RISC-V: The New Kid on the Block

Semico Research Corp.
October 2019
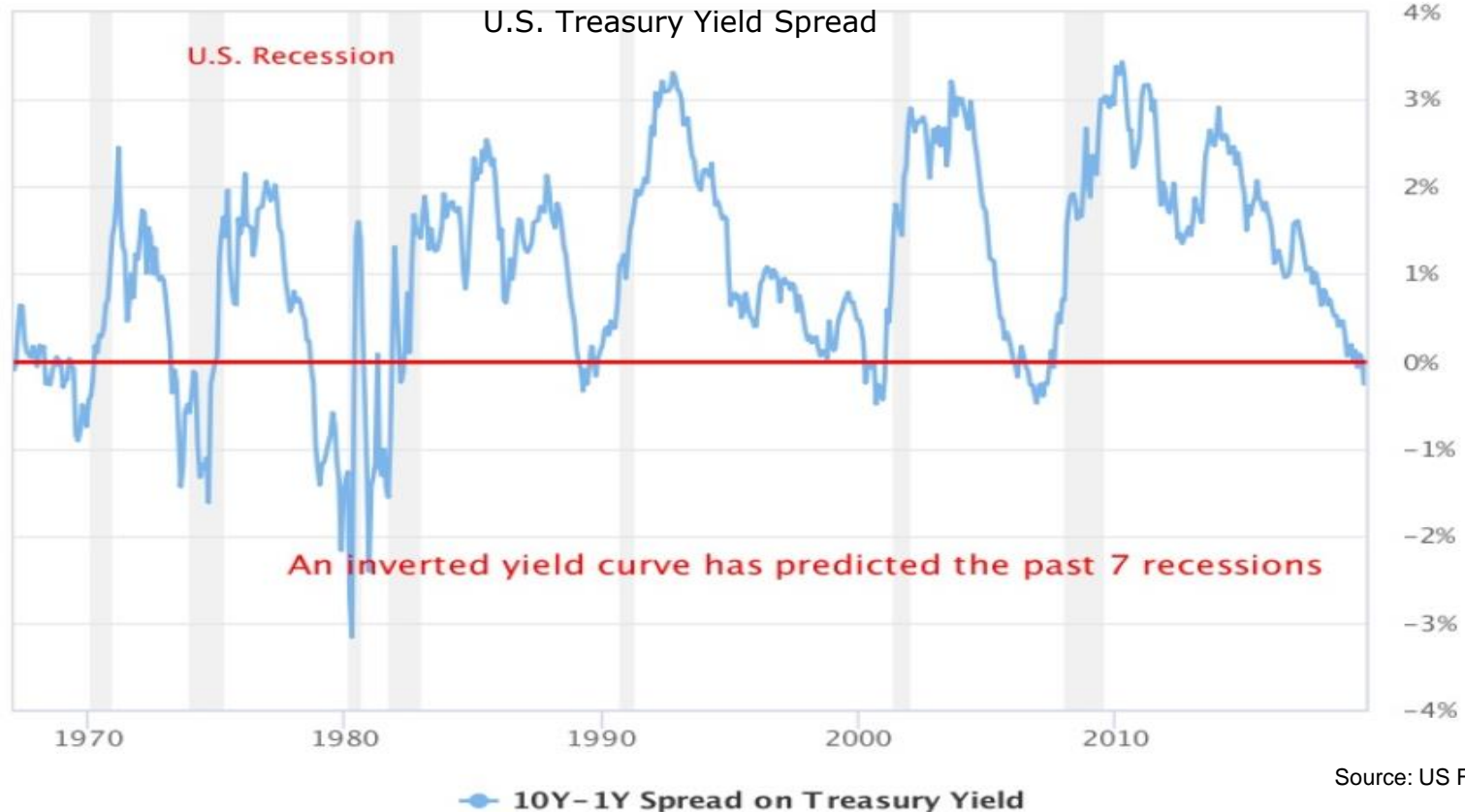
World GDP: A Mixed Bag

GDP Growth

	2014	2015	2016	2017	2018	2019f	2020f
China	7.3%	6.9%	6.7%	6.9%	6.6%	6.1%	5.7%
India	7.0%	7.5%	7.9%	6.6%	7.7%	5.9%	6.3%
Korea	3.3%	2.8%	2.9%	3.1%	3.0%	2.1%	2.3%
Brazil	0.5%	-3.6%	-3.5%	1.0%	1.9%	0.8%	1.7%
U.S.	2.5%	2.9%	1.6%	2.3%	3.3%	2.4%	1.9%
Germany	1.9%	1.7%	1.9%	0.8%	1.9%	0.7%	1.1%
Japan	0.4%	1.4%	0.9%	1.7%	1.3%	1.0%	0.7%

Source: Semico Research Corp. and Government Statistics

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U.S. Yield Curve Trending Down

U.S. Treasury Yield Spread

U.S. Recession

An inverted yield curve has predicted the past 7 recessions

Source: US Federal Reserve

10Y−1Y Spread on Treasury Yield

End Market Drivers

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IoT Driving Internet Bandwidth and Servers

Cloud Servers Data Centers

5G

LTE, ZigBee, SigFox, DigiMesh etc.

Massive Amounts of Data at the Edge

Critical Data

Analyze & Store

Filter & React

Local Decisions

Source: Semico Research Corp.

Artificial Intelligence
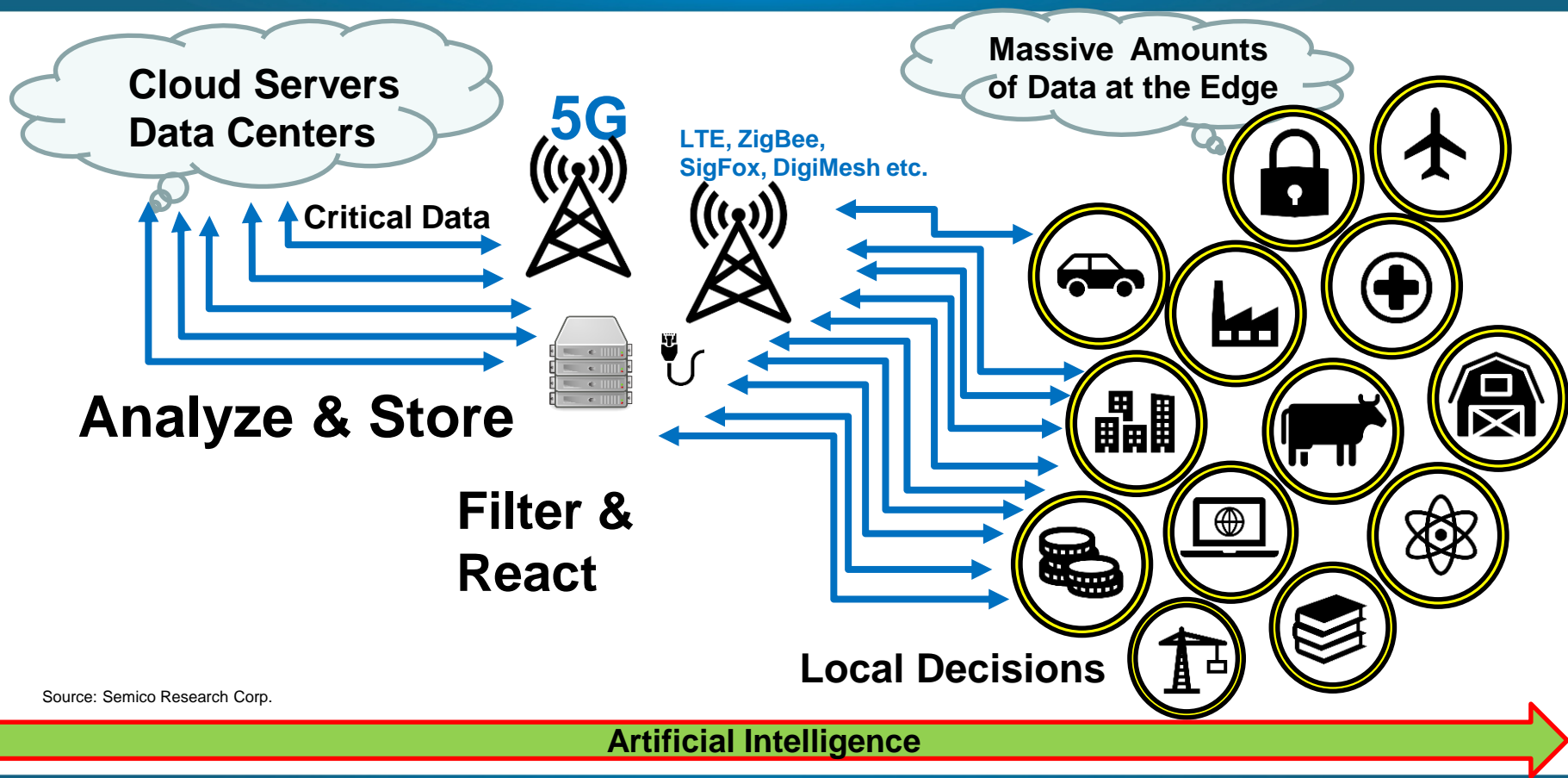
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Vision Systems Growing Rapidly

Market is driven by wide range of applications many require HPC

Automotive

Industrial/Medical
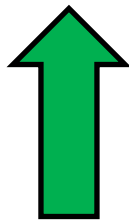
Mobile

Infrastructure/ Security

Military/Aerospace

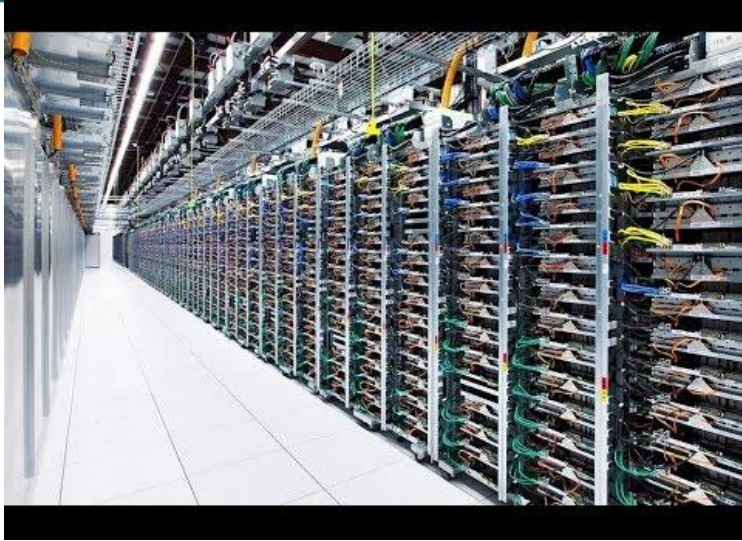# 2019:Traditional Markets Slow Growth or Declining

-7.7%
60M Units

-1.0%
2.0 B Units

1.0%
166M Units

Source: Semico Research Corp.

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2019 Growth Markets

Server
18% 30.7M

Smart Speakers
45% 83M

Automotive
1.0% 125M

Source: Semico Research Corp.

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# Electric Vehicle Sales Expanding in 2019

EV Sales 2019:

361 K vehicles

• Tesla Model 3	180
• Tesla Model X	24
• Tesla Model S	24
• Prius Prime	21
• Honda Clarity	12
• Chevy Volt	10
• Chevy Bolt	16
• Nissan Leaf	20
• BMW 530e	9
• All others	45

Other notable models: Fiat 500e, Ford Fusion Energi, and BMW i3, Audi e-tron, Volvo XC40/XC90/V60/S90

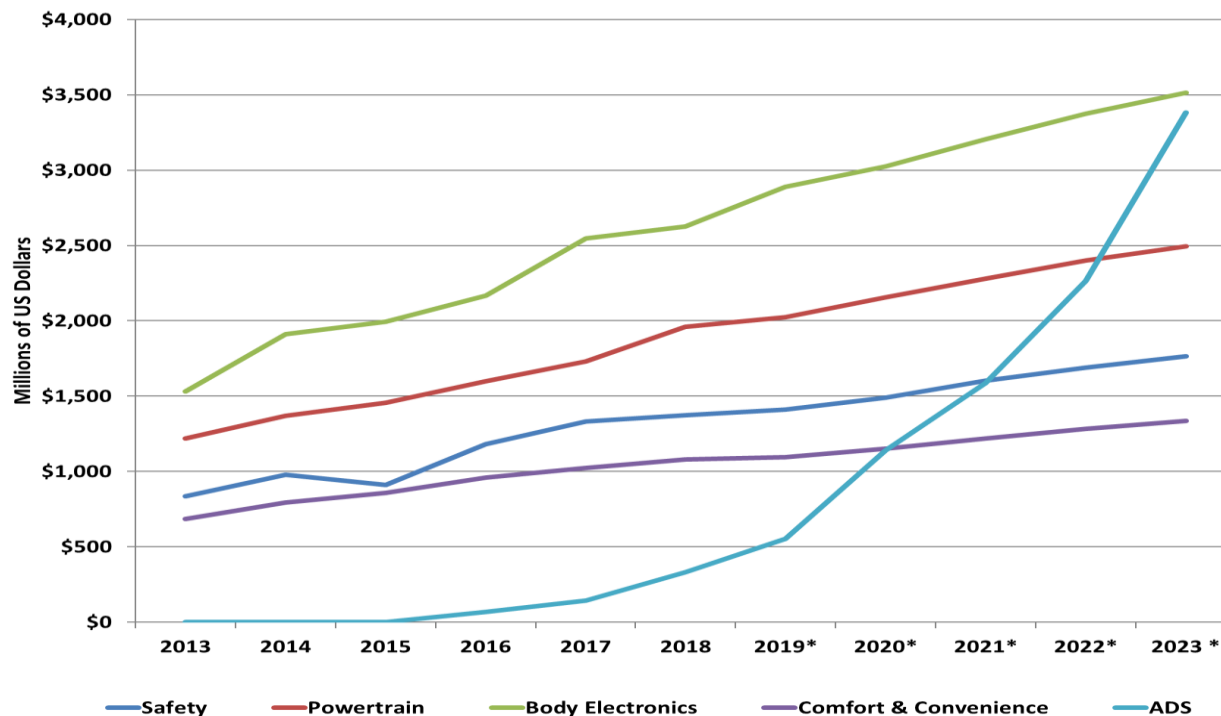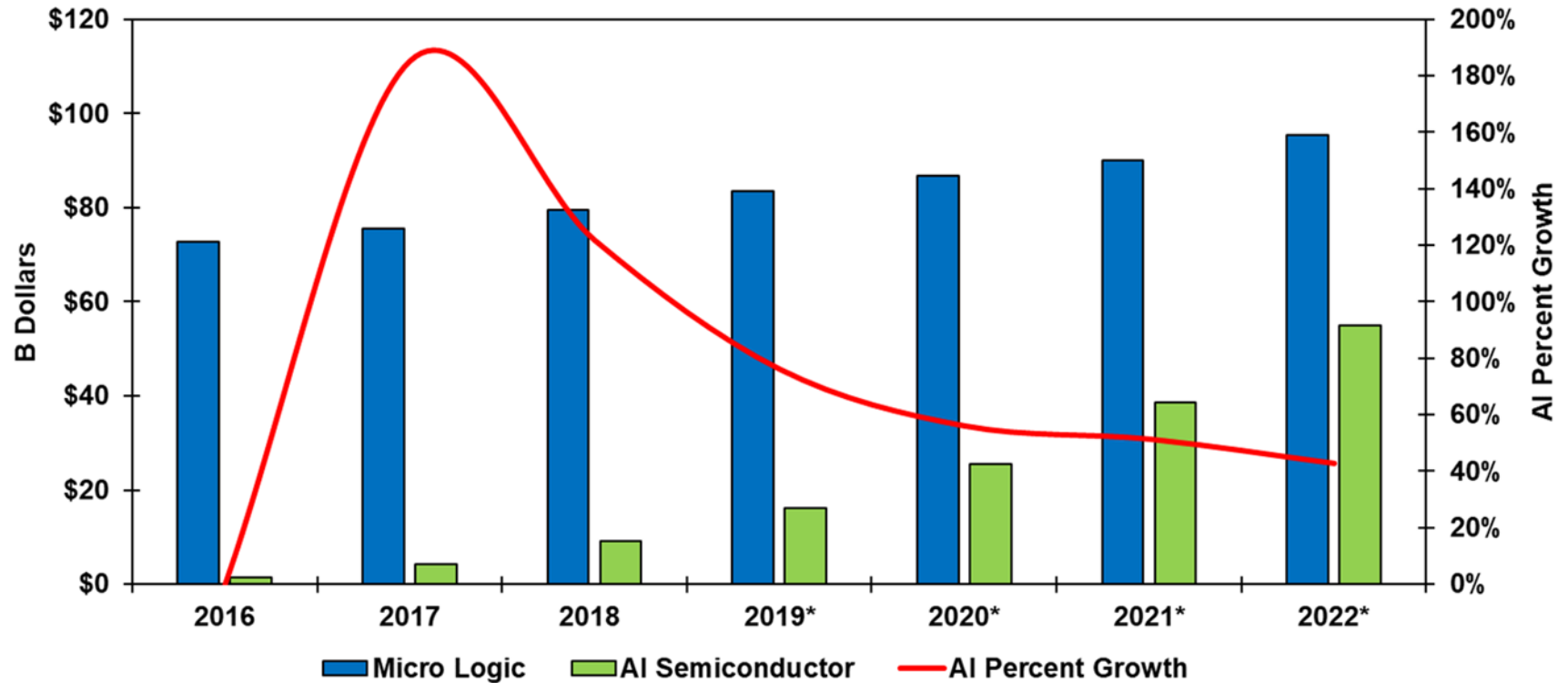Source: Semico Research Corp. and Company Sources

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AI in Automotive

Source: Cadence
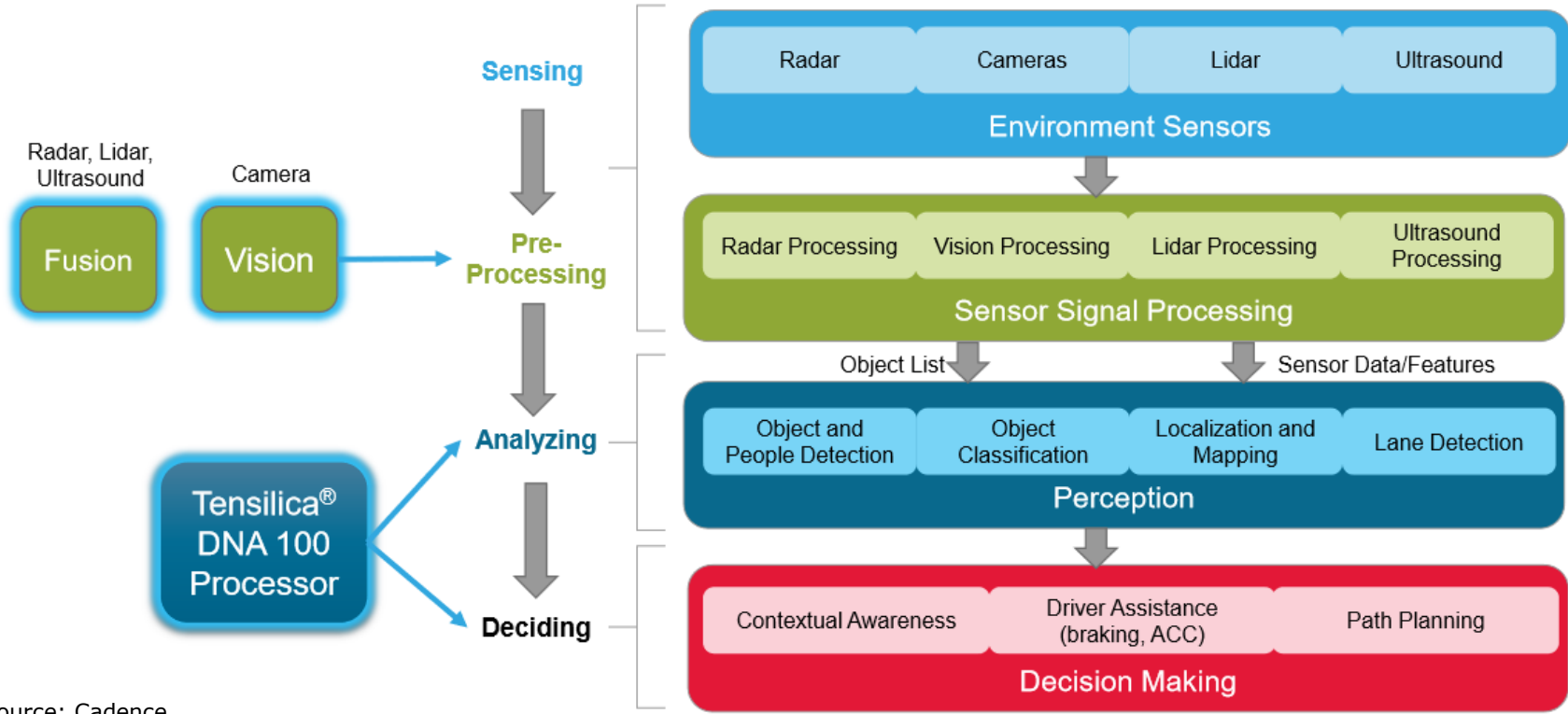
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Automotive Processor Forecast

Automotive Processors by Function
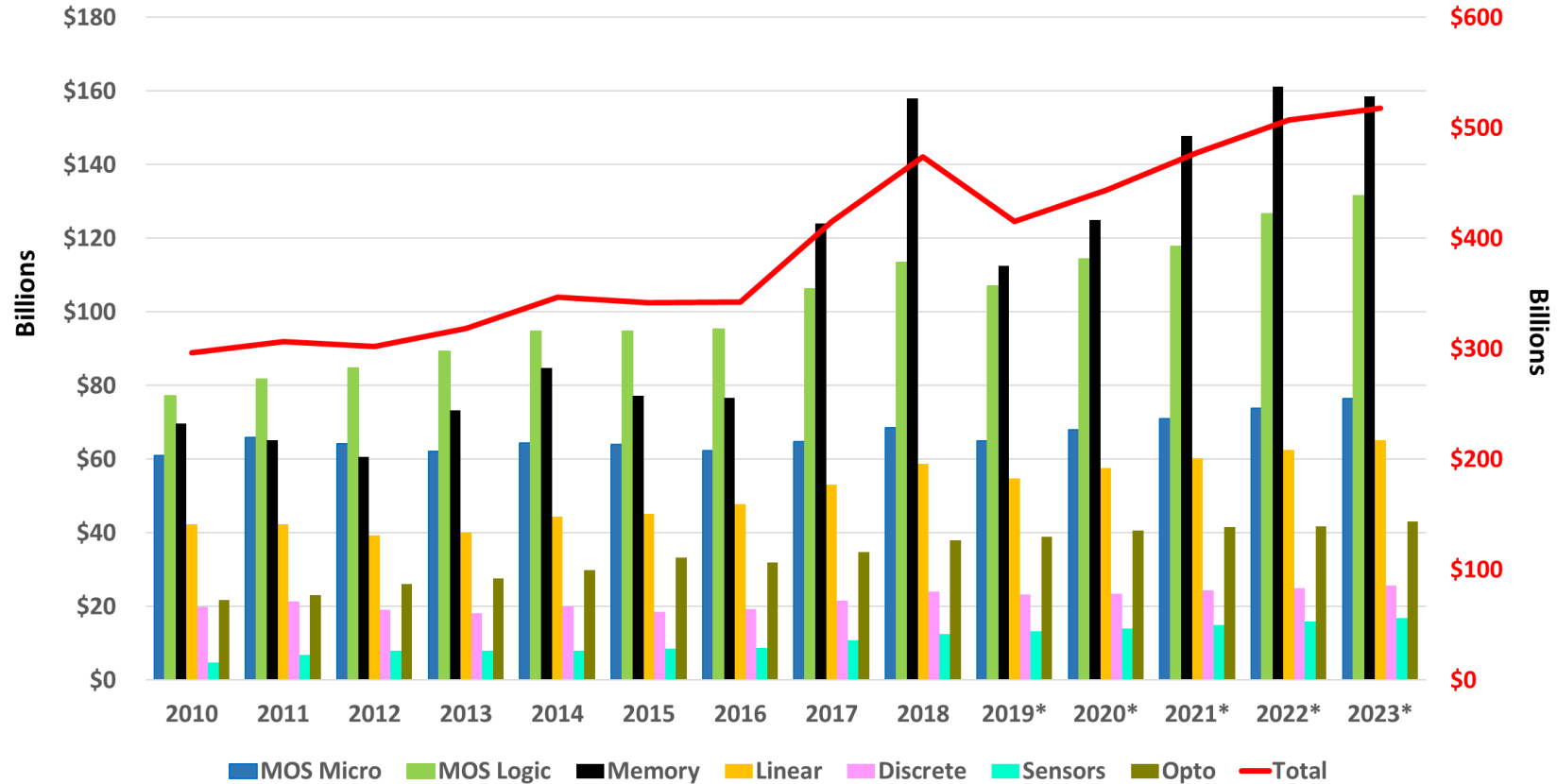
Source: Semico Research Corp.

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Semiconductor Forecast for AI

Source: Semico Research Corp.

Semiconductor Forecast

Source: Semico Research Corp.

Legend: MOS Micro, MOS Logic, Memory, Linear, Discrete, Sensors, Opto, Total

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RISC-V
What is the Potential?

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RISC-V Mythbusters

- RISC-V is only good for low end products

- RISC-V is hard to integrate into an SoC

- Takes longer to design with RISC-V

- The ecosystem is rapidly expanding

- Market demand is growing for open source IP
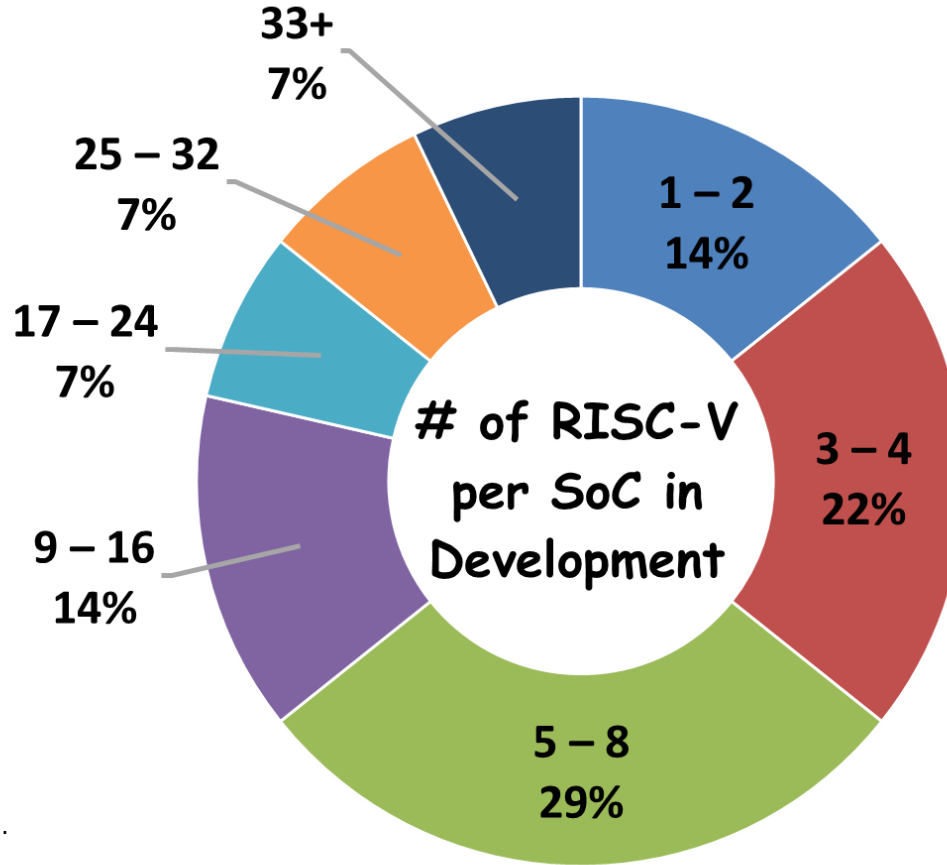
- RISC-V offers a viable alternative to ARM
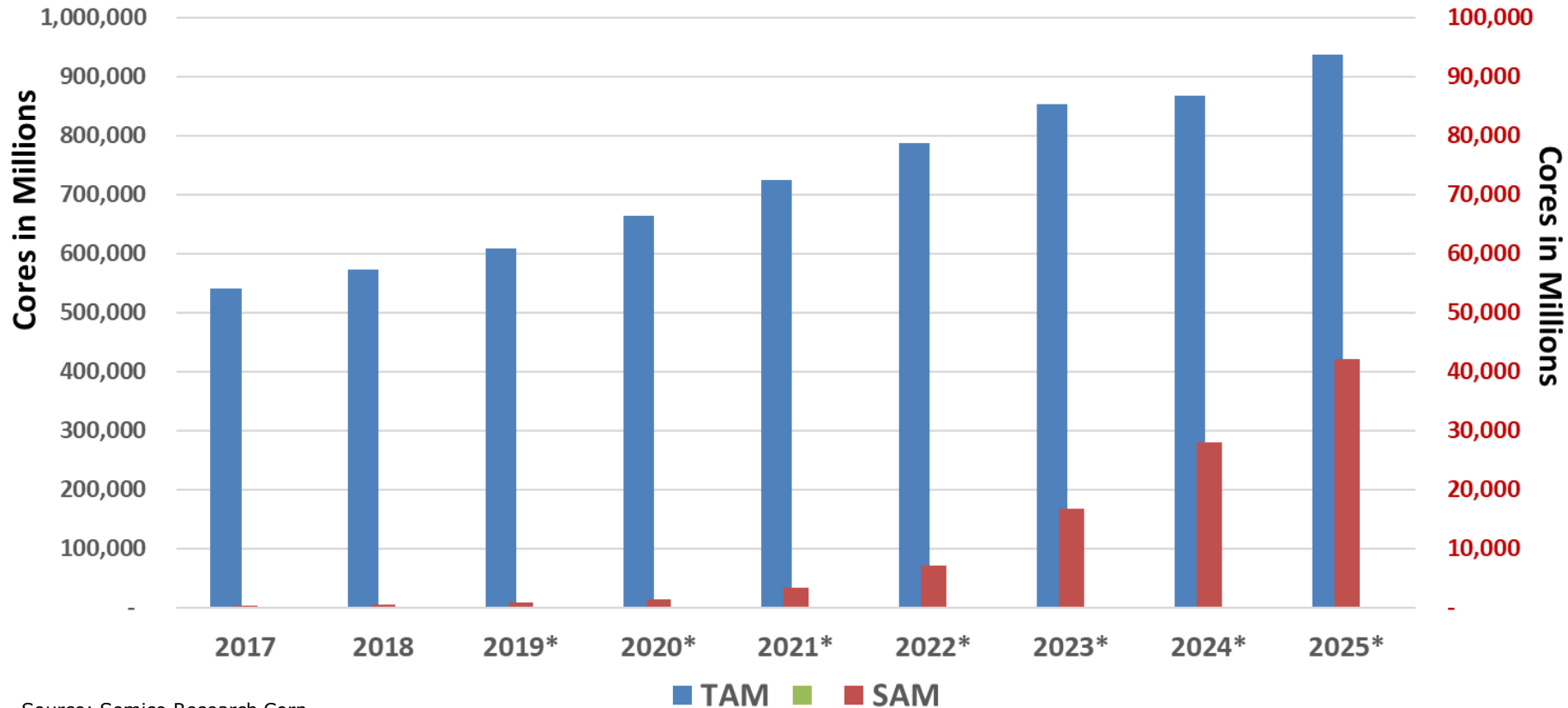
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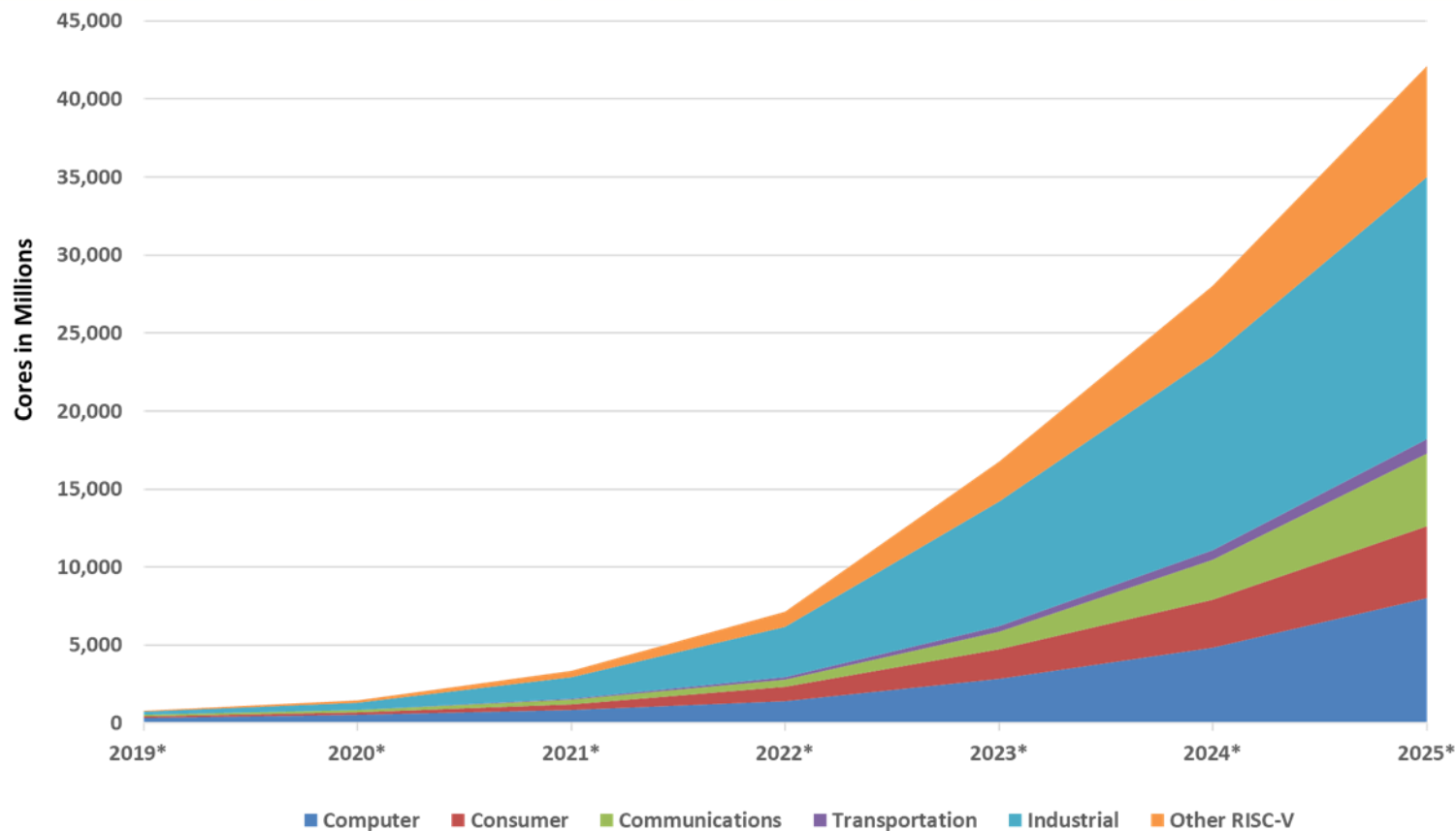
Source: Semico Research Corp.

What are the Industry Survey Results?

Source: Semico Research Corp.

TAM versus SAM for all CPU Cores

Source: Semico Research Corp.

CAGR for Major End Use Markets by Products

	Computer	Consumer	Communications	Transportation	Industrial	Other RISC-V	Total
Adv. Perf Multicore SoC	95%	109%	437%	153%	139%	159%	134%
Value Multicore SoC	96%	143%	432%	159%	172%	186%	163%
Basic SoC	102%	191%	419%	166%	160%	201%	177%
FPGA	99%	107%	357%	163%	143%	164%	138%
Total	97%	134%	401%	160%	149%	172%	146%

Source: Semico Research Corp.

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Computing
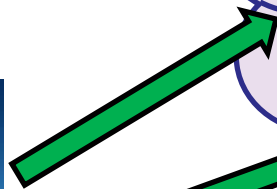
Artificial Intelligence

Thank You

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- **Artificial Intelligence: Powering the Next Generation of Growth**

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