## Semiconductor WEEK:

## April 15, 2022

**Tech**Insiahts

### An overview of results and conclusions from recent reports at TechInsights

#### Chip Market Research Services

## It's still hot and vistas are clear but don't forget the mountainous cycles

- Order activity for semiconductor equipment resumed its decline, slipping 0.6 points to 112 degrees in the first week of April
- Production and Capacity Plan

#### **Semiconductor Analytics**

#### Last Week in the Semiconductor Market:

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Semiconductor sales pulled back 3% W/W in the 1st week of 2Q22. Sales are closing in on 2021 levels. The IC weather cooled another 4°F last week. Zooming in on NAND growth this week, 13-wk MA growth bounced up last week after slowing. Still, growth has stayed well above 2021 levels.

Growth is forecast to slow and finish 2022 around +13% Y/Y, reaching \$69B. IC Supply/Demand indices eased to Tight. Foundry dropped to Saturated, while DRAM and NAND slipped. Analog and Power slid to Tight. Chip demand in China and Russia are down, contributing to the shortage's steady easing this year from a broad market perspective. There are shortages of certain SKUs, which still get the media's spotlight. For example, FPGAs and Auto ICs remain in shortage, while GPUs quickly saturated.

### Chip History Center

# Intel's Birth May 1968: Robert (Bob) Noyce and Gordon Moore: The decision that would change the course of semiconductor history.

**Intel introduces its first product August 1969:** The 3101 SRAM with this press release.

Lam Research AutoEtch 480: the system that built the company. A landmark in the history of equipment and it was one of the first single wafer, load-locked plasma etchers.

#### The Chip Insider

#### Strategy and Tactics: Inflation is the new pandemic

#### **Semiconductor Stocks**

- TechInsights' Semiconductor Stock Indices continue to fall again this week along with the market
- Semiconductor Stock Index fell
- Semiconductor Equipment Stock Index sunk
  - Nikon was this week's biggest winner
- EDA Stock Index plummeted
- Electronics Materials Stock Index decreased
- Hottest Stocks: Nikon, ASM Pacific Technology, ON Semiconductor, CMC Materials, BASF, and Qualcomm

# The Chip Insider®'s Graphics File







#### Contact us to access more details

It's still hot and vistas are clear but don't forget the mountainous cycles

- Order activity for semiconductor equipment resumed its decline, slipping 0.6 points to 112 degrees in the first week of April
- The biggest issues for equipment manufacturers this year are supply-related as demand remains strong
- TechInsights' Chip Price Performance Index slipped at a faster clip

Forecast as of March 2022:	2021	2022
Semi Equipment (\$B):	\$ 124.0	\$ 149.2
Sequential Change	34.2%	20.3%
Capacity Utilization:	97.2%	96.9%
ICs (\$B):	\$ 492.3	\$ 568.2
Sequential Change	27.4%	15.4%
IC Units (BU):	394.2	439.0
Sequential Change	23.7%	11.4%
Electronics (\$B) :	\$ 2,574	\$ 2,758
Sequential Change	18.9%	7.1%

### **TechInsights**

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Insights Interview:

### Workforce Development Solutions...

### with Ajit Manocha of SEMI



### What the conversation is about:

- Labor shortages have become the echo pandemic from the ravages COVID has had on the economy.
- This is no truer than in the semiconductor industry, where Workforce Development has long been on the To-Do lists of many.
- Most industry efforts appear to be more about lobbying others to do something about workforce development.
- It's really hard to do something substantive about it but SEMI is.

Click here to watch online



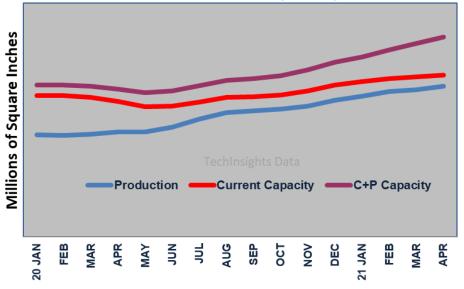
# The Chip Insider® Graphics

## Production and Capacity Plan:

 Production and Capacity remain high

**Production and Capacity Plan:** chart gives rolling averages for semiconductor production, currently active capacity, and current plus planned capacity in millions of square inches of silicon wafers.

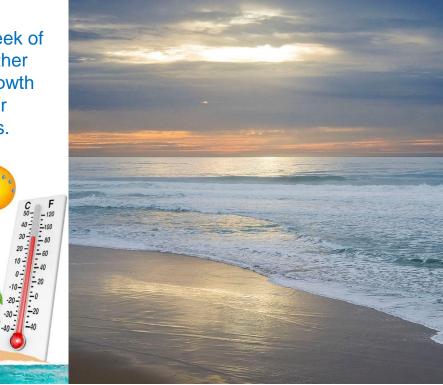
#### **Production and Capacity Plan**



## Semiconductor Analytics

### Last Week in the Semiconductor Market:

Semiconductor sales pulled back 3% W/W in the 1<sup>st</sup> week of 2Q22. Sales are closing in on 2021 levels. The IC weather cooled another 4°F last week. Zooming in on NAND growth this week, 13-wk MA growth bounced up last week after slowing. Still, growth has stayed well above 2021 levels. Growth is forecast to slow and finish 2022 around +13% Y/Y, reaching \$69B. IC Supply/Demand indices eased to Tight. Foundry dropped to Saturated, while DRAM and NAND slipped. Analog and Power slid to Tight. Chip demand in China and Russia are down, contributing to the shortage's steady easing this year from a broad market perspective. There are shortages of certain SKUs, which still get the media's spotlight. For example, FPGAs and Auto ICs remain in shortage, while GPUs guickly saturated.



1: Measures Order Activity 2: Measures Pricing Power

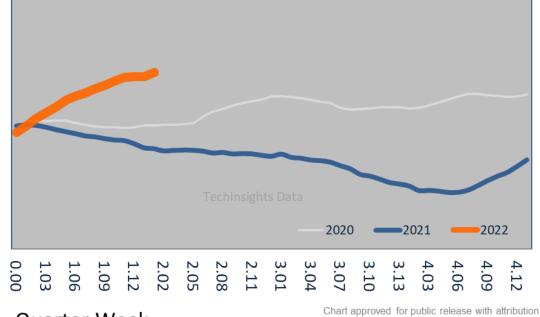


## **Electronics Retail Pricing Trends:**

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

**Electronics Pricing Barometer** 

indexed 13 week moving average



Quarter.Week

Electronics' Retail Price MAs turned back up

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#### Insights Interview:

## Innovation in Memory ...

### with Scott DeBoer of Micron Technology



# What the conversation is about:

 Scott DeBoer of Micron Technology has a conversation with Dan Hutcheson about what it takes to innovate in Memory today. Scott leads Micron's global technology development and engineering efforts – from silicon design to high-value system solutions.

Click here to watch online



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# The Chip Insider® Strategy & Tactics

Strategy and Tactics: Inflation is the new pandemic

#### <u>Summaries:</u>

Inflation is the new pandemic: It's time for the leadership of the semiconductor and equipment industry to come to a strategic agreement on how the industry will deal with the coming inflation threat. This is important because it is a given that no one in today's leadership has ever had to compete in an inflationary business environment. Back in February I wrote about the threat, which I repeat below. Unfortunately ... I've seen the great leaders of General Confusion and Major Disaster\* looming in the distance, as tool and critical subsystem suppliers face rising costs and chip companies push back against requests to raise prices.

The chip companies are raising prices and so are the foundries. We've also heard of foundries ... are blaming the shortage, an inability to bring up new cleanrooms fast enough due to labor shortage, and push-outs of semiconductor equipment deliveries. In my opinion, the bottom line is they are afraid of committing to long-term prices as they should. Their actions also speak to a belief that the assumption of central banks being able to quickly cure it is in error... And only recently did Fed Chair Powell acknowledge it might be different this time. What I am afraid of is the rise of the money supply and the

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decline in availability of cheap labor... China's wages are on the rise... Meanwhile, let's assume inflation at the 7% range going forward. That means your costs rise by 23% in 3 years and 84% by 2030. Now picture a classic semiconductor equipment business model that assumes 55% gross margins and 20% net. Let's hold tool prices constant and only allow for supplier costs to be effected by inflation. Then apply it to a revenue forecast out to 2030. Realistically we don't get there. Now the industry could do what I suggested back in February: raise prices. But talking to executives since then, it's clearly not working out... So I have an alternative that the industry could adopt that would keep semiconductor production capacity affordable today while allowing for the risk of rising costs in the future. It ...

"The only thing we have to fear is...fear itself nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance" — Franklin D. Roosevelt's 1933 inaugural address

### **TechInsights**





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#### THE CHIP HISTORY CENTER

The Virtual Museum of Semiconductors

Intel's Birth May 1968: Robert (Bob) Noyce and Gordon Moore: The decision that would change the course of semiconductor history. It was a sunny California day when two men met at a home on Loyola Drive in Los Altos. It would have looked like any weekend front-yard meet-up. Robert (Bob) Noyce had been mowing his lawn. Gordon Moore had just popped over. Yet it was more than just a simple chat ...

Intel introduces its first product August 1969: The 3101 SRAM with this press release. It was part of Moore's "Goldilocks strategy," to develop three technologies at once. Features included "fast access times of 50 nanoseconds" ... and ... "power dissipation of 6 milliwatts-per-bit." It was priced at \$99.50 each, or a whopping \$1.56 per-bit. This was cutting edge performance, circa 1969 ...

Lam Research AutoEtch 480: the system that built the company. A landmark in the history of equipment and it was one of the first single wafer, load-locked plasma etchers. Its market success proved it was one of the best etchers of the day. Introduced in 1981, just a year after the company's founding, this would be one of the key products to build Lam into a giant in the semiconductor industry. It marked a substantial divergence from what was available at the time. As Lam put it, "AutoEtch 480 has been ...

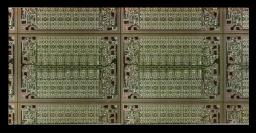
#### Intel's Business Plan ~June 1968

www.chiphistory.org

a

The company will engage in research, development, adm manufacture integrated electronic structures to fulfill the needs of manufacturers. This will include thin films thick films, semiconductor devices, and other solid state components used ih monolithic integrated structures

A variety of processes will be established, both at a laboratory and production level. These include crystal growth, slicing, lapping,





semi

### Supporters:









Section



#### S&P 500 Approved 1 Copyright © T Jun-21 Apr-22 Jan-21 Jul-21 Aug-21 Sep-21 Oct-21 Jan-22 Feb-22 Mar-22 Nov-21 May-21 Feb-2 Var-2 Apr-21 Dec-2

#### **TechInsights' Stock Indices:**

Semiconductors -2.5% Equipment -3.3% Electronic Materials -0.9% EDA -6.6%

**TechInsights** 



this week along with the market, three of the four indices hit yearly lows.

#### Semiconductor Industry Stock Performance Indices

## Semiconductor Stocks: Weekly Growth and Forward P/E Ratios by Company

Weekly Gains 4/15/2022										
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E					
IDM			Fab-lite to Fabless							
Intel	-2.9%	13	AMD	-7.9%	21					
Micron	-2.8%	6	Analog Devices	-1.4%	17					
ON Semiconductor	1.0%	12	Broadcom	-2.2%	15					
Samsung Electronics	-1.8%	_	IBM	-0.9%	12					
SK hynix	-3.6%		Infineon	-3.3%	13					
STMicroelectronics	-3.3%	11	MagnaChip Semiconductor	-5.2%	11	AD				
Western Digital	-1.8%	5	MaxLinear	-3.1%	12	ove				
Foundry & OSAT			MediaTek	-1.0%	_	Above Avg				
Amkor	-1.2%	7	NVIDIA	-8.0%	34					
ASE	-1.6%	9	Panasonic	-2.4%	10	_				
GLOBALFOUNDRIES	-4.8%	20	Qualcomm	0.2%	11	p				
JCET	-0.3%	13	Silicon Laboratories	-3.1%	41	4				
SkyWater Technology	-10.9%	_	Skyworks	-3.7%	10					
SMIC	-2.8%	11	Texas Instruments	-0.3%	19	lop				
TSMC	-0.9%	15								
UMC	-3.9%	9				Z				

#### **TechInsights' Semiconductor Stock**

**Index** fell this week, ON Semiconductor and Qualcomm claiming two of the top six stock spots this week and being the only two semiconductor stock companies to finish in positive territory.

IDM -2.2% Foundry & OSAT -3.3% Fabless & Fablite -3.0%

AMD AMD Analog Devices<sup>ADI</sup> Amkor<sup>AMKR</sup> ASE ASX Broadcom <sup>AVGO</sup> GLOBALFOUNDRIES <sup>GFS</sup> IBM <sup>IBM</sup> Infineon <sup>IFNNY.PK</sup> Intel <sup>INTC</sup> JCET<sup>600584.SS</sup> Micron Technology <sup>MU</sup> On Semiconductor <sup>ON</sup> Panasonic <sup>PC</sup> MagnaChip Semiconductor <sup>MX</sup> MaxLinear <sup>MXL</sup> MediaTek <sup>2454.TW</sup> NVIDIA <sup>NVDA</sup> Qualcomm <sup>QCOM</sup> Samsung Electronics <sup>005930.KS</sup> Silicon Laboratories <sup>SLAB</sup> SkyWater Technology<sup>SKYT</sup> Skyworks<sup>SWKS</sup> SMIC <sup>SMI</sup> STMicroelectronics<sup>STM</sup> Texas Instruments <sup>TXN</sup> TSMC <sup>TSM</sup> UMC <sup>STMicroelectronics</sup> Western Digital WDC

## Chip Equipment & Related Stocks: Weekly Growth and Forward P/E Ratios by Company

Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E	
Wafer Fab:			Test:			
Applied Materials	-5.5%	13	Advantest	-4.9%	_	
ASM International	I -2.1% 23 Teradyne				16	
ASML	-2.1%	28	FormFactor	-1.6%	18	
KLA	-5.8%	14				
Lam Research	-7.2%	13	Assembly:			
Onto Innovation	-5.8%	_	BESI	-4.0%	-	
Nikon	4.2%	-	Kulicke & Soffa	-2.2%	9	
TEL	-2.8%	-	ASM Pacific Technology	1.5%		
Veeco Instruments	-6.4%	13				

**TechInsights' Semiconductor Equipment Stock Index** sunk despite strong gains from Nikon for another straight week. Nikon was this week's biggest winner. ASM Pacific Technology also being a top performer this week.

WFE -3.7% Test -3.0% Assembly -1.6%

Applied Materials AMAT Advantest ATEYY ASM International ASMIY ASM Lithography ASML ASM Pacific 0522.HK BE Semiconductor BESIY.PK FormFactor FORM KLA KLAC Kulicke & Soffa KLIC Lam Research LRCX Onto Innovation ONTO Nikon 7731 Teradyne TER Tokyo Electron Limited 8035 Veeco VECO

## Electronic Materials Stocks: Weekly Growth and Forward P/E Ratios by Company

Weekly Gains		4/15/202					
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks		rice ange	Forward P/E	
EDA			DNP	-1	.7%	_	
Cadence	-5.3%	37	DuPont de Nemours	-0	.2%	5	
Synopsys	-7.8%	35	JSR	-2	2.1%	_	
Ansys	-6.8%	34	Shin-Etsu	-1	.0%	_	
Electronic Materials			SOITEC		2.3%	_	
BASF	0.2%	2	Tokyo Ohka	-0	.6%	_	
CMC Materials	0.5%	21					
			Abov		Top 4-6	Top 1-3	

**TechInsights' EDA Stock Index** plummeted.

**TechInsights' Electronic Materials Stock Index** decreased this week, CMC Materials and BASF came out on top.

Ansys, Inc. <sup>ANSS</sup> BASF <sup>BASFY</sup> CMC Materials <sup>CCMP</sup> Cadence <sup>CDNS</sup> DNP <sup>7912</sup> DuPont <sup>DD</sup> JSR <sup>4185</sup> Shin-Etsu <sup>4063</sup> SOITEC<sup>SOI.PA</sup> Synopsys <sup>SNPS</sup> Tokyo Ohka <sup>4186</sup>

The Prior	TechInsights' Indices of Chip Industry Stocks				Weekly Growth			nies	Growth	nies	owth	e of rth	500	7th 700	
Week's Close	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Companies Up	Max Gro	Companies Down	Min Growth	Range o Growth	S&P 5	S&P 500 Growth
10-Sep-21	89.6	92.2	94.7	90.4	-1.0%	2.4%	2.7%	-0.2%	24	11.4%	-29	-8.1%	19.5%	93.5	-1.7%
17-Sep-21	88.9	92.6	94.3	88.6	-0.8%	0.4%	-0.4%	-2.0%	23	5.5%	-30	-6.8%	12.3%	93.0	-0.6%
24-Sep-21	89.2	91.7	93.1	88.1	0.3%	-1.0%	-1.3%	-0.5%	22	5.8%	-30	-5.2%	11.0%	93.5	0.5%
01-Oct-21	85.8	84.2	88.6	82.6	-3.8%	-8.2%	-4.8%	-6.2%	6	4.3%	-48	-14.7%	19.0%	91.4	-2.2%
08-Oct-21	84.7	81.0	87.3	80.3	-1.4%	-3.8%	-1.5%	-2.8%	15	2.9%	-39	-14.3%	17.2%	92.1	0.8%
15-Oct-21	85.5	82.8	90.6	83.9	1.0%	2.2%	3.8%	4.4%	39	8.1%	-14	-11.8%	19.9%	93.8	1.8%
22-Oct-21	86.8	85.3	91.3	88.9	1.5%	3.0%	0.8%	5.9%	40	15.7%	-14	-11.6%	27.3%	95.4	1.6%
29-Oct-21	89.0	89.6	93.7	92.2	2.6%	5.0%	2.6%	3.8%	38	24.6%	-16	-8.3%	32.9%	96.6	1.3%
05-Nov-21	94.4	95.0	98.0	94.6	6.1%	6.1%	4.6%	2.5%	45	30.5%	-8	-29.8%	60.3%	98.6	2.0%
12-Nov-21	95.9	95.5	98.7	96.4	1.5%	0.4%	0.7%	1.9%	31	8.5%	-16	-12.1%	20.6%	98.3	-0.3%
19-Nov-21	98.3	97.5	98.2	99.4	2.6%	2.1%	-0.4%	3.2%	39	12.2%	-16	-16.8%	29.0%	98.6	0.3%
26-Nov-21	97.7	96.0	95.5	96.8	-0.6%	-1.6%	-2.8%	-2.7%	16	11.8%	-39	-9.6%	21.4%	98.6	0.1%
03-Dec-21	95.9	94.5	92.9	95.0	-1.9%	-1.6%	-2.7%	-1.9%	12	6.0%	-44	-11.1%	17.1%	95.2	-3.5%
10-Dec-21	97.5	96.9	95.7	98.8	1.6%	2.6%	3.0%	4.0%	40	13.2%	-15	-7.5%	20.7%	98.9	3.8%
17-Dec-21	94.7	93.8	97.7	96.5	-2.9%	-3.2%	2.1%	-2.3%	12	25.6%	-43	-15.6%	41.2%	96.9	-1.9%
24-Dec-21	98.6	97.7	99.3	100.2	4.1%	4.2%	1.7%	3.8%	50	13.8%	-6	-2.8%	16.6%	99.2	2.3%
31-Dec-21	100.0	100.0	100.0	100.0	1.5%	2.3%	0.7%	-0.2%	44	8.1%	-11	-2.7%	10.8%	100.0	0.9%
07-Jan-22	96.6	96.3	99.4	89.7	-3.4%	-3.7%	-0.6%	-10.3%	10	7.4%	-45	-17.5%	24.9%	98.1	-1.9%
14-Jan-22	98.5	102.0	99.3	87.4	2.0%	5.9%	-0.1%	-2.5%	36	23.7%	-20	-4.9%	28.6%	97.8	-0.3%
21-Jan-22	90.1	90.4	93.8	81.0	-8.5%	-11.4%	-5.6%	-7.3%	3	5.1%	-53	-20.3%	25.4%	92.3	-5.7%
28-Jan-22	87.1	84.5	92.4	79.7	-3.4%	-6.6%	-1.5%	-1.7%	11	5.0%	-45	-21.8%	26.8%	93.0	0.8%
04-Feb-22	90.2	87.3	92.3	81.5	3.5%	3.3%	-0.1%	2.3%	41	17.5%	-13	-4.3%	21.8%	94.4	1.6%
11-Feb-22	89.6	86.1	93.2	78.7	-0.7%	-1.4%	1.0%	-3.4%	20	10.6%	-33	-8.9%	19.5%	92.7	-1.8%
18-Feb-22	90.1	86.8	93.0	75.0	0.6%	0.8%	-0.2%	-4.7%	28	12.2%	-26	-7.0%	19.2%	91.2	-1.6%
25-Feb-22	90.1	87.5	91.9	82.5	0.0%	0.8%	-1.3%	9.9%	30	14.7%	-25	-9.5%	24.2%	92.0	0.8%
04-Mar-22	85.3	81.4	86.8	81.5	-5.3%	-6.9%	-5.5%	-1.2%	7	6.4%	-48	-18.6%	25.0%	90.8	-1.3%
11-Mar-22	82.1	79.7	87.1	76.9	-3.7%	-2.2%	0.3%	-5.7%	9	9.7%	-45	-11.1%	20.8%	88.2	-2.9%
18-Mar-22	87.9	90.3	92.7	83.7	7.1%	13.3%	6.5%	8.8%	53	31.3%	-2	-5.9%	37.2%	93.6	6.2%
25-Mar-22	89.1	91.8	94.0	82.9	1.3%	1.7%	1.3%	-0.9%	36	9.2%	-16	-5.5%	14.7%	95.3	1.8%
01-Apr-22	85.4	87.8	91.5	86.1	-4.2%	-4.3%	-2.6%	3.9%	5	5.0%	-50	-23.1%	28.1%	95.4	0.1%
08-Apr-22	80.1	81.9	87.1	82.3	-6.2%	-6.8%	-4.8%	-4.4%	2	5.5%	-53	-17.6%	23.1%	94.2	-1.3%
15-Apr-22	78.1	79.2	86.4	76.9	-2.5%	-3.3%	-0.9%	-6.6%	6	4.2%	-49	-10.9%	15.1%	92.2	-2.1%

# Links to **Conference Call** Transcripts

April 15<sup>th</sup>

Taiwan Semiconductor Manufacturing Company Limited (TSM) CEO C. C. Wei on Q1 2022 Results - Earnings Call Transcript

April 8<sup>th</sup> and before

Western Digital Corporation (WDC) Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference (Transcript)

<u>Cisco Systems, Inc. (CSCO) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022</u> <u>Transcript</u>

International Business Machines Corporation (IBM) Management Presents at Morgan Stanley Technology, Media and Telecom Brokers Conference 2022 [Transcript]

<u>Texas Instruments Incorporated (TXN) CEO Rich Templeton Presents at Morgan Stanley 2022 Technology, Media &</u> <u>Telecom Conference (Transcript)</u>

IDT Corporation (IDT) CEO Shmuel Jonas on Q2 2022 Results - Earnings Call Transcript

Lam Research Corporation's (LRCX) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 (Transcript)

NXP Semiconductors N.V. (NXPI) Presents at Morgan Stanley Tech Conference, San Francisco Conference (Transcript)

Intel Corporation (INTC) CEO Patrick Gelsinger Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 (Transcript)

NVIDIA Corporation (NVDA) Presents at Morgan Stanley 2022 Technology, Media and Telecom Conference (Transcript)

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