

COVID-19 has considerably changed the DRAM & NAND industry¹

Quarterly Market Monitor

MARKET DYNAMICS:

- NAND - Q1 2020:
Market conditions continued to improve due to robust demand and constrained supply. Profitability for the NAND vendors improved in Q1-20, with industry margins turning positive.
Capex will be down in 2020, despite early ramp spend from YMTC.
The market outlook for early 2020 is favorable; significant uncertainty for H2 2020
- DRAM – Q1 2020
COVID-19 is having a mixed impact on DRAM demand.
DRAM production growth will be negatively impacted by COVID-19.
Revenue outlook for 2020 has been reduced 3% due to lower prices and shipments.
Yole Développement still anticipates a strong recovery in 2021 and 2022

MARKET OUTLOOK

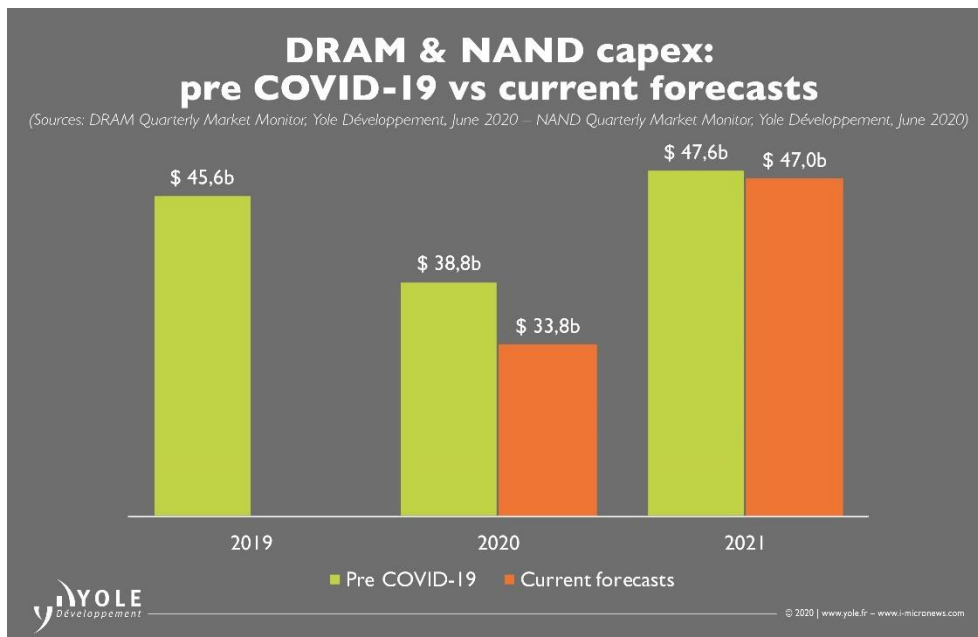
Capex: current forecast assumes a much steeper 2020 capex drop-off

Prior to the COVID-19 outbreak expectations were for combined DRAM and NAND capex of US\$38.8 billion in 2020, down 15% year-over-year, including both WFE² and infrastructure spend. This decrease was a result of the memory market downturn that plagued 2019—and much of 2018 for NAND—as well as the timing of infrastructure build outs and technology transitions.

*“The current forecast assumes a much steeper 2020 capex drop-off, with combined DRAM and NAND capex of US\$33.8 billion, down 26% from 2019 and 13% lower than the prior outlook”, asserts **Mike Howard, VP of DRAM and Memory Research, part of the Semiconductor & Software division at Yole Développement.** “It is expected that the memory suppliers will be more cautious with investments this year due to the uncertainty around second half demand and longer-term economic ramifications. The memory suppliers are likely to err on the side of caution and push spend into 2021 or potentially further depending on market conditions.”*

¹ Extracted from [NAND Quarterly Market Monitor](#) and [DRAM Quarterly Market Monitor](#), Yole Développement, June 2020

² WFE : Semiconductor Wafer Fab Equipment



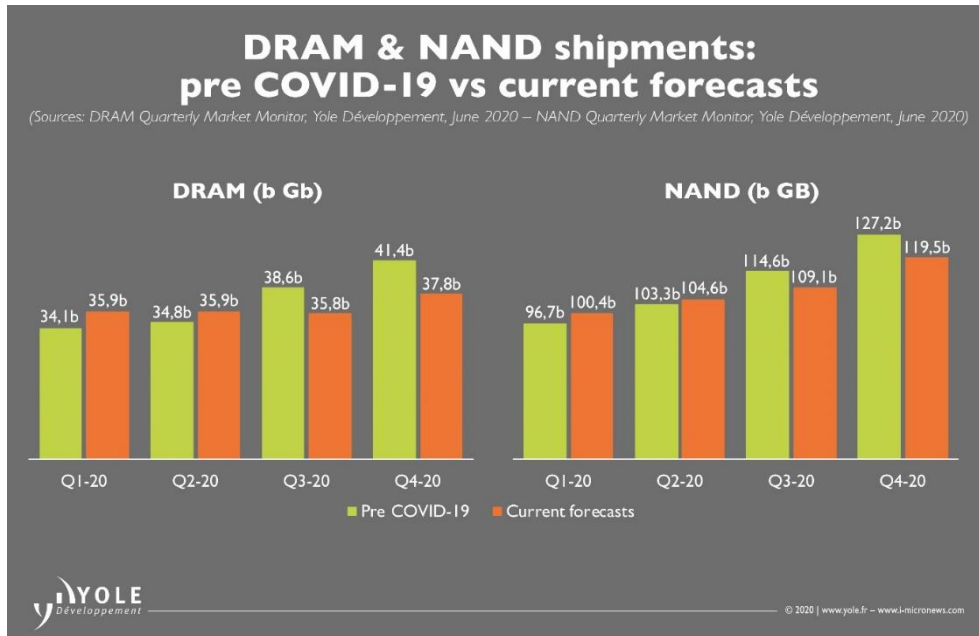
COVID-19: an impact almost immediately felt by the memory suppliers

Indeed, Yole’s analysts point out the shift in first half bit shipments for both market segments, DRAM and NAND.

The widespread work- and learn-from-home transition has provided a near-term boost to the memory suppliers, leading to first half memory bit shipments higher than previously anticipated. Shipment growth has been led by strong server and PC demand and customer buy-aheads due to supply chain concerns, which have helped offset initial COVID-related weakness in the smartphone and consumer markets.

“Looking ahead to the rest of the year, although datacenter demand is expected to remain resilient, we anticipate continued weakness in the smartphone and consumer markets and softening PC demand after the initial surge from the first half wanes”, explains **Walt Coon, VP of NAND and Memory Research, part of the Semiconductor & Software division at Yole.**

Demand for traditional enterprise servers is also at risk, as economic uncertainty may lead to more conservative IT spend. As a result, second half 2020 bit shipment expectations have been lowered for both DRAM and NAND.



The impact to NAND bit shipments is not expected to be as significant as DRAM for a several reasons.

Walt Coon from Yole: *“Prior to the outbreak, 2020 NAND bit growth was already expected to be constrained, with the market just emerging from a major downturn and supply impacts from previous capex cuts taking hold.”*

Additionally, NAND has the continued benefit of the HDD-to-SSD replacement cycle in PC’s, with the current PC demand surge coming from corporate buyers who overwhelmingly use SSD-based storage along with Chromebooks on the education side using NAND-based storage. Finally, the introduction of new gaming consoles later this year, which are shifting from HDD to high density SSD-based storage solutions, will provide a significant boost to bit demand in the second half.

Mike Howard from Yole: *“For the full year, DRAM bit growth (2020 vs. 2019) has been lowered from 17% in the prior forecast to 15%, while NAND bit growth has been lowered from 30% to 29%.”*

WHAT’S NEXT?

Consequences of the covid-19 outbreak

Effects from the COVID-19 pandemic on the memory markets have been immediate and dramatic. According to Yole, they are expected to continue impacting the memory markets into the foreseeable future. Memory suppliers will so respond proactively and with caution given the uncertainty in the markets to ensure the long-term health of the memory industry. In this context, lot of questions are pending and Yole’s memory analysts investigate to deliver detailed updates all year long within the NAND Quarterly Market Monitor and the DRAM Quarterly Market Monitor.

Yole's Memory Quarterly Market Monitors, NAND and DRAM will be published every beginning of June (Q2), September (Q3) and December (Q4). The aim of Yole's team is to give a closer look at the main markets and players.

Yole's analysts invite you to follow our memory activities on i-Micronews, especially during this complex period due to the impact of Covid-19 and discover the memory reports collection including: Status of the Memory Industry, Emerging Non-Volatile Memory and more.

Stay tuned to i-Micronews to get further info. about our memory activities!

Press contacts

Sandrine Leroy, Director, Public Relations, leroy@yole.fr

Marion Barrier, Assistant, Public Relations, marion.barrier@yole.fr

Le Quartz, 75 Cours Emile Zola – 69100 Villeurbanne – Lyon –France – +33472830189
www.yole.fr - www.i-micronews.com– [LinkedIn](#) – [Twitter](#)

About the Memory team at Yole Développement

Walt Coon joins Yole Développement's memory team as VP of NAND and Memory Research, part of the Semiconductor & Software division.

Based in the US, Walt is leading the day-to-day production of both market updates and Market Monitors, with a focus on the NAND market and semiconductor industries. In addition, he is deeply involved in the business development of these activities.

Walt has significant experience within the memory & semiconductor industry. He spent 16 years at Micron Technology, managing the team responsible for competitor benchmarking, and industry supply, demand, and cost modeling. His team also supported both corporate strategy and Mergers & Acquisitions analysis.

Previously, he spent time in Information Systems, developing engineering applications to support memory process and yield enhancement.

Walt Coon earned a Master of Business Administration from Boise State University (Idaho, United-States) and a Bachelor of Science in Computer Science from the University of Utah (United-States).

Mike Howard is a member of the memory team at Yole Développement (Yole) as VP of DRAM and Memory Research.

Mike's mission at Yole is to deliver a comprehensive understanding of the entire memory and semiconductor landscape (with special emphasis on DRAM) via market updates and Market Monitors. Mike is also deeply involved in the business development of all memory activities. Mike is based in the US.

Mike has a deep understanding of the DRAM and memory markets with a valuable combination of industry and market research experience. For the decade prior to joining Yole, Mike was the Senior Director of DRAM and Memory Research at IHS. Before IHS, Mike worked at Micron Technology where he had roles in corporate development, marketing, and engineering.

Mike earned a Master of Business Administration at The Ohio State University (United-States), a Bachelor of Science in Chemical Engineering and a Bachelor of Arts in Finance at the University of Washington (Washington, United-States).

Simone Bertolazzi, PhD is a Technology & Market analyst at Yole Développement (Yole) working with the Semiconductor & Software division. He is member of the Yole's memory team and he contributes on a day-to-day basis to the analysis of nonvolatile memory technologies, their related materials and fabrication processes. Previously, Simone carried out experimental research in the field of nanoscience and nanotechnology, focusing on emerging semiconducting materials and their opto-electronic device applications. He (co-) authored more than 15 papers in high-impact scientific journals and was awarded the prestigious Marie Curie Intra-European Fellowship.

Simone obtained a PhD in physics in 2015 from École Polytechnique Fédérale de Lausanne (Switzerland), where he developed novel flash memory cells based on heterostructures of two-dimensional materials and high-k dielectrics.

Simone earned a double M. A. Sc. degree from Polytechnique de Montréal (Canada) and Politecnico di Milano (Italy), graduating cum laude.

Emilie Jolivet is Director of the Semiconductor & Software Division at Yole Développement, member of the Yole Group of Companies, where her specific interests cover package & assembly, semiconductor manufacturing, memory and software & computing fields.

Based on her valuable experience in the semiconductor industry, Emilie manages the expansion of the technical and market expertise of the Semiconductor and Software Team. The team interacts daily with leading companies allowing semiconductor & software analysts to collect a large amount of data and integrate their understanding of the evolution of the market with technology breakthroughs.

In addition, Emilie's mission focusses on the management of business relationships with semiconductor leaders and the development of market research and strategy consulting activities inside the Yole group.

Emilie Jolivet holds a Master's in Applied Physics specializing in Microelectronics from INSA (Toulouse, France). After an internship in failure analysis at Freescale (France), she was an R&D engineer for seven years in the photovoltaic business where she co-authored several scientific articles. Enriched by this experience, she



Press Release

graduated with an MBA from IAE Lyon and then joined EV Group (Austria) as a business development manager in 3D & Advanced Packaging, before joining Yole Développement in 2016.

About Yole Développement

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services as well as reverse engineering and reverse costing services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide... [More](#)

For more information and images, please visit [i-Micronews](#)

###