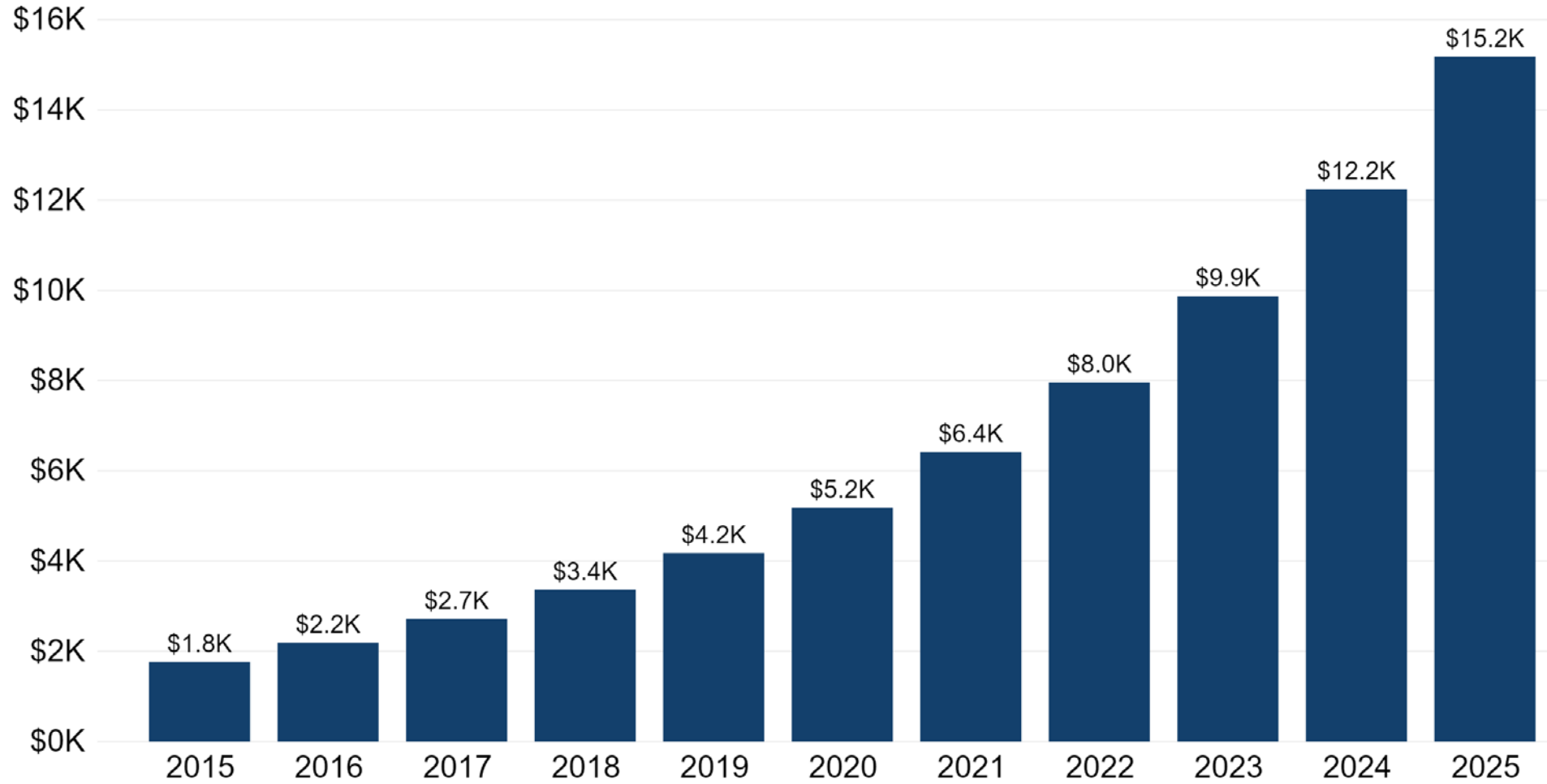
The background is a dark blue gradient with several thick, black, angular geometric shapes scattered across it. A small yellow horizontal line is positioned above the word 'Generative'.

# Generative Design

GENERATIVE DESIGN

# North American Generative Design Market Revenue

(IN MILLIONS USD)



Sources: ABI Research & AMT

GENERATIVE DESIGN

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# Industry Examples

The nTopology logo is displayed inside a white circular frame. It features the word "nTopology" in a white sans-serif font, with a light blue horizontal line underlining the "n".

nTopology



FRUSTUM

The Autodesk logo is shown inside a white circular frame. It consists of a white stylized 'A' icon followed by the word "AUTODESK" in a white sans-serif font.

AUTODESK





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# New Business Platforms

NEW BUSINESS PLATFORMS

# Industry Vertical Examples: Automotive Startups





NEW BUSINESS PLATFORMS

## Industry Horizontal Examples: Manufacturing-as-a-Service

proto labs®

PLETHORA

Xometry



The background is a dark blue field filled with a grid of glowing blue squares. Some squares are solid blue, while others are just outlines. A network of thin, light blue lines crisscrosses the grid, creating a sense of digital connectivity and data flow. The overall aesthetic is high-tech and modern.

**Digital  
Strategy**





**Improving  
Decision Making**



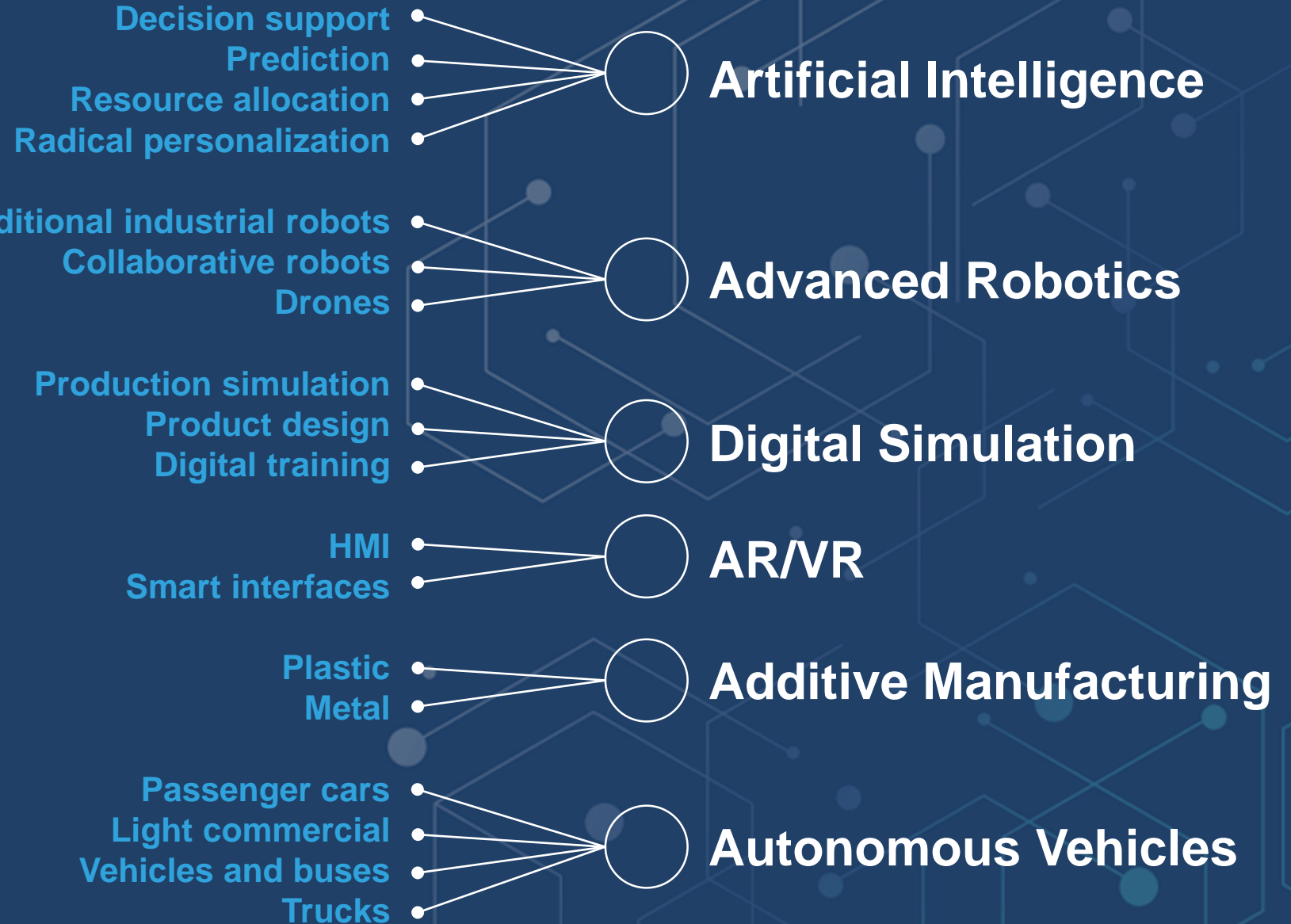
**Improving  
Operations**



**Monetization  
of Design**

DIGITAL STRATEGY

# New Digital Technologies Affecting Strategic Playground



DIGITAL STRATEGY

# Global Standards Harmonization

*Flexible, secure interoperability in the manufacturing technology industry*



SERCOS

DNP  
QIF  
3MF

OPC

Interoperability

Harmonization

UMATI EtherCAT STEP

MT Connect

UA

DeviceNet  
EdgeCross

HART

PackML

PROFINET

BacNet

Modbus

MQTT

Inteoperability

Interfaces

MT Connect®





International  
Tech Centers



 **AMT**



SF/Bay Area  
Tech Lab







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**Thank  
You.**

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VP & CTO

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