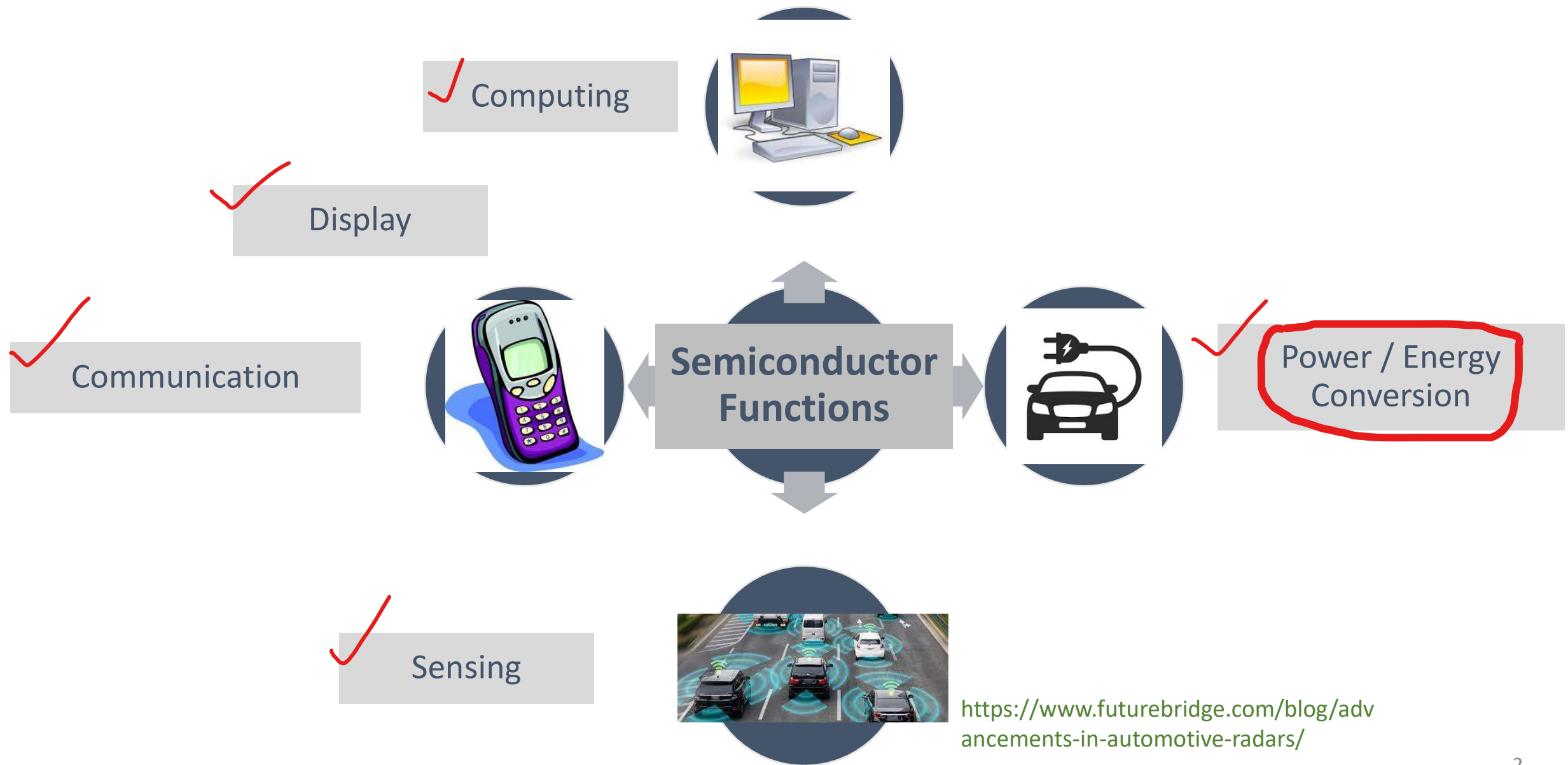


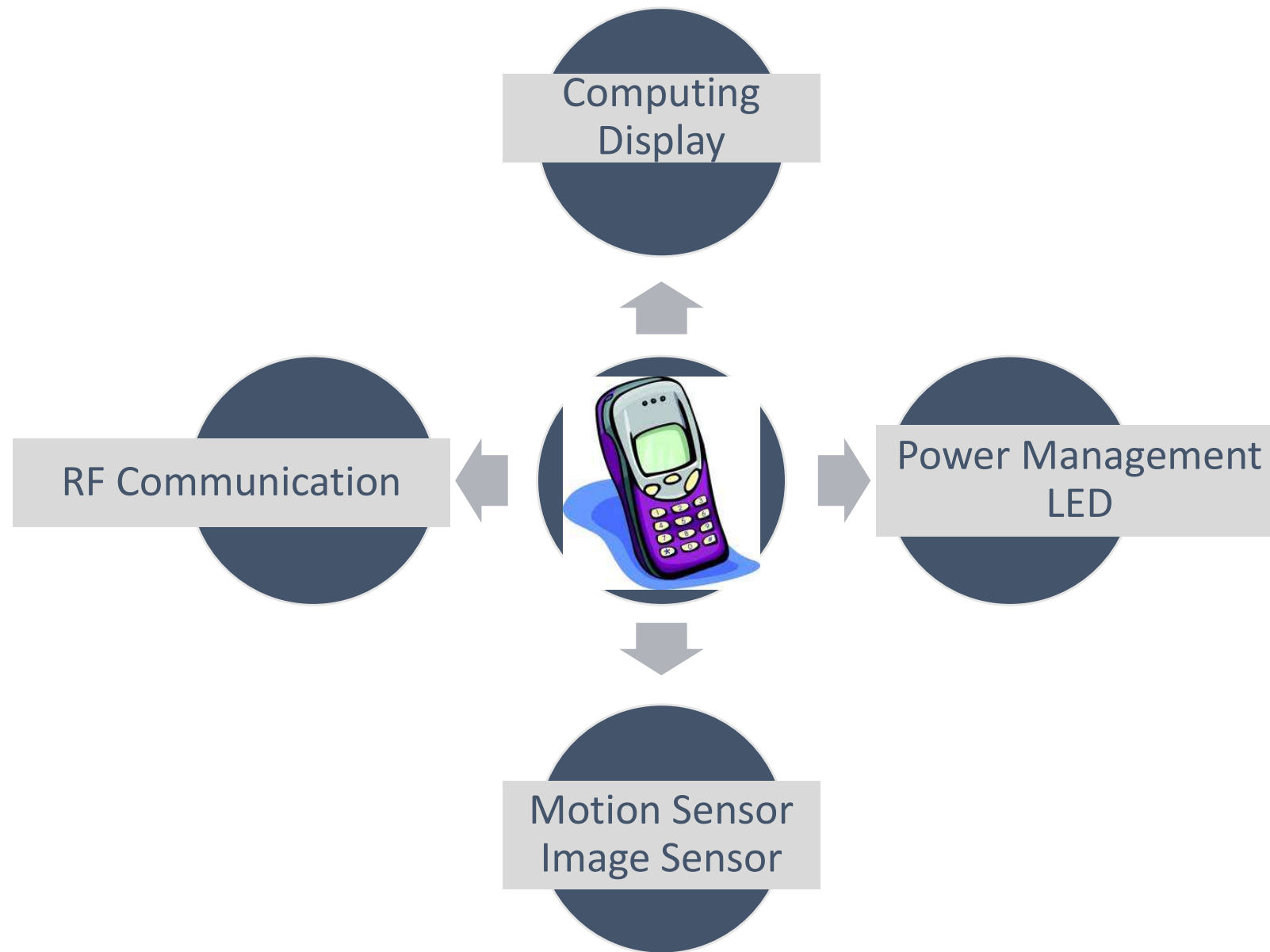
# Semiconductor Industry Overview

# Semiconductors, semiconductors everywhere



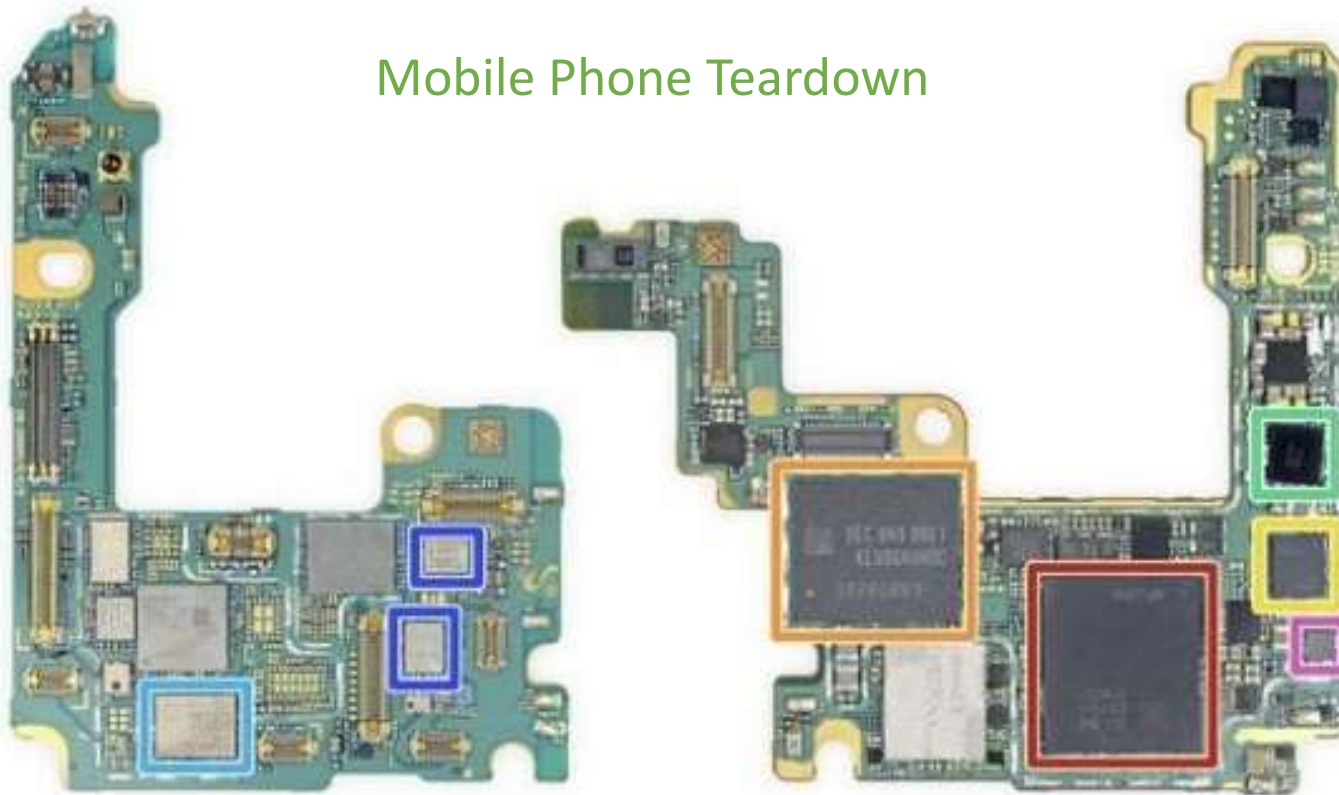
<https://www.futurebridge.com/blog/advancements-in-automotive-radars/>

# Semiconductors – **vital organs** for electronics



# Semiconductors – ‘vital organs’ of electronics

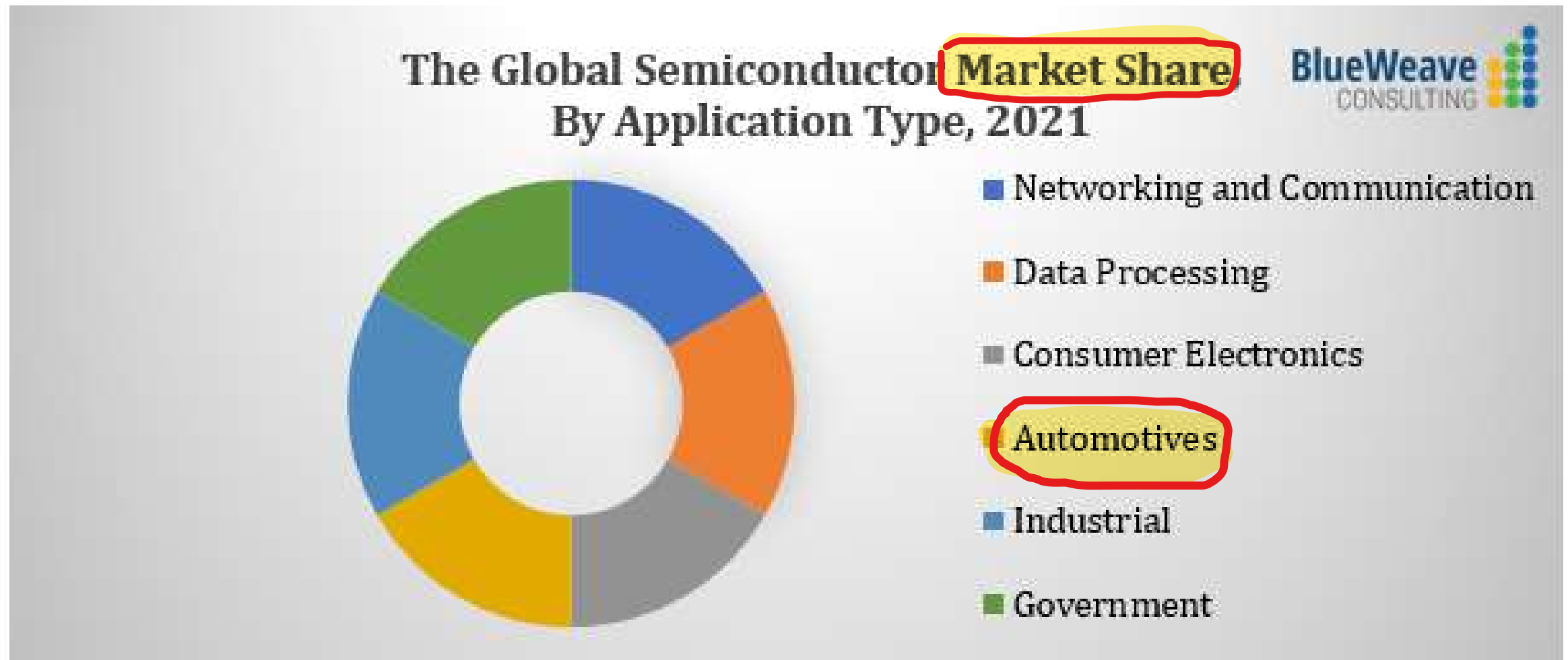
## Mobile Phone Teardown



- Qualcomm Snapdragon 888 layered beneath Samsung K3LK4K40CM-BGCP 12 GB LPDDR5 RAM Logic, Memory
- Samsung flash storage KLUDG4UHDC-B0E1 128 GB NVM Storage  
Non-Volatile Memory = Permanent Memory
- Qualcomm SMR526 5G modulator Radio RF Frequency
- Maxim MAX77705C power management IC Power
- Qualcomm QPM5825 power management IC Power
- Qualcomm QDM5872 and QDM4820 Front-End Module RF  
Front-End Modules (FEMs) manage RF signal processing for cellular communication
- Cirrus Logic CS35L40 audio amplifier IC AMS  
A Class-D audio amplifier designed to drive speakers or headphones AMS (Analog and Mixed-Signal)

<https://www.ifixit.com/News/52372/the-chips-you-find-in-ifixit-teardowns-part-1-power-management>

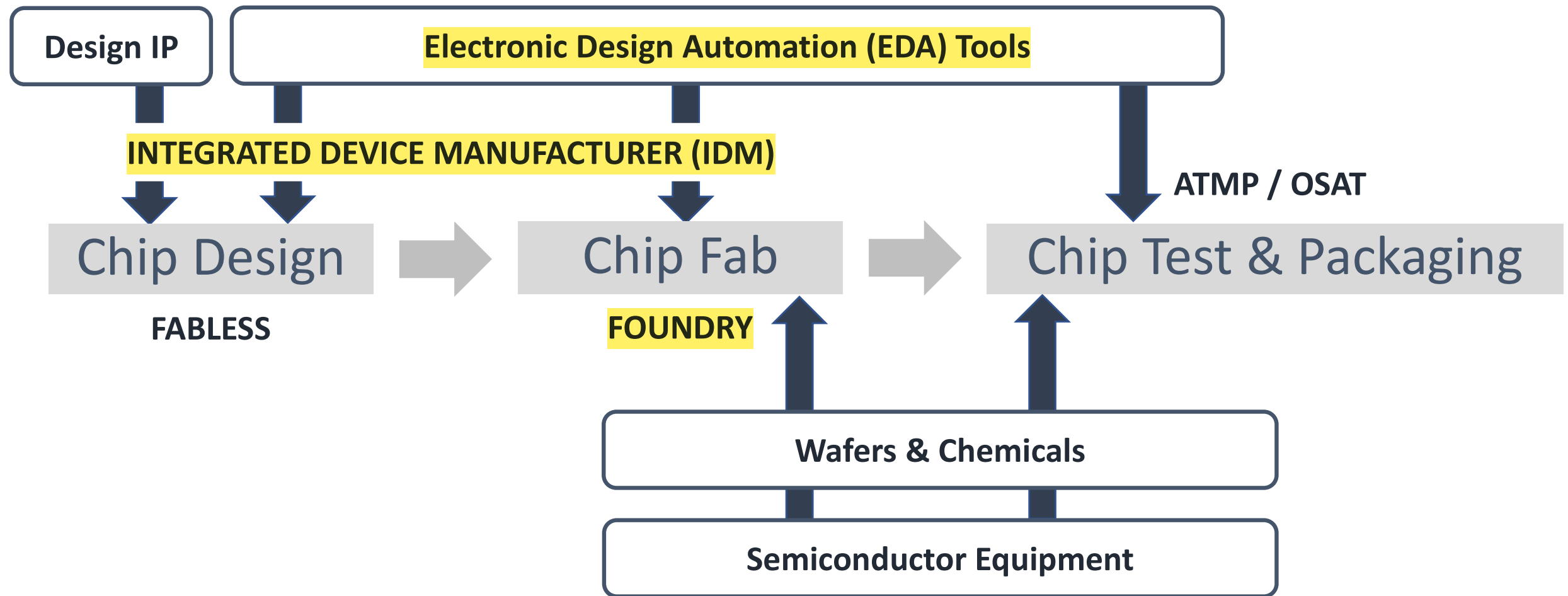
# Semiconductor Applications by Sector



Source: BlueWeave Consulting



# Semiconductor Industry Who's Who



# Largest Semiconductor Consumers

**Table 1. Top 10 Companies by Semiconductor Design TAM, Worldwide, 2021 (Millions of U.S. Dollars)**

2021 Rank	2020 Rank	Vendor	2021 Spending	2021 Market Share (%)	2020 Spending	2020-2021 Growth (%)
1	1	Apple	68,269	11.7	54,180	26.0
2	2	Samsung Electronics	45,775	7.8	35,622	28.5
3	4	Lenovo	25,283	4.3	19,023	32.9
4	6	BBK Electronics	23,350	4.0	14,258	63.8
5	5	Dell Technologies	21,092	3.6	16,814	25.4
6	8	Xiaomi	17,251	3.0	10,254	68.2
7	3	Huawei	15,382	2.6	22,710	-32.3
8	7	HP Inc.	13,789	2.4	10,745	28.3
9	9	Hon Hai Precision	8,855	1.5	7,387	19.9
10	10	Hewlett-Packard Enterprise	8,736	1.2	5,395	24.8
		Others (outside top 10)	337,695	57.9	269,849	25.1
		<b>Total semiconductor</b>	<b>583,477</b>	<b>100.0</b>	<b>466,237</b>	<b>25.1</b>

TAM = total available market

Source: Gartner (February 2022)

Swaroop Ganguly, IIT Bombay



# Largest Semiconductor Companies



## TOP 10 MOST VALUABLE SEMICONDUCTORS BRANDS 2023

1 ✓  US\$22.9 bn	2  US\$21.6 bn	3 ✓  US\$16.9 bn	4  US\$9.1 bn	5 ✓  US\$8.6 bn
6  US\$8.2 bn	7 ✓  US\$6.9 bn	8  US\$5.4 bn	9  US\$5.3 bn	10 ✓  US\$4.6 bn

Revenue

Brand Finance®

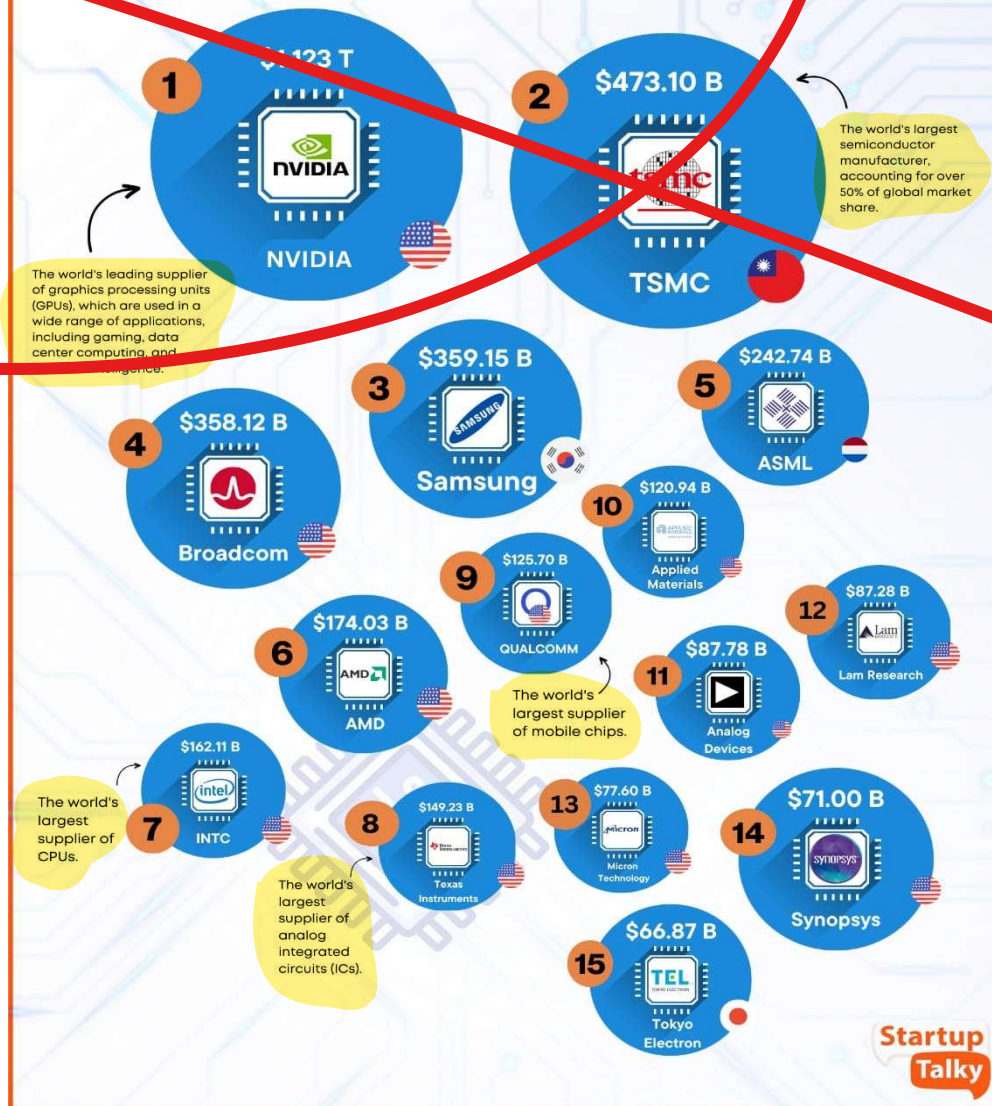
Source: Brand Finance Semiconductors 20 2023

[brandirectory.com/semiconductors](https://brandirectory.com/semiconductors)



# Largest Semiconductor Companies

## Top 15 Biggest Semiconductor Companies in the World



Market Cap

# Largest Semiconductor Fabless Companies

**Table 1: Global Top Ten IC Design Company Revenue Ranking, 1Q22** (Unit: US\$1 Million)

1Q22 Rank	1Q21 Rank	Company	1Q22 Revenue	1Q21 Revenue	YoY
1	1	Qualcomm	9,548	6,281	52%
2	2	NVIDIA	7,904	5,173	53%
3	3	Broadcom	6,110	4,849	26%
4	5	AMD	5,887	3,445	71%
5	4	MediaTek	5,007	3,805	32%
6	9	Marvell	1,412	821	72%
7	6	Novatek	1,281	929	38%
8	8	Realtek	1,044	822	27%
9	-	Will Semiconductor	744	815	-9%
10	-	Cirrus Logic	490	294	67%
	7	Xilinx	-	851	-
-	10	Dialog	-	366	-
Total Revenue			39,427	27,342	44%

## Notes

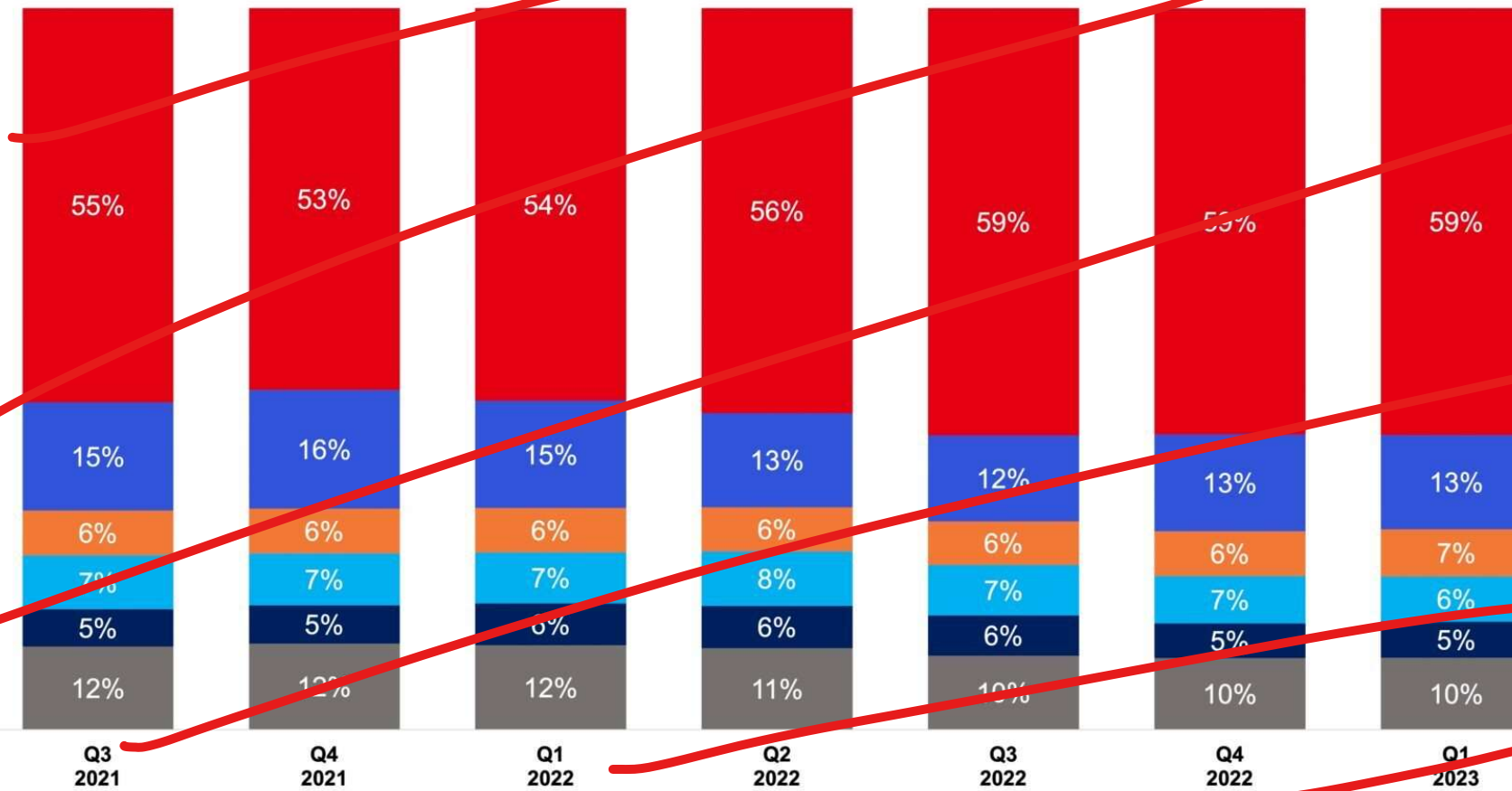
1. This top ten ranking only accounts for companies ahead of public financial reporting.
2. Qualcomm revenue only includes QCT; NVIDIA excludes OEM/IP revenue; Broadcom revenue only includes semiconductors; Will Semiconductor revenue only includes semiconductor design and sales.
3. NT\$:US\$ exchange rate: 1Q22 - 28.50:1; 1Q21 - 28.39:1
4. RMB:US\$ exchange rate: 1Q22 - 6.336:1; 1Q21 - 6.483:1

Source: TrendForce, Jun. 2022

<https://www.electronicshweekly.com/news/business/798573-2022-06>

# Largest Semiconductor Foundries

Global Semiconductor Foundry Market Share (Q3 2021 - Q1 2023)



■ TSMC ■ Samsung Foundry \* ■ GlobalFoundries ■ UMC ■ SMIC ■ Others

(\*) Samsung includes foundry service for its internal logic IC business

<https://www.counterpointresearch.com/global-semiconductor-foundry-market-share/>

Do you 'see' Taiwan?!

Flag

Estimated Market Size ~ \$ 143B

<https://www.mordorintelligence.com/industry-reports/semiconductor-foundry-market>



# Largest Semiconductor Packaging Companies

OSAT (Outsourced Semiconductor Assembly and Test) refers to companies that provide specialized services in the semiconductor supply chain, focusing on the back-end processes of semiconductor manufacturing. These companies handle the assembly, packaging, and testing of semiconductor chips designed and fabricated by other firms, such as integrated device manufacturers (IDMs) or fabless semiconductor companies.

## OSAT: Outsourced Semiconductor Assembly & Test

Semiconductor packaging companies are firms specializing in enclosing semiconductor devices (like microchips) in protective casings that facilitate connectivity and operation. This process involves protecting the silicon chip, ensuring electrical connections, and enabling integration into electronic systems. Packaging is critical for device performance, durability, and functionality.



Swaroop Ganguly, IIT Bombay

## ATMP: Assembly Test Marking & Packaging

ATMPs (Assembly, Testing, Marking, and Packaging) are a set of processes in semiconductor manufacturing that occur during the back-end stage of the production lifecycle. These processes are crucial for transforming semiconductor wafers into finished, functional chips that are ready for integration into electronic devices.

# India's start in the semiconductor business?!

June 22, 2023 at 7:00 AM EDT

## Micron Announces New Semiconductor Assembly and Test Facility in India

New DRAM and NAND assembly and test facility – the first in India – will expand Micron's global manufacturing base to meet future demand

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Business News Tech Tech & Internet Tata Electronics set for semiconductor packaging foray

## Tata Electronics set for semiconductor packaging foray

By Dia Rekhi, ETtech Last Updated: May 03, 2022, 06:00 AM IST

THE NEW INDIAN EXPRESS  
NATION WORLD STATES CITIES OPINION BUSINESS SPORT GOOD NEWS MOVIES PHOTOS VIDEOS

Home Cities Hyderabad

## Kaynes Tech to set up Rs 2.8K crore semiconductor plant in Hyderabad

Kaynes board chairperson Savitha Ramesh stated that the proposed facility will be a world-class plant with state-of-the-art technology and machinery.

Published: 07th October 2023 09:29 AM | Last Updated: 07th October 2023 09:29 AM

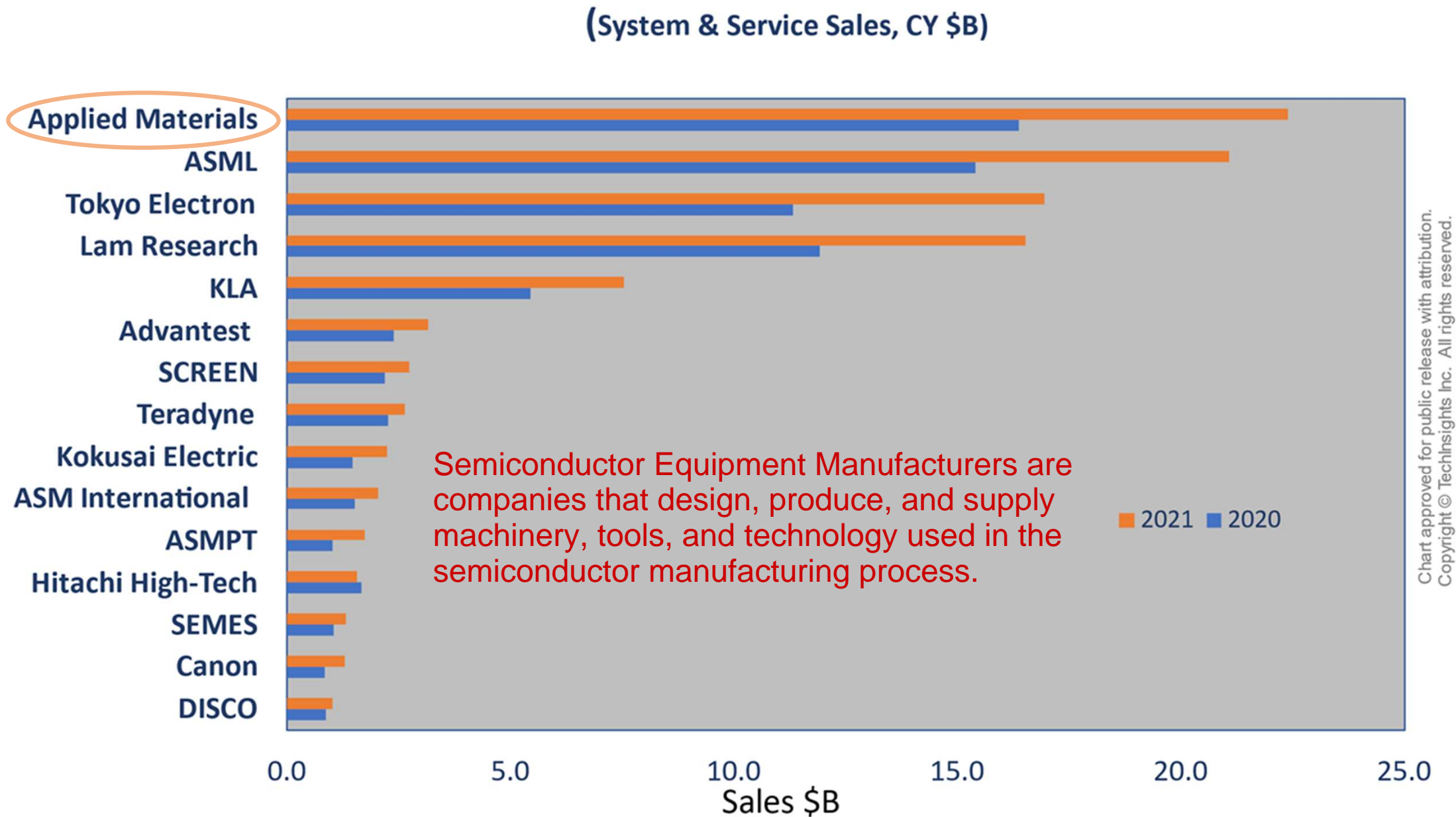
A+ A

## Kaynes' semiconductor facility in Telangana sparks controversy in Karnataka

Large and medium industries minister MB Patil shot down opposition BJP's allegation that Karnataka is losing investments to other states

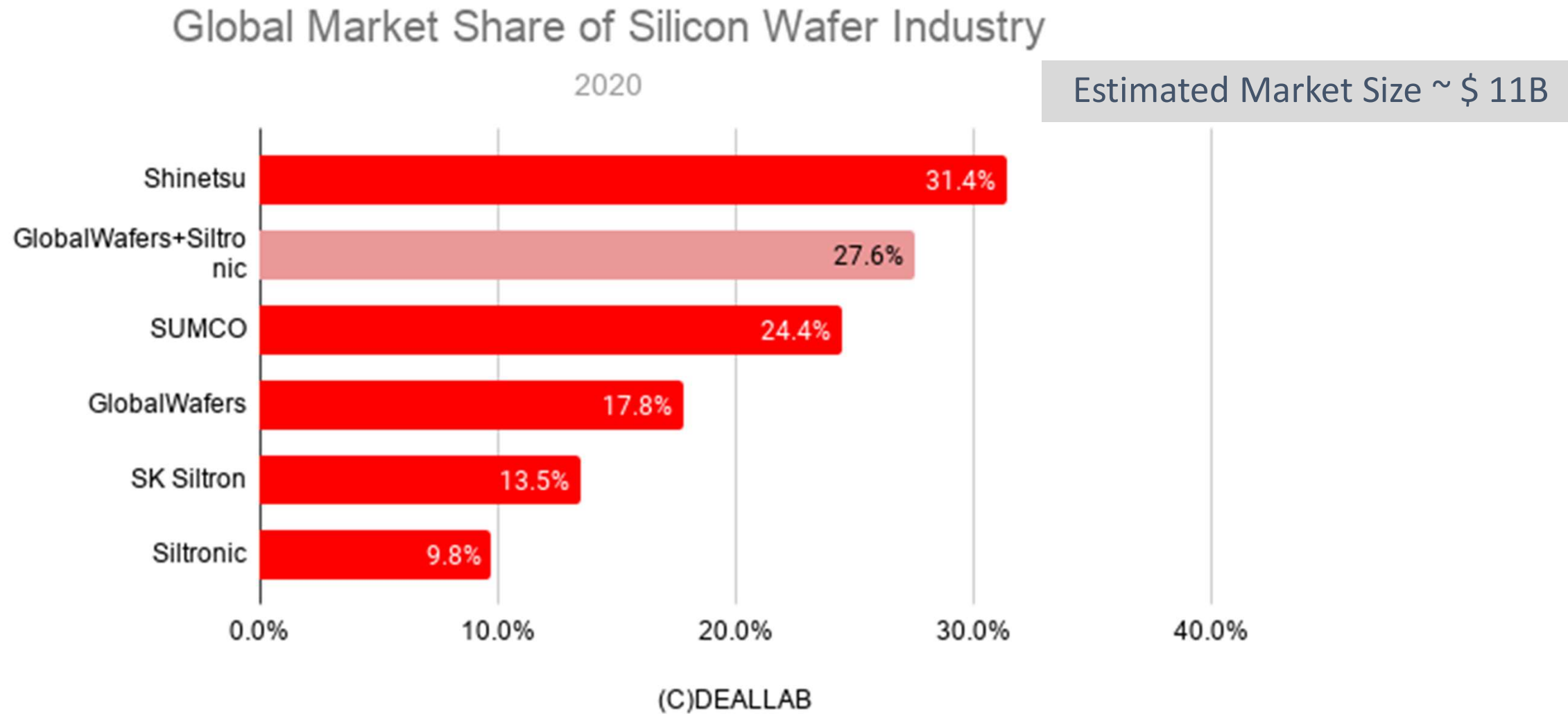
MONEYCONTROL NEWS  
OCTOBER 27, 2023 / 08:50 PM IST

# Largest Semiconductor Equipment Manufacturers





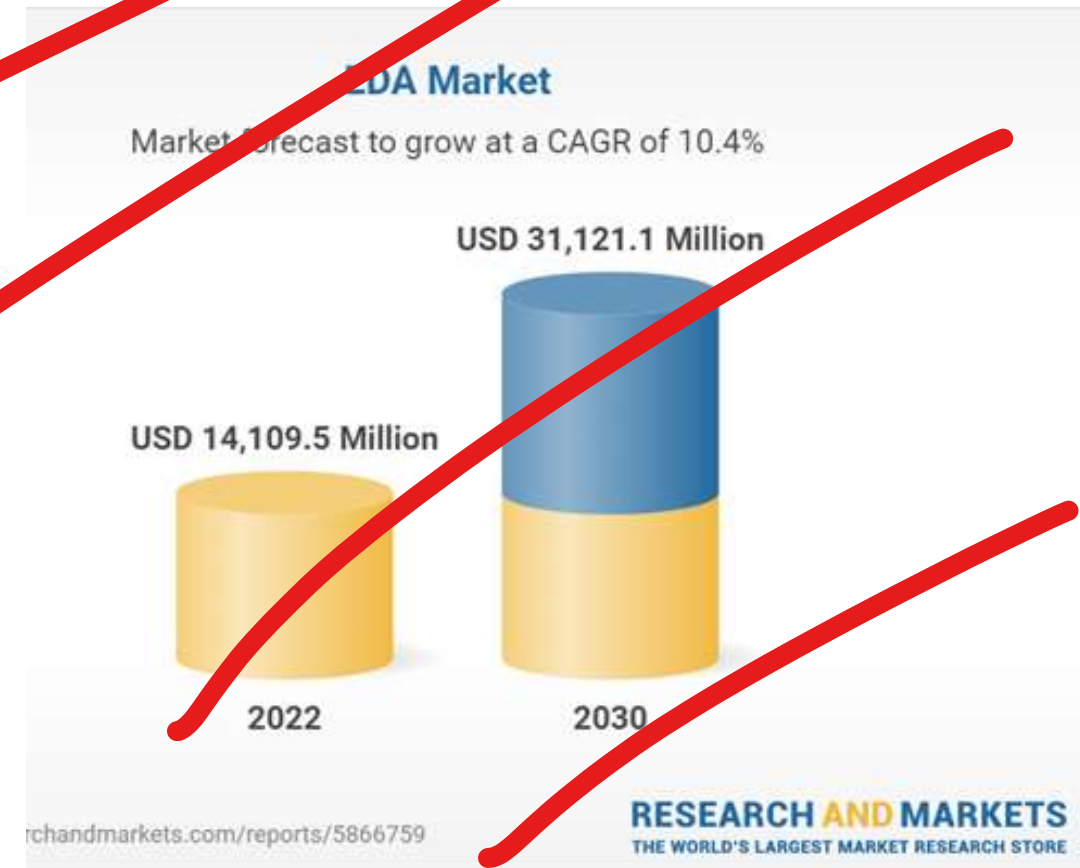
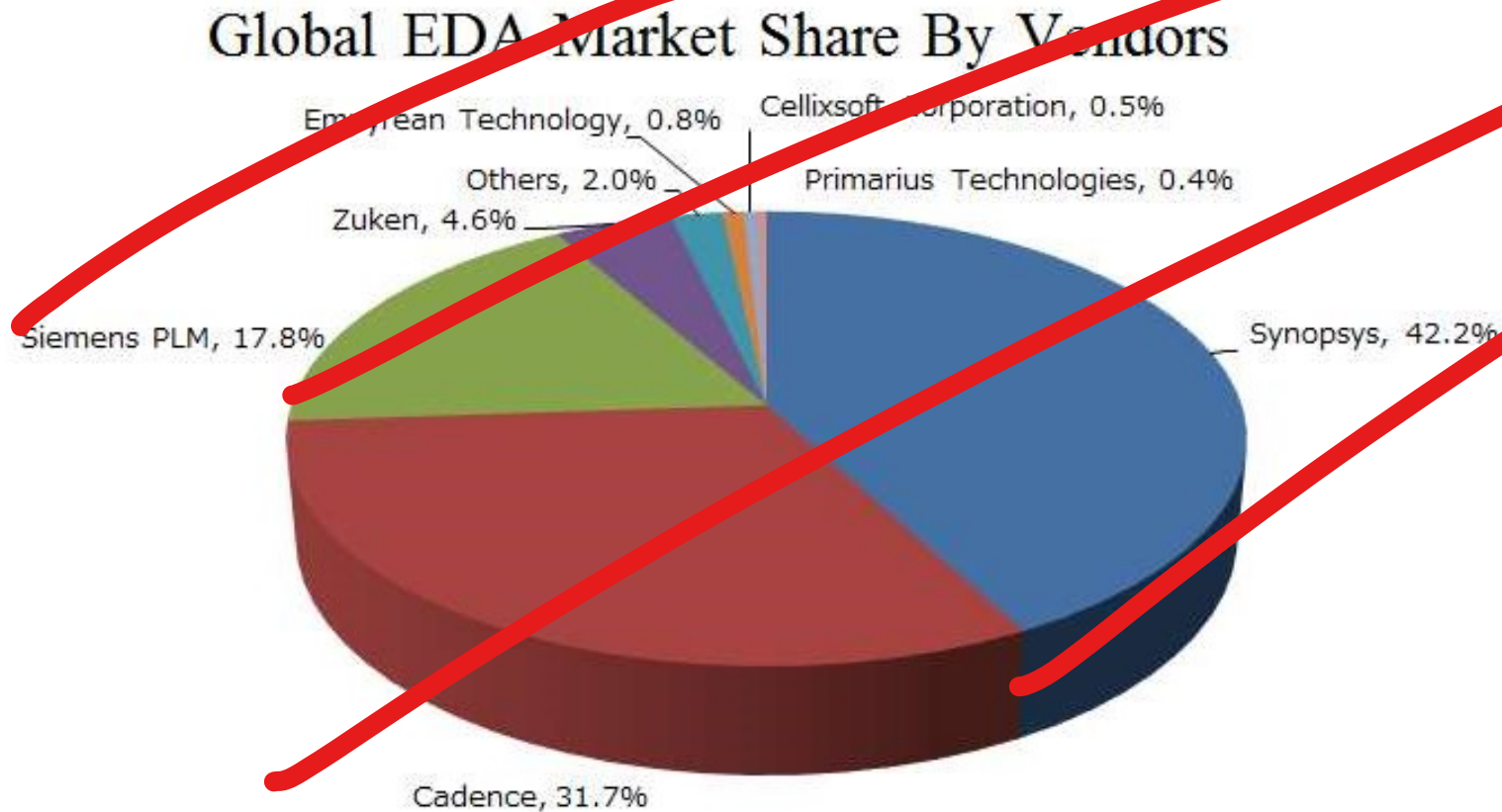
# Largest Semiconductor Wafer Suppliers





# Largest Semiconductor EDA Companies

Semiconductor EDA (Electronic Design Automation) companies provide software tools and solutions that enable the design, analysis, and verification of semiconductor devices and systems



# Indian Semiconductor Market Dashboard

## India Semiconductor Market Dashboard, 2021-2026

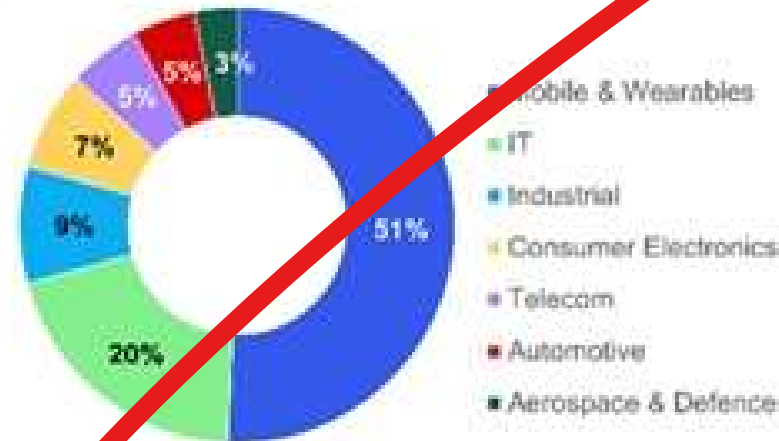
India Semiconductor Market Consumption in USD Billion and CAGR Growth between 2021-2026

**\$300 Billion**

In USD

**19%**  
CAGR

India Semiconductor Market Share by Sector in 2021



Nearly **80%** of total semiconductor components revenues come from **IT, Industrial Mobile and Wearables.**

India locally Sourced Semiconductor Market Share, 2021 vs 2026



Government's vision under 'Make in India', 'Aatmanirbhar Bharat' and 'PLI scheme' along with its constant pursuit towards reviving the infrastructure through the adoption of digital technology will boost local manufacturing of semiconductor components.

# India Semiconductor Mission



# India Semiconductor Mission

- ❑ Fiscal support for semiconductor design and manufacturing
  - Silicon fabs
  - Display fabs
  - Compound semi / sensor / discrete semi / silicon photonics fabs
  - OSAT/ATMP facilities
- ❑ Transfer of SCL under ISM and its modernization ?
- ❑ Capacity building for semiconductor industry – 85K total target
  - 5K Ph.D.; 30K B.Tech./M.Tech.; 50K Diploma/Technicians
  - 50% projected to be retained in India

# IITB Policy Input into India Semiconductor Mission



## Detailed Project Report (DPR) of the Semiconductor R&D Center

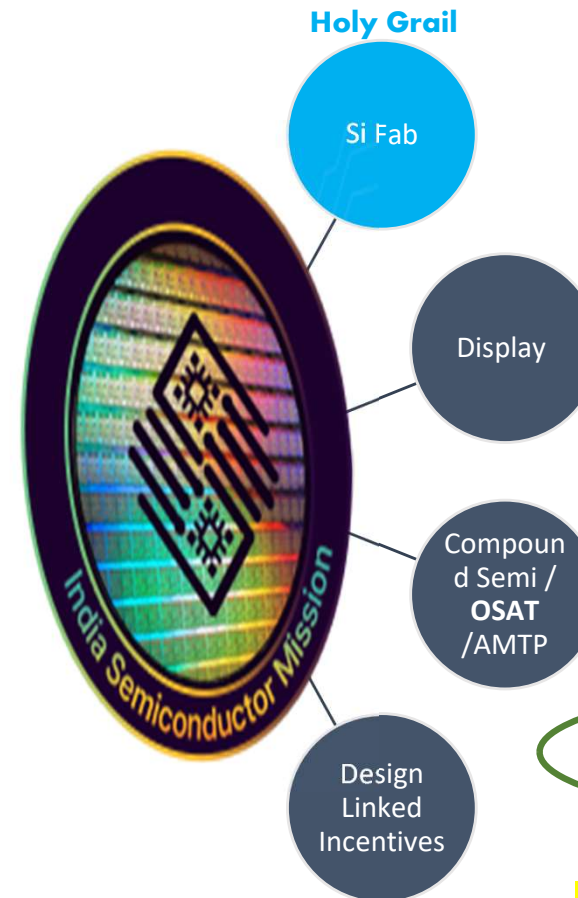
Udayan Ganguly, Swaroop Ganguly, Raj Nair\*  
IIT Bombay, \* GlobalFoundries  
Nov 10, 2020 (Ver 1)  
Commissioned by O/o PSA

DPR Team



**2020: IITB led Team submits DPR for  
Semiconductor R&D Center**

**2021: 10B\$ Cabinet  
Sanctioned**



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### Micron to set up \$2.75 billion India chip assembly facility

4 min read • 22 Jun 2023, 10:27 PM IST

Shouvik Das, Gulveen Aulakh



### Tata Electronics set for semiconductor packaging foray

By Dia Rekhi, ETTech • Last Updated: May 03, 2022, 06:00 AM IST



### Applied Materials to pump in \$400m for Bengaluru engineering centre

TNN / Jun 23, 2023, 06:39 IST

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## (End) Semiconductor Industry Overview