

Mu Capital Group



[27/10/2021]

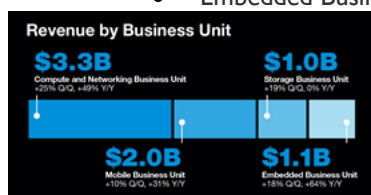
[Micron Technology Inc]

[MU]

COMPANY OVERVIEW

Micron Technology, Inc. engages in the provision of innovative memory and storage solutions. Micron Technology sells to PC and storage manufacturers, with semiconductor chips, DRAM and NAND flash memory making up the almost all of revenue. Micron operates through the following segments:

- Compute & Networking Business Unit (CNBU)
- Mobile Business Unit (MBU)
- Storage Business Unit (SBU)
- Embedded Business Unit (EBU)



The CNBU segment includes memory products sold into cloud server, enterprise, client, graphics, and networking markets. The MBU segment offers memory products sold into smartphones and other mobile-device markets. The SBU segment comprises of SSDs and component-level solutions sold into enterprise and cloud, client, and consumer storage markets, and other discrete storage products sold in component and wafer forms. The EBU segment consists of memory and storage products sold into automotive, industrial, and consumer markets. The four segments make up approximately 44%, 26%, 14% and 16% of revenue respectively.

Majority of Micron Technology's operations take place in the United States, China, Taiwan, Hong Kong, and Japan, with the United States market making up more than 50% of revenue (2019).

INVESTMENT RATIONALE

Micron Technology has a very lucrative opportunity for growth in relation to its semiconductor business. Currently there is a worldwide large-scale shortage semiconductor supply issue which is causing mass problems in other industries. Typically with technologies such as this during an undersupply period, revenue falls and so profit falls and this is expected to be seen in Q4 2021. However, Micron are expected to invest \$7 billion in a new plant this year in Japan and invest \$150 billion over the next decade in production lines we should see the semiconductor chips revenue rise significantly as early as Q1 2022 as we enter the correction phase which should see profits soar.

Micron Technology has been recruiting rather successfully the brightest talent in the memory industry. Recently they have hired many high profiles Japanese and South Korean engineers from companies such as Toshiba, SK Hynic and Samsung and have been using them to develop its production technology at its facilities in the U.S. and Japan. While

Price (27/10/2021)	[\$68.24]
Market Cap (bn)	[\$76.335B]
EV (bn)	[\$76.078B]
Beta (5Y monthly)	[1.27]

[SECTOR]

Mean Price Target	[\$95.33]
% Upside	[39.7%]

24m performance:



Market Data:

52- Week Range	[49.3-96.96]
Shares Out. (bn)	[1.12]
P/E (ttm)	[13.13]x
PEG (5-yr expected)	[0.81]
EPS (ttm)	[2.38]
EPS growth	[116.2]%
Yield	[0.1]%
Payout ratio	[0.0]%

Profitability:

Profit margin	[21.16]%
Op margin	[24.53]%
ROA (ttm)	[7.55]%
ROE (ttm)	[14.14]%

Financial Data:

Revenue (bn)	[29.25]
Revenue growth	[36.6]%
EBITDA (bn)	[13.01]
EBITDA growth	[49.67]%
EBITDA margin	[24.68]%

Leverage:

Net debt (bn)	[7.34]
Total debt/equity	[16.7]x
Current ratio	[3.10]
Cash ratio	[1.34]

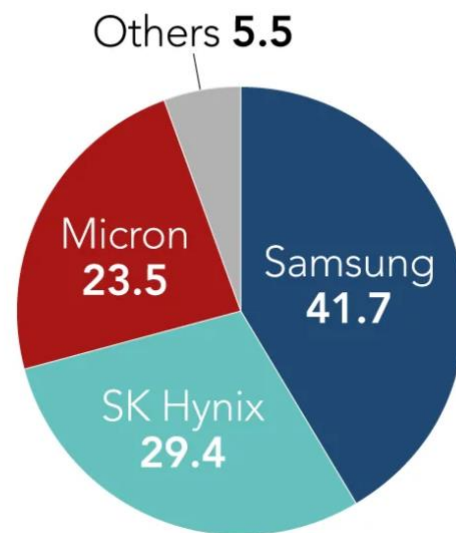
Micron's largest competitor Samsung uses large portions of their revenue to fund research in its other vastly diverse technology portfolio, Micro uses majority of its profits to reinvest in the development of semiconductor chips. Micron have recently started production of a new NAND chip ahead of Samsung and are keen to be the first to mass produce new, industry-leading products and are expected to be a major player from 2022 in the NAND industry and with the NAND market expecting to rise from \$46.62 billion in 2020 to \$86.36 billion in 2026 there is a great investment opportunity.

In 2021 they have seen a huge increase in the 5G phone market. By the end of 2022 the number of 5G phone users are expected to more than double from 637 million to 1.34 billion. 5G handsets require 50% more DRAM and double the amount of NAND chips compared to 4G phones. Micron specialises in both of these areas and should be able to capitalise on this growing mobile market with their strong performance in technology and innovation.

MARKET POSITION

Three companies dominate DRAM market

(Share of \$66.3 billion market in 2020, in percent)



Figures do not add up to 100 due to rounding

Source: Omdia

Micron Technology is a large player in the semiconductor industry. It has held its place as the 5th largest semiconductor company for the last 3 years with the 2020 revue reaching over \$20 billion.

In the DRAM market Micron holds approximately 23.5% of the market share and its main competitors are Samsung and SK Hynix. Over the last 5 years Micron has seen a 3% increase in market share in the DRAM market while the largest company, Samsung, has seen a 5% fall over the last five years and it is predicted that this trend should continue over the next few years. Also, with Micron leading production lines with the new I-alpha DRAM chip and their continued efforts to find the leading technology this should also see market share rise.

● Samsung	34%
● Kioxia*	18.3%
● WDC	14.7%
● SK Hynix	12.3%
● Micron	11%
● Intel	6.7%
● Others	2.8%

In the NAND flash market Micron is a sizeable player holding 11.1% of the market share. In this market its biggest competitors are SK Hynix, WDC Kioxia and Samsung. With the early production of a new NAND chip Micron are expected to widen their market share in 2022. The DRAM market in 2020 was valued at \$45.81 billion and is expected to rise to \$48.64 billion, growing at a CAGR of 0.86% while the NAND Flash Memory market is expected to grow rapidly from nearly \$50 billion in 2020 to almost \$106 billion, with a CAGR of 11% during 2021-2027.

MANAGEMENT STRUCTURE

Micron Technology has a strong and diverse leadership team, with members having huge experience in the industry and have a proven track record of success such as:

Sanjay Mehrota – CEO

Sanjay has served as Micron’s President, CEO and Director since May 2017. Prior to his time at Micron Sanjay co-founded and led SanDisk Corporation as a start-up in 1988 until its sale in May 2016 for \$19 billion. He has won a variety of awards for his time at SanDisk and currently sits on the Engineering Advisory Board at the University of California, Berkley. Sanjay has huge experience in management and in the storage industry.

David Zinsner – CFO

David joined Micron in 2018 as Senior Vice President and CFO. David has served as president and chief operating officer at another semiconductor company Affirmed Networks and senior vice president of finance and CFO at Analog Devices. Added to this experience in the industry David has a master’s degree in finance and accounting from Vanderbilt University and so his experience and track record suggest he can deliver for Micron.

INTEGRITY AND ESG ANALYSIS

In the past there have been some instances of price-fixing and anti-competitive practices, as well as workplace safety and health violations. There don’t seem to be any major controversies since 2012, although they are currently being sued by an ex-employee. They allege that Micron violated California law by failing to reimburse the plaintiff and other, similarly situated employees for internet and phone-related expenses. According to the operative complaint, the lawsuit seeks to certify a class of Micron’s California employees who were not reimbursed “for all expenses within four years preceding filing the complaint to the time of final judgment.”

Micron Technology Inc

Industry Group: Semiconductors

Country: United States

Identifier: NAS:MU

ESG Risk Rating

17.7 Low Risk



Ranking

INDUSTRY GROUP
Semiconductors

15 out of 287

UNIVERSE

Global Universe

2201 out of 14469

Last Update: Oct 7, 2021

Industry Comparison

	ESG RISK RATING	INDUSTRY RANK
Texas Instruments Incorporated	20.3	Medium 38 out of 287
Advanced Micro Devices Inc	18.1	Low 19 out of 287
SK Hynix Inc.	20.2	Medium 37 out of 287
Analog Devices Inc	23.8	Medium 77 out of 287
Micron Technology Inc	17.7	Low 15 out of 287

According to sustainalytics Micron has a fairly low ESG risk and they have a comparatively high ESG rating compared to their competitors.

Micron has adopted specific long-term environmental sustainability goals in four areas: emissions, energy, water and waste. They have committed to investing approximately \$1 billion over the next five to seven years to support these goals. They have also made commitments in their sourcing practices, people programs, products and community involvement.

- Community Support
 - They donated hundreds of thousands of masks to health care workers and distributed nearly \$24 million to global organizations focused on education and supporting basic needs.
 - They also reached more than 600,000 students and educators through global STEM programs.
 - They dramatically increased giving overall, with nearly 60% of their team, 88% of senior leaders and 100% of the board participating in 2020, generating \$4.8M in donations (most of it matched 2:1 by Micron to deepen the impact) and 150,000 volunteer hours.

- fostering a more inclusive culture and world
 - They increased their female board representation by 50% when Lynn Dugle joined last year, and have implemented inclusive hiring practices to increase representation of underrepresented groups.
 - To support social justice, Micron directed a \$1 million donation from the Micron Foundation to the NAACP Legal Defense and Education Fund.
 - They allocated \$250 million for cash management through minority-owned firms, boosting the economies of underrepresented communities.
 - Micron spent over \$104 million with diverse-owned businesses and committed to doubling that spend over the next two years.
 - They increased participation in our employee resource groups by 84%, which enhance team member belonging, foster inclusivity and strengthen connections within our communities globally.

- Sustainability
 - Emissions – They reduced greenhouse gas emissions per unit of production by 36% since calendar year 2018 (CY18).
 - Their goal is a 75% reduction of GHG per unit of production from CY18 levels in CY30..
 - Energy – They initiated negotiations supporting new renewable energy development and procurement to meet our goal of using 100% renewable energy in the U.S. in CY25.
 - Water – They maintained their water conservation rate at 50%.
 - Their target is 75% water conservation through reuse, recycling and restoration in CY30.
 - Waste – They expanded reuse, recycling and recovery to 84%.
 - They are working toward 95% reuse, recycling and recovery, and zero hazardous waste to the landfill in CY30.

KEY RISKS

- Volatility in average selling prices for semiconductor memory and storage products may adversely affect business.
- A significant portion of revenue is concentrated with a select number of customers. In each of the last three years, approximately one-half of our total revenue was from their top ten customers. A disruption in relationship with any of these customers could adversely affect their business
- Risks surrounding Intellectual Property Rights
- Competition Risks:
 - The semiconductor memory and storage markets are highly competitive. They face intense competition in the semiconductor memory and storage markets from a number of companies, including Intel; Samsung Electronics Co., Ltd.; SK Hynix Inc.; Kioxia Holdings Corporation (formerly Toshiba Memory Corporation); and Western Digital Corporation. Some of their competitors are large corporations or conglomerates that may have greater resources to invest in technology,

capitalize on growth opportunities, and withstand downturns in the semiconductor markets in which we compete.

- In addition, some governments may provide, or have provided and may continue to provide, significant assistance, financial or otherwise, to some of our competitors or to new entrants and may intervene in support of national industries and/or competitors. In particular there is a threat of increasing competition as a result of significant investment in the semiconductor industry by the Chinese government and various state-owned or affiliated entities that is intended to advance China's stated national policy objectives. In addition, the Chinese government may restrict us from participating in the China market or may prevent us from competing effectively with Chinese companies.
- Increases in wafer capacity, improve yields, and reduce die size within the industry may result in significant increases in worldwide supply and downward pressure on prices. Increases in worldwide supply of semiconductor memory and storage also result from fabrication capacity expansions, either by way of new facilities, increased capacity utilization, or reallocation of other semiconductor production to semiconductor memory and storage production. Increases in worldwide supply of semiconductor memory and storage, if not accompanied by commensurate increases in demand, could lead to further declines in average selling prices for our products and could materially adversely affect our business, results of operations, or financial condition.
- Geopolitical risks:
 - In 2020, 88% of revenue was from products shipped to customer locations outside the United States.
 - We also purchase a significant portion of equipment and supplies from suppliers outside the United States.
 - Additionally, a significant portion of our facilities are located outside the United States, including in Taiwan, Singapore, Japan, and China.
 - General trade tensions between the United States and China have been escalating since 2018, with U.S. tariffs on Chinese goods and retaliatory Chinese tariffs on U.S. goods. Some of Micron's products are included in these tariffs. Higher duties on existing tariffs and further rounds of tariffs have been announced or threatened by U.S. and Chinese leaders.
 - Additionally, the United States has threatened to impose tariffs on goods imported from other countries, which could also impact certain customers' or Micron's operations. If the United States were to impose current or additional tariffs on components that they or their suppliers' source, costs for such components would increase. They may also incur increases in manufacturing costs and supply chain risks due to efforts to mitigate the impact of tariffs on our customers and our operations.
 - Additionally, tariffs on customers' products could impact their sales of such end products, resulting in lower demand for our products.
 - Further changes in trade policy, tariffs, additional taxes, restrictions on exports or other trade barriers, or restrictions on supplies, equipment, and raw materials including rare earth minerals, may limit Micron's ability to produce products, increase our selling and/or manufacturing costs, decrease margins, reduce the competitiveness of our products, or inhibit our ability to sell products or purchase necessary equipment and supplies, which could have a material adverse effect on our business, results of operations, or financial condition.

However, these risks are unlikely to materialise within a 10-year window. It is unlikely that the Chinese or any other government will be able to out-compete Micron with tariffs within the next 10 years as it is very costly to develop the R&D and supply chains. Although there is some political risk this may reduce with the election of Biden and the risk can be reduced within the company by diversifying customers and supply chains. Also, although the supply of memory and storage systems is set to increase the demand for them may be undervalued. A lot of the discussion around the technology of the future centres are the 'internet of things' where all sorts of devices are connected to the internet. These trends are already being seen with central heating and light bulbs being connected to phones. All these future devices will require chips. Also, as the world becomes more digitalised the demand for memory and storage systems must continue to grow, especially as technology trends move towards increases in data utilisation and analysis all of which require greater storage capabilities.

OPPORTUNITIES FOR GROWTH

[Micron Technology Inc.](#) is planning to build a DRAM plant in Hiroshima prefecture, western Japan, for as much as 800 billion yen (\$6.98 billion). Micron's new plant will start operations by 2024 and will serve to meet the medium-to-long term demand for data centres and other applications. SMBC Nikko Securities Inc. analyst Takeru Hanaya wrote in a note that the report leaves a positive impression and that the firm assumes the finalization of the investment "would lead to a long-term bullish outlook, at least for Micron's DRAM market."

Demand in the semiconductor industry is typically fuelled by a disruptive new technology. Between 1997 and 2007, rapid increases in the popularity of PCs boosted demand for central processing units (CPUs) and memory chips, while the broad penetration of the Internet drove volume for Ethernet equipment, network processors and ASICs. The era of the smartphone began with the introduction of the iPhone in 2007, driving demand for mobile processors, while the adoption of cloud computing has pushed growth for server CPUs and storage.

In the future, artificial intelligence will likely be the catalyst that will drive another decade-long growth cycle for the semiconductor sector. PWC expect the market for AI-related semiconductors to grow from a current US\$6bn in revenues to more than US \$30bn by 2022. Although AI-driven use cases are expected to find their way across every industry segment over time, their adoption will likely be determined by the size of investment in the technology, the pace of its development and the speed at which its benefits are realized.

Increased Digitalisation will also be a driver as increased demand for mobile devices across the globe, which could be a driver for growth for Micron as a producer of memory and storage systems. This trend has been encouraged by the increase in Digitalisation during Covid-19.

FINANCIAL EVALUATION

Company Description	Micron Technology Inc. is an American producer of computer memory and computer data storage including dynamic random-access memory, flash memory and USB flash drives.	
Year Incorporated	1978	
Number of Employees	40000	
Headquarters	Boise, Idaho USA	
Industry	Semiconductors	
Market Cap (m)	77.12B	
Beta	1.27	
Current Price	\$	68.94

52 Week High	\$	96.96
52 Week Low	\$	49.30

- Micron technology has a lower PE ratio than their peers. Also, a PEG ratio of 0.49 compared to 1.12 for Intel corporation and 10.12 for Seagate Technology. As a general rule a PEG of less than one suggests that the company is undervalued. In comparison to their competitors, they are better in most areas however they score less than their peers in P/FCF, P/sales and EV/Rev. However, their current ratio higher than closest competitors: intel corporation (2.07), Seagate technology (1.27) suggesting that their assets may be more highly valued compared to their peers.

Company Name	Revenue \$USD (in millions)	EBIT \$USD (in millions)	Net income \$USD (in millions)	(margin)	FCF Per Share \$USD	EPS \$USD	P/E	P/FCF	P/Sales	P/Book	P/EBITDA	EV/Rev	EV/EBITDA
Intel Corporation	78474	23671	20899	27%	3.95	5.15	9.37	11.42	2.56	2.36	2.0374E-09	2.64	5.96
MediaTek	11578	1554	1471	13%	1.85	1.84	18.44	3.96	3.67	3.18	1.7733E-08	2.96	24.6
Western Digital Corporation	16922	1250	821	5%	2.42	2.61	21.6	19.44	1.28	2.02	2.2876E-08	1.37	9.46
Seagate technology	10681	1456	1314	12%	5.57	6.85	12.85	13.7	2	31.36	4.7528E-08	2.12	13.02
Mean	29413.75	6982.75	6126.25	0.141725	3.4475	4.1125	15.565	12.13	2.3775	9.73	2.2544E-08	2.2725	13.26
Median	14250	1505	1392.5	0.125	3.185	3.88	15.645	12.56	2.28	2.77	2.0305E-08	2.38	11.24
Micron Technology Inc (XNAS:MU)	27,705	6,838	5,861	21%	2.13	5.14	13.41	32.38	3.05	1.88	0.00	2.68	5.79

ALL FIGURES TTM (LTM).

Indicator	Median	Mean
P/E	Less than peers	Less than peers
P/FCF	Greater than peers	Greater than peers
P/Sales	Greater than peers	Greater than peers
P/Book	less than peers	less than peers
P/EBITDA	less than peers	less than peers
EV/Rev	Greater than peers	Greater than peers
EV/EBITDA	less than peers	less than peers

Financial Summary

	2017	2018	2019	2020	2021	Sum of Previous 4 Quarters
Revenue	20,322	30,391	23,406	21,435	27,705	27,705
growth		49.55%	-22.98%	-8.42%	29.25%	0.00%
EBITDA	9,743	19,696	12,849	8,721	13,053	13,052
growth		102.16%	-34.76%	-32.13%	49.67%	-0.01%
margin	47.94%	64.81%	54.90%	40.69%	47.11%	47.11%
EBIT	5,882	14,937	7,425	3,071	6,839	6,838
growth		153.94%	-50.29%	-58.64%	122.70%	-0.01%
margin	28.94%	49.15%	31.72%	14.33%	24.69%	24.68%
FCF	3,419	8,521	3,409	83	2,438	2,438
growth		149.22%	-59.99%	-97.57%	2837.35%	0.00%
margin	41.94%	48.97%	25.85%	1.00%	19.55%	19.55%
Net Income	5,089	14,135	6,313	2,687	5,861	5,861
growth		177.76%	-55.34%	-57.44%	118.12%	0.00%
margin	25.04%	46.51%	26.97%	12.54%	21.16%	21.16%
EPS	4.41	11.50	5.52	2.38	5.14	#FIELD!
growth		160.81%	-51.98%	-56.99%	116.21%	#FIELD!
IRR	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

CAGR Table			
	1 Year	2 Year	4 Year
Revenue	29%	9%	8%
EBITDA	50%	1%	8%

EBIT	123%	-4%	4%
FCF	2837%	-15%	-8%
Net Income	118%	-4%	4%
EPS	116%	-4%	4%

Fiscal Year	2017	2018	2019	2020	2021	Qs	Current (Ex-Qs)
Profitability Ratios							
Return on Equity	26%	42%	17%	7%	13%	13%	
Profit Margin	25%	47%	27%	13%	21%	21%	
	#VALU	#VALU	#VALU	#VALU	#VALU	#VALU	
Internal Rate of Return	E!	E!	E!	E!	E!	E!	
Asset Turnover	58%	70%	48%	40%	47%	47%	
Profitability	25%	47%	27%	13%	21%	21%	
Leverage	181%	130%	133%	138%	134%	134%	
Liquidity Ratios							
Current Ratio	2.34	2.79	2.58	2.71	3.10	3.10	
Cash Ratio	1.02	1.18	1.24	1.23	1.34	1.34	
Debt Ratios							
Debt to Equity	81%	30%	31%	36%	32%	32%	
Interest Coverage Ratio	13.57	50.88	103.04	42.81	68.13	265.28	
Interest Coverage Ratio Applicable?	YES	YES	YES	YES	YES	YES	
Valuation Ratios							
Earnings Per Share	4.41	11.50	5.52	2.38	5.14	#FIELD !	
Price to Earnings	7.39	4.55	8.28	18.19	14.29		13.39
PEG	-	-	-	-	-	-	0.48
PEG Including Dividends	-	-	-	-	-	-	-
FCF Per Share	2.96	6.93	2.98	0.07	2.14	#FIELD !	-
Price to Free Cash Flow	9.51	5.23	38.09	0.00	32.26	#FIELD !	-
Dividend Per Share	-	-	-	-	-	-	-
Dividend Yield	-	-	-	-	-	-	0.58%

SHAREHOLDER STRUCTURE

Top 10 Owners of Micron Technology Inc

Stockholder	Stake	Shares owned	Total value (\$)	Shares bought / sold	Total change
The Vanguard Group, Inc.	7.44%	83,800,133	5,948,133,440	+545,445	+0.66%
BlackRock Fund Advisors	4.87%	54,872,392	3,894,842,384	-551,857	-1.00%
SSgA Funds Management, Inc.	4.09%	46,005,104	3,265,442,282	+694,381	+1.53%
PRIMECAP Management Co.	3.88%	43,652,263	3,098,437,628	-1,776,326	-3.91%
Sanders Capital LLC	3.28%	36,899,299	2,619,112,243	+3,283,630	+9.77%
Fidelity Management & Research Co...	2.09%	23,526,722	1,669,926,728	-15,396,739	-39.56%
Capital Research & Management Co...	1.77%	19,965,598	1,417,158,146	+742,598	+3.86%
Geode Capital Management LLC	1.65%	18,596,772	1,319,998,877	+635,287	+3.54%
Capital Research & Management Co...	1.57%	17,682,655	1,255,114,852	+5,443,651	+44.48%
Arrowstreet Capital LP	1.32%	14,859,625	1,054,736,183	+151,891	+1.03%

Number of Insider Trades

INSIDER TRADE	3 MONTHS	12 MONTHS
Number of Open Market Buys	15	23
Number of Sells	24	66
Total Insider Trades	39	89

Number of Insider Shares Traded

INSIDER TRADE	3 MONTHS	12 MONTHS
Number of Shares Bought	502,099	826,955
Number of Shares Sold	531,226	1,497,356
Total Shares Traded	1,033,325	2,324,311
Net Activity	(29,127)	(670,401)

Although there have been slightly more shares sold by management than share bought in the last 3 months, this likely not a cause of concern as this seems more reflective of management liquidating some assets rather than responding to any bad news.

REFERENCES

https://www.annualreports.com/HostedData/AnnualReports/PDF/NYSE_MU_2020.pdf

<https://www.pwc.com/gx/en/industries/tmt/publications/global-tmt-semiconductor-report-2019.html>

https://violationtracker.goodjobsfirst.org/prog.php?parent=&major_industry_sum=&offense_group_sum=&primary_offense_sum=&agency_sum=&agency_sum_st=&hq_id_sum=&company_op=starts&company=Micron+Technology&major_

[industry%5B%5D=&case_category=&offense_group=&all_offense%5B%5D=&penalty_op=%3E&penalty=&govt_level=&agency_code%5B%5D=&agency_code_st%5B%5D=&pen_year%5B%5D=&pres_term=&free_text=&case_type=&ownership%5B%5D=&hq_id=&naics%5B%5D=&state=&city=](#)

<https://lawstreetmedia.com/news/tech/ex-employees-complaint-against-micron-technology-shifted-to-federal-court/>

<https://investors.micron.com/static-files/e4bddac1-1670-4ed6-a5f0-9873340fdd41>

<https://media-www.micron.com/->

/media/client/global/documents/general/about/micron_sustainability-progress-summary-2021-final.pdf?la=en&rev=007e767a3e9743648dea146b6cf97034

<https://www.bloomberg.com/news/articles/2021-10-20/micron-plans-7b-dram-plant-in-japan-nikkan-kogyo-reports>

<https://www.ft.com/content/21d70ba3-f3c7-4f2a-b311-c5850d0d1af6>