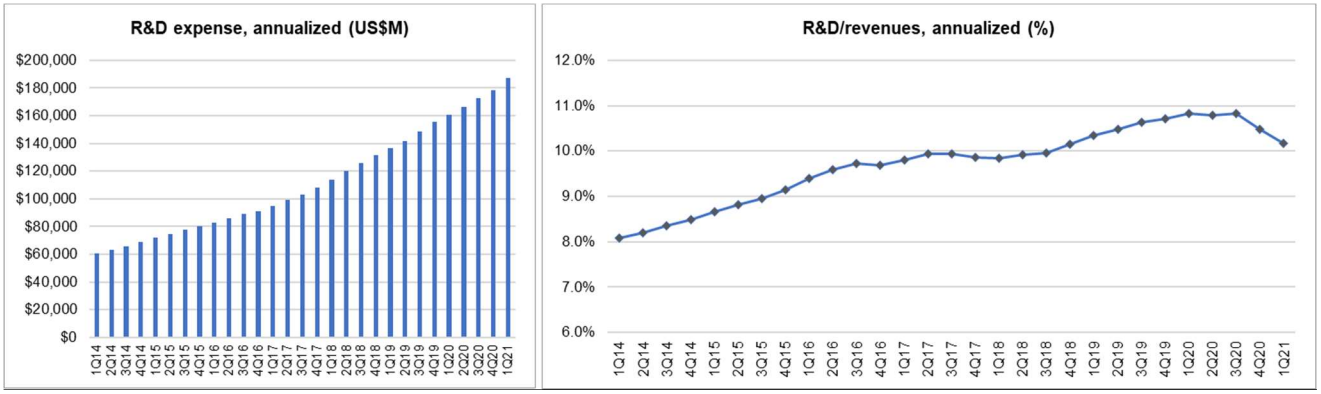
for use in their end product. Figure 5 illustrates the webscale sector's R&D spending over the last few years, in absolute terms and as a percentage of revenues.

Figure 5: R&D expense and R&D as percent of revenues, webscale sector



Source: MTN Consulting

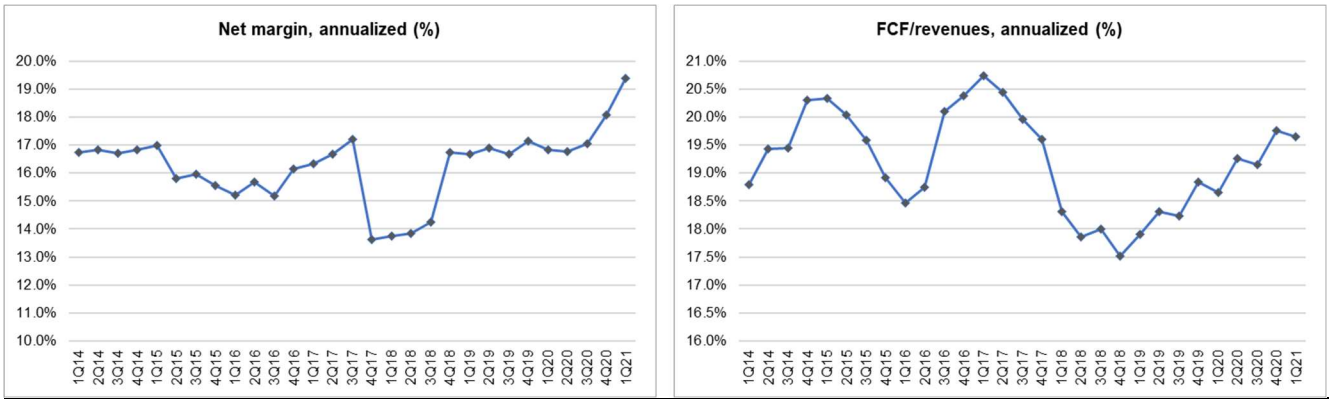
The recent drop-off in the R&D to revenues ratio (above chart, right) is due to the above-average growth of the ecommerce sector, which is dominated by companies spending relatively little on R&D.

Focus areas for R&D spending among webscale providers include: operating systems; artificial intelligence capabilities; homegrown chip design and development; content development, streaming platforms, and gaming; device and component development and optimization; autonomous vehicles; smart cities applications; and, healthcare platforms. Some portion of webscale R&D involves payments for the licensing of intellectual property from other companies, including partners and affiliates.

Profit margins remain strong

Figure 6 illustrates average net profit margins and free cash flow margins, on an annualized basis, for the webscale sector.

Figure 6: Webscale net profit and free cash flow margins, annualized



Source: MTN Consulting

As shown above, margins dropped in 2018 for both measures. That was due in part to big surge in capital spending that year, as well as company-specific factors like a weak year for the iPhone, for Apple. Both net income and FCF margins, though, have increased over the last few quarters. The growth in net margin has been more consistent as FCF margin growth has been hampered by a big run-up in capital spending.