

After difficult market conditions in 2019, NAND & DRAM outlook appears favorable in 2020¹

Quarterly Market Monitor

MARKET DYNAMICS:

- NAND market conditions and profitability for the vendors improved in Q4 2019.
- NAND industry margins remained negative during this period.
- NAND capex is likely down slightly in 2020 and includes early ramp spend from YMTC.
- DRAM revenue was down slightly in Q4-19 but market dynamics improved.
- DRAM Capex was down in 2019 and will decline again in 2020, helping the market recover in 2020 and beyond.

MARKET OUTLOOK

NAND strengthens, DRAM nears the bottom, announces Yole Développement (Yole). In addition COVID-19 leads to uncertainty...

Combined DRAM and NAND revenue was higher in Q4 2019 with revenue increasing \$0.7 billion to \$27.5 billion. Revenue for Q4-19 rose 2.5% compared to Q3 2019 and decreased 23.4% compared to Q4 2018. Demand in Q4-19 was robust due to seasonality and recovering datacenter demand. Supply growth was somewhat constrained due to low production growth and normalizing inventory levels.

The following includes further details on the performance of the NAND and DRAM markets for Q4-19 with a look ahead to the coming quarters. The situation surrounding COVID-19 remains extremely fluid. Yole continues to actively monitor the supply chain and will adjust our outlook in real-time as information becomes available...

Profitability for the NAND vendors improved in Q4-19, but industry margins remained negative, at -3%, with Samsung the only supplier posting positive margins. *“Looking ahead, it is imperative that supplier margins improve to support this capital-intensive business,”* asserts **Walt Coon, VP of NAND and Memory Research, part of the Semiconductor & Software division at Yole.**

DRAM market share rankings for Q4 2019 did not change, with Samsung retaining the top spot, SK hynix holding onto the second spot, Micron retaining third place, and Nanya holding

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

onto fourth place... Given the capital expenditure plans for 2019 and 2020 Yole's analyst do not expect significant shifts in manufacturing market share this year.

"Improving market conditions in 2020 will result in rising prices and revenue for the DRAM market," forecasts **Mike Howard, VP of DRAM and Memory Research, part of the Semiconductor & Software division at Yole.**

WHAT'S NEXT?

Consequences of the covid-19

COVID-19 pandemic makes forecasting extremely difficult, comment Yole's memory analysts. The dynamics of the DRAM industry over the last 18 months provide some insight into potential industry performance going forward. Capital expenditure was cut significantly (~30%) in 2019 and, as late as Q3-19, plans existed at suppliers to reduce capital expenditure by as much again in 2020. Given the anticipated significant reduction in global DRAM demand, it is likely that capital expenditure will be down substantially in 2020. Although demand for 2020 is still very much unknown, suppliers will likely lower production plans in anticipation of weak demand. At Yole, analysts believe low investment (resulting in low production growth) will result in a market that is better balanced than the falloff in demand would indicate...

Despite COVID-19, NAND outlook for early 2020 appears to be favorable for the suppliers. Blended NAND pricing will increase in Q1-20 and likely again in Q2 given current pricing momentum, normalized inventory levels, and limited production growth, offsetting lower seasonal demand growth and initial impacts from the virus.

"The second half of 2020 is clearly at significant risk," comments Walt Coon from Yole. Will COVID-19 cause massive demand destruction (instead of demand pushouts)? Will the YMTC ramp up and growth from incumbent suppliers offset improving seasonal demand aided by the arrival of new gaming consoles? ...

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 March (Q1), 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!

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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



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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](#)

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