Technology Sector Mostly Resilient Through COVID-19

What’s changed?

Ratings Expectations. S&P Global took 51 negative rating actions across the technology sector during March and April due to pandemic-related concerns but rating actions have been more balanced since May and with a positive bias since late summer. Based on our 2021 information technology (IT) spending forecast for a 3.4% growth and an improving global economy, positive ratings bias may continue, with more outlook revisions to stable from negative in 2021.

What are the key assumptions for 2021?

IT Forecast. We expect global IT spending will grow about 3.4% in 2021, lagging our global GDP forecast of 5.3%. Despite pockets of strength (such as robust cloud spending and acceleration of 5G technology), we expect certain hardware sales, such as PCs, to decline as the tailwind of work-from-home sales in 2020 turns into a headwind in 2021 and enterprises continue to monitor their spending.

New U.S. Administration. Tech regulation will remain a focus under the new administration. While U.S.-China trade tensions will continue, we expect policies to be more predictable, with the possibility of easing of trade barriers. The new administration may seek to reverse some of the corporate tax cuts, but we don’t expect the impact to be detrimental for tech companies.

What are the key risks around the baseline?

Mergers and Acquisitions (M&A). We expect semiconductor industry to continue to consolidate due to higher research and development (R&D) requirements and benefit from scale efficiencies. Legacy hardware providers may also seek M&A or divestitures to reposition their product portfolios as they face challenges from accelerating cloud migration, which could portend elevating credit risk in 2021.

IT Recovery. There is a high degree of uncertainty around our IT spending growth forecast as we assume a COVID-19 vaccine will be widely available by mid-2021. If Asia, especially China, relapses and supply chain is disrupted, impact to the tech sector could be severe.
Ratings trends and outlook

Global Technology

Chart 1
Ratings distribution

Chart 2
Ratings distribution by region

Chart 3
Ratings outlooks

Chart 4
Ratings outlooks by region

Chart 5
Ratings outlook net bias

Chart 6
Ratings net outlook bias by region

**Shape of recovery**

Table 1

<table>
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<th>Sensitivities and Structural Factors</th>
<th>Shape Of Recovery</th>
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<tr>
<td>Technology</td>
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<tr>
<td>IT Services</td>
<td>Moderate</td>
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<tr>
<td>Software</td>
<td>Low</td>
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<tr>
<td>Hardware</td>
<td>Moderate</td>
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<tr>
<td>Semiconductors</td>
<td>Moderate</td>
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Source: S&P Global Ratings.

S&P Global Ratings believes there remains a high degree of uncertainty about the evolution of the coronavirus pandemic. Reports that at least one experimental vaccine is highly effective and might gain initial approval by the end of the year are promising, but this is merely the first step toward a return to social and economic normality; equally critical is the widespread availability of effective immunization, which could come by the middle of next year. We use this assumption in assessing the economic and credit implications associated with the pandemic (see our research here: [www.spglobal.com/ratings](http://www.spglobal.com/ratings)). As the situation evolves, we will update our assumptions and estimates accordingly.

This report does not constitute a ratings action.
Technology

Ratings trends and outlook

S&P Global took 51 negative rating actions in March and April across the technology sector, mostly in the speculative-grade category, as a result of pandemic-related concerns. Since May, financial markets have stabilized, economies have gradually reopened, and work-from-home adoption accelerated enterprises’ move to the cloud and spurred purchases of IT hardware. As a result, our technology issuer rating actions have become more favorable over the past six months. We expect modest expansion of global IT spending in 2021, spurred by continued growth in the cloud and ramping of 5G smartphone sales, underpinned by a gradually improving global economy and a vaccine widely available by mid-year. Under this scenario, we believe ratings will continue its upward bias, with more outlook revisions to stable from negative through 2021.

Main assumptions about 2021 and beyond

1. Global IT spending will return to modest growth in 2021
We forecast global IT spending will decrease about 2.8% in 2020, better than our global GDP forecast of a drop of 4%, as COVID-19 has accelerated the digital transformation. Our 2021 IT spending outlook is cloudy, but we forecast global IT spending will grow about 3.4%, solid but lagging our global GDP forecast of 5%. Despite pockets of strength (such as robust cloud spending and acceleration of 5G technology), we expect certain IT hardware sales, such as PCs, to decline as work-from-home benefits in 2020 turn into a headwind in 2021 and enterprises continue to monitor their spending on IT services and software.

2. New U.S. administration should provide stability
Tech regulation will remain a focus under the new administration as big tech expands its global footprint, and we expect companies to be resourceful in remediating any impact from new legislations. While U.S.–China trade tensions will continue with ongoing intellectual property (IP) disputes and China’s investment in homegrown tech, we expect policies under the new administration to be more predictable, with the possibility of lowering of trade barriers and providing assistance to U.S. companies diversifying out of China. The new administration may seek to reverse some of the corporate tax cuts enacted under the Tax Cut and Jobs Act of 2017, and while we expect such measures to hurt companies’ bottom lines and cash flow, we don’t expect the impact to be detrimental for tech companies.

The U.S.–China trade tensions and the supply chain disruptions caused by the COVID-19 pandemic have put on center stage the tech sector’s reliance on China as a global manufacturing hub. Any diversification away from China will be gradual. Additionally, China’s goal to achieve technological self-reliance should be interpreted as a sign of fierce competition between the U.S. and China and a continued focus on national security concerns by both countries for many years to come. While we do not expect China to materially narrow the gap with the U.S. on the most advanced technologies in the near term, longer term a stronger China, supported by policies and commitments within China’s public and private sectors, will be disruptive to the tech industry.
Global IT spending will return to modest growth in 2021

After an initial wave of factory shutdowns and supply chain challenges, IT spending has proven mostly resilient in 2020. COVID-19 has accelerated the digital transformation across enterprises, and demand for remote work hardware and online resources led to solid sales of personal computers (PCs). Data center spending, especially by hyperscale cloud providers, jumped as enterprise customers accelerated their move to the cloud to create more flexible and resilient remote work environment. Semiconductor sales, especially memory, exceeded expectations and software sales remained sticky. We expect 2020 global IT spending to decline about 2.8% (see table 2).

Our 2021 IT spending outlook is cloudy as global economic recovery will be largely driven by the prevalence of COVID-19 cases, which are spiking across the U.S. and Europe currently, and the availability of a vaccine, which we assume will be widely available by mid-2021. Against this backdrop, we forecast that global IT spending will increase by about 3.4% in 2021, a solid growth but one that lags our global GDP growth forecast of 5%. We believe IT spending will grow less than global GDP as work-from-home benefits in 2020 will turn into a headwind in 2021 as many enterprises have pulled forward their hardware purchases into 2020. We believe enterprises will continue to scrutinize their IT budgets and delay growth-oriented projects that have longer payback periods. Software sales, especially SaaS, will continue to expand but the growth rate could be below recent trends as price increases will be difficult to implement. We believe these pockets of slower growth will partially offset continued strong cloud spending and wide adoption of 5G smartphones.

Over the longer term, we expect IT spending to outgrow global GDP as enterprises continue with the digital transformation to meet evolving demand for the next wave of technology innovations in areas such as Internet of Things, artificial intelligence (AI), machine learning, and autonomous driving, which all require greater connectivity, storage, and processing power.

Below we discuss the outlooks for key technology products.

Table 2

Growth Forecasts

<table>
<thead>
<tr>
<th></th>
<th>2019</th>
<th>2020e</th>
<th>2021e</th>
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</thead>
<tbody>
<tr>
<td>Macro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global GDP Growth</td>
<td>2.8%</td>
<td>(4.0%)</td>
<td>5.0%</td>
</tr>
<tr>
<td>Global IT Spending</td>
<td>4.2%</td>
<td>(2.8%)</td>
<td>3.4%</td>
</tr>
<tr>
<td>Revenues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Services</td>
<td>4%</td>
<td>(3%)</td>
<td>3%</td>
</tr>
<tr>
<td>Software</td>
<td>9%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>(12%)</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Network Equipment</td>
<td>3%</td>
<td>(5%)</td>
<td>2%</td>
</tr>
<tr>
<td>Mobile Telecom Equip</td>
<td>3%</td>
<td>(1%)</td>
<td>0%</td>
</tr>
<tr>
<td>External Storage</td>
<td>1%</td>
<td>(7%)</td>
<td>5%</td>
</tr>
<tr>
<td>Shipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>(1%)</td>
<td>2%</td>
<td>(7%)</td>
</tr>
<tr>
<td>Smartphone</td>
<td>(2%)</td>
<td>(10%)</td>
<td>7%</td>
</tr>
<tr>
<td>Server</td>
<td>(2%)</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Printer</td>
<td>(15%)</td>
<td>1%</td>
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IT services

We expect the IT services industry to experience 3% revenue growth in 2021, following what we estimate is a 3% decline in 2020. We note that the performance in IT services is less volatile than global GDP or overall IT spending given its typically contractual

Work-from-home benefits in 2020 will turn into a headwind in 2021 as many enterprises have pulled forward their hardware purchases into 2020
recurring nature of project work as well as the steady increase in digital-oriented work to modernize existing business operations and workflows.

The IT services industry is not without its worries: we saw COVID-19 caused customers to delay large projects, such as enterprise resource planning (ERP) software implementations and consulting engagements that have longer payback periods, whereas application management and other projects that allow for remote-delivery have been less impacted. The urgency for cloud adoption, digital transformation, and automation has never been clearer and we believe more enterprise customers will accelerate their cloud migration and digitalization journey.

To keep up with this, traditional IT services providers will need to modernize their offerings. Scale and efficiency gains will be crucial to maintaining profitability, especially in the secular declining areas such as business process and data center outsourcing.

**Software**

We expect software market growth to be about 4% in 2021, up from about 2% in 2020, but well below the high-single digit pace from 2019. Belt tightening among enterprise customers amid the COVID-19 pandemic caused the contraction in 2020 and we expect some of those effects will linger into 2021. Demand shocks and work-from-home policies have increased pressure on companies to find efficiencies and become more flexible. This has accelerated their digital transformation plans, which rely heavily on software, so while we forecast software market growth in 2021 to remain below its long-run average due to continued COVID-19 uncertainty, we expect it to return to high-single-digit levels in 2022 once the spread of the virus is under control.

Software-as-a-service (SaaS), which represents about one-third of the total software market, has proven to be one of the best performing subsectors through COVID-19 and should continue to take market share away from on-premises software. The SaaS model provides lower total ownership costs because the SaaS provider can more efficiently manage hardware and maintenance and significantly reduce the customer’s hardware and IT services spending. Customers also find lower upfront costs and less-complex implementations, making the purchase decisions easier for customers. In addition, customers can more easily scale applications across their enterprises, get quicker access to the latest updates, and have more predictable software expenditures as they shift the spending to operating expense budgets from capital expenditure budgets.

**Semiconductors**

S&P Global’s view of the semiconductor industry has improved through 2020, supported by the quick recovery from supply chain disruption in China and an improving IT spending environment. First-half 2020 results were mixed: analog and microcontroller sales were down (reflecting weak demand especially in auto and industrial end markets), while logic and memory segments were resilient due to ongoing investments in data centers and hardware sales related to work-from-home practices, gaming, and 5G phones. Third quarter results were mostly better than expected but near-term outlook is mixed given surging COVID-19 cases in U.S. and Europe and still-weak enterprise spending. We currently expect global semiconductor revenues to increase 4% in 2020 (see chart 7).

In 2021 we expect semiconductor spending to improve near 5% area. We expect non-memory growth to grow near 5% as most hardware categories, excluding PC, grow revenues in line with overall global GDP. We especially expect significant growth for semiconductor companies exposed to smartphones as 5G phone shipments could jump from about 200 million units in 2020 to about 500 million units in 2021. Cloud capex, including hyperscale providers, should continue to increase double-digit percent offset by weak hardware sales targeting enterprises. Auto and industrial end markets should also gradually improve through the year. We expect memory sales to grow in excess of global GDP at
about 6% in 2021 as 5G phones require greater memory content, server demand from cloud providers remain solid, and SSD sales continues to gain traction.

Chart 7
Semiconductor industry revenues by segment

While we remain optimistic about industry growth over the longer term (growing semiconductor content, disciplined supply, lower volatility), we maintain a cautious view over the near term, not just because of COVID-19 but also because of the ongoing U.S.-China trade tensions as well as longer term implications stemming from China’s heavy investments in native manufacturing.

Smartphones
We expect the smartphone unit shipments to grow by 7% in 2021, following a disappointing 2020 (we expect 10% unit decline). Shipments have markedly improved since the first quarter as supply chain disruptions eased and consumer spending gradually improved. Our view of a strong smartphone unit sales rebound in 2021 is predicated on the lengthened replacement cycle and pent-up demand, especially when new 5G smartphones are expected to bring new applications and use cases in addition to better data speed, battery life, and camera quality and features. We currently expect 5G smartphone shipments to reach around 500 million units in 2021, more than double the 2020 levels. We believe the Huawei ban will likely cause market share shifts among the major smartphone original equipment manufacturers (OEMs) rather than lost sales.

PC
The personal computers category has been a major benefactor in 2020 as COVID-19 has induced growing purchases of notebooks and tablets due to employees working from home, schools and parents purchasing hardware for remote learning, and growing demand for online entertainment. The growth hasn’t slowed, with IDC reporting that third-quarter 2020 PC shipments grew almost 15% year over year to over 80 million units with sizable backlog. We now expect 2020 PC shipments to be up 2% compared to 2019.
In 2021 we expect global PC shipments to decline roughly 7%, with declines more pronounced in the second half of the year, as aggressive purchases by enterprises and consumers during 2020 leave few upgrade opportunities in the following few years. Ongoing economic uncertainty of a COVID-19 resurgence will also curtail enterprises from aggressively purchasing hardware. Even schools may need to pull back their IT spending given potentially shrinking school budgets. We note that PC industry revenues may decline even more than 7% as cheaper products (such as Chromebooks) continue to take greater share of the laptop market. Over the longer term, we continue to expect the PC market to shrink with the three largest vendors—HP Inc., Dell Technologies Inc., and Lenovo Group Ltd.—continuing to take share from other vendors.

Server

Server shipments are likely to grow near 3% in 2020 primarily due to strong demand from hyperscale cloud providers as they ramp up capital spending to meet demand from work from home and rising e-commerce activity. This trend has slowed during the second half of 2020 as cloud providers digest their purchases, but we still expect cloud demand to be positive in 2021 as workload continues to migrate to the cloud. We estimate hyperscale server purchases account for more than one-third of the total market. We remain cautious of enterprise spending into 2021 as the economic recovery is showing signs of weakening and IT budgets pressured.

In all, we forecast server unit growth near 4% in 2021. However, the market growth will come at the expense of legacy hardware providers such as Dell and HP as large cloud providers continue to design their own servers through original design manufacturers (ODMs). We expect Dell and HP server shipments to decline in 2021 while that of ODMs, whose market share is over 30%, continues to grow.

Storage

We expect external storage systems revenue will grow about 5% in 2021 following a 7% decline in 2020. Enterprise customers reduced technology spending in 2020 in response to COVID-19, and the pandemic has accelerated the shift to the public cloud. However, we expect the release of some pent-up demand in 2021 to result in above-trend growth as enterprises catch up on deferred investment. We also expect all-flash arrays to continue taking share from hybrid and hard disk drive (HDD)-only systems, as NAND chip price declines narrow the cost of flash memory relative to HDDs. We are seeing that large cloud providers prefer to leverage their scale to custom-build storage infrastructure instead of purchasing it from major branded OEMs such as Dell, HP, and NetApp Inc., so the adoption of the hybrid cloud approach—whereby some workloads remain on premises as others shift to the cloud—is critical for the viability of the external storage systems market. Meanwhile, we expect enterprise customers, who have traditionally been major purchasers of external storage systems and have growing storage needs, will leverage technology, especially on the software front, to optimize their storage capacity.

Networking equipment

We expect the networking equipment market to be modestly positive in 2021, reflecting the continued buildout of the cloud data centers and the demand for faster speed on the switching side. The routing segment has been challenged in recent years due to significantly lower spending by the largest customer segment—service providers—mainly because of a lack of major product refreshes. We believe service providers will continue to invest in 100G/400G capacity to meet higher bandwidth demand, especially in the current COVID-19 environment, although we are cautious of historically uneven carrier spending patterns. Enterprise spending, especially on-premise hardware, has been weak during 2020, as evidenced by Cisco Systems Inc., but we expect this to improve modestly through 2021.
Mobile telecommunications equipment

We expect the mobile telecommunications equipment market to be relatively flat in 2021 but grow by a low-single-digit percentage over the longer term, primarily driven by increasing 5G networks roll-out and network densification. 5G investments is still considered in the early stages. As network deployments gradually ramps, this next-generation technology could sustain telecom equipment market growth in the next several years. Over time, we expect 5G investments to intensify given that it offers lower latency and other capabilities supporting enterprises for advanced use cases, including Internet of Things and applications such as autonomous driving. At the same time, we expect a gradual decline in network spending on older technologies.

Beyond the macroeconomic implications of COVID-19, the start of 5G investment in each geographic market is also impacted by the availability of spectrum, a prerequisite to deploying 5G networks. Many operators in North America and Asia have begun to commercialize 5G and are building out their 5G networks. On the other hand, Europe is lagging as many countries have been later to award spectrum access to the telecom operators. Furthermore, rising awareness of security concerns related to Chinese vendors in several European markets have delayed procurement decisions. While we believe 5G will provide growth opportunities to the overall telecom equipment market, the growth trajectory could be somewhat bumpy given the impact from COVID-19 and geopolitical factors.

Printers

We expect printer shipments to decline by 15% in 2020 as remote work and office closures reduce upgrade opportunities in an already shrinking market. Despite this, we do not anticipate a material recovery in 2021, with just a 1% growth, due to digitalization of content and documentation, which will force vendors to pursue new revenue and profit growth strategies, such as expanding service revenue, profit-centric selling, and cost restructuring.

New U.S. administration should provide stability

Regulation

Bipartisan support for tech regulation continues to grow as big tech expands its footprint globally. We continue to view breakup of large-cap tech as a low-probability event; however, the threat of meaningful antitrust actions remains. We expect large tech companies to understand the political environment and avoid sizable M&As in efforts to prevent drawing further attention to their market dominance. While both sides of the aisle have expressed concerns about Section 230 of the U.S. Communications Decency Act, which provides platforms such as Facebook and YouTube protection against liability for content created by its users, a Democratic administration will likely focus on stricter standards around hate speech and disinformation. However, any legislative change will take time, during which companies, we believe, will modify their business models to minimize impact. Furthermore, Vice President-elect Kamala Harris, with her political ties to tech-heavy California, could be a modest positive for the industry. We believe the threat of antitrust actions by regulators could extract changes to how large tech companies operate, but any actions, enforced or self-selected, would be manageable.

China and trade

We expect a less confrontational trade policy with China under the new administration but for U.S.-China trade tension to remain with key issues still unresolved. Lingering disputes and ambition for IP leadership will continue to push China to invest in homegrown tech, including raw material procurement and manufacturing and design capabilities. However, we expect policies under the new administration to be more
predictable, which will be helpful for business planning and capital spending. We also expect lowering trade barriers and building of international coalition against China. We believe the U.S. government could provide financial assistance to tech companies to diversify their manufacturing so as to limit reliance on China. Restrictions around immigration and H1-B visas are likely to be softened, although we do not expect immediate removal of sanctions against Huawei or other Chinese firms. While confrontation with China will likely dominate trade policy in the near term, we expect the technology sector, as well as others such as auto and capital goods, to benefit from less uncertainty around tariffs and more stability around the administration’s decision-making.

**Taxes**

While a divided congress may limit the president-elect’s plans, the Biden administration may still seek to reverse some of the corporate tax cut under the Tax Cut and Jobs Act of 2017 (TCJA), raise the corporate tax rate to 28% from 21%, and reinstate the alternative minimum tax of 15% of book income. Such measures will hurt technology companies’ bottom lines and cash flows, although we don’t expect the impact will be detrimental. Most companies benefited from the TCJA rate reduction, with some using the tax savings and repatriated cash for dividends and stock buybacks. Democrats have long argued that buybacks restrain business’ capacity to reinvest profits more meaningfully, and the Biden administration may propose limiting buybacks without investment in areas such as R&D, higher wages, and better employee benefits. However, the extent of impact on the tech industry is uncertain as we believe tech companies base their investment decisions on demand outlook and longer-term architecture rather than tax rule changes.

**U.S. supply chain diversification and China tech self-reliance at early stages**

China has been the major global manufacturing hub for the tech industry for decades, and while the supply chains have become more complex, conventional wisdom has held that the risks are offset by the benefits. That might be changing. With the rise in geopolitical tension, especially between the U.S. and China, as well as the supply chain disruptions caused by the COVID-19 pandemic, many tech companies are reevaluating their supply chain strategy. Potentially prohibitive costs, questions about the efficiency of labor forces elsewhere, and the need for readily available raw materials/resources stand in the way of a more aggressive manufacturing diversification away from China. More importantly, as China is the world’s second biggest economy, with a burgeoning middle class, tech firms face the potential of alienating and losing access to China.

We believe certain tech vendors will gradually—the emphasis is on gradually—diversify manufacturing and assembly away from China. U.S. federal, state, or local governments could provide subsidies to incentivize the reshoring of tech manufacturing, especially in areas that are considered national security concerns. While this could be perceived as a step toward tech deglobalization, we believe any diversification efforts will be focused on building new manufacturing facilities outside of China, in countries such as Vietnam, India, Mexico, and in Eastern Europe, and closer to end consumers, rather than a lift-and-shift of existing plants. Given the existing supply chain has been established over decades, it will be difficult to completely avoid geographical supply chain dependency risk.

Growing U.S. efforts to curb China’s access to critical U.S. technology have also strengthened China’s determination to reduce its reliance on foreign technology, as laid out in its 14th five-year development plan for 2021-2025. China targets achieving technological self-reliance by 2035; this is the first time that it has clearly set a self-sufficiency agenda under its flagship development blueprint. For decades, China’s tech advancement has been most noticeable in manufacturing and labor efficiencies, and it has recently made substantial progress in new technology such as 5G mobile communications and AI.
However, China remains significantly behind in semiconductor technology, which is still tightly controlled by the US, Japan, and other countries such as Taiwan and Korea. The Chinese government has long pursued moving up the value chain, and the strategy of pursuing self-sufficiency is not new. In 2015, Premier Li Keqiang introduced the policy of “Made in China 2025,” which encouraged the development of high tech products and services, particularly semiconductor manufacturing. The policy was followed up by aggressive investments and subsidies. It asked for 70% of domestic semiconductor consumption to be made locally in 2025, a goal that seems beyond reach, given that China only produced about 16% of its semiconductor consumption and imported over $300 billion of semiconductors in 2019. The pace of Chinese expansion could slow at least in 2020-2021 after the U.S. government tightened export control in June 2020.

The limited success of China’s Made in China 2025 policy highlights the challenges plaguing China’s ambitions to build its own technology industry. First, the semiconductor supply chain is complex and globalized. With the U.S. blockade likely staying in place until at least early 2021, China is likely to lack the access to critical equipment and materials to advance its technology. It remains unclear whether the U.S. government will grant licenses for equipment sales to Chinese semiconductor companies such as SMIC, and their scope if granted. Developing critical equipment locally carries high execution risk with questionable commercial viability. Forcing local manufacturers to use sub-optimal equipment in their manufacturing processes will certainly weaken their efficiency and competitiveness in the face of global competition.

Second, it has been difficult to reach technology parity with industry leaders who have amassed a significant portfolio of IP after decades of operational experience and industry consolidation. For example, SMIC has seen its gap with TSMC widen constantly over the years, despite heavy government subsidies to its R&D efforts. Without prospects of obtaining advanced technology through acquisitions, the technology gap between Chinese semiconductor companies and global leaders seems unlikely to narrow quickly even with coordinated efforts by the government. Also, China lacks semiconductor talent, and recruits from overseas continue to face high hurdles because of high political and legal risks. It could take a long time for China to nurture sufficient home-grown talent for its semiconductor supply chain. All those constraints indicate that China’s ambition to become fully self-sufficient in technology, particularly related to semiconductor supply, is truly a long march, despite increasing state coordination and spending.

We believe China’s ambitious plan is unlikely to materially alter the competitive landscape in the global semiconductor market over the next several years based on the constraints it is currently facing. However, increase in Chinese semiconductor supply may still introduce oversupply risk to certain product segments that use more mature technology.

**Credit metrics and financial policy**

Investment-grade companies’ balance sheets have remained mostly consistent over the past few years. By and large, most technology companies have refrained from overextending their balance sheets following the U.S. tax reform in 2017, with a few exceptions. Notably, we downgraded Oracle Corp. and Qualcomm Inc. due to increased share buybacks, and IBM Corp. due to its acquisition of RedHat Inc (see chart 8). However, companies with significant balance sheet capacity such as Cisco Systems Inc, Microsoft Corp., and Intel Corp. have executed sizable share repurchases utilizing their excess liquidity, and therefore their ratings remain unchanged. Following tax reform, Apple stated its intention to reach a roughly net cash neutral position over time, although it has been moving towards it slowly and is roughly halfway towards its goal.

The tech sector is acquisitive, particularly in the semiconductor and software segments. The semiconductor space has been consolidating since 2015 as companies seek to enhance their product portfolios, strengthen their competitive positions, gain leverage
with customers and suppliers, and capture cost efficiencies. Software companies seek to acquire targets that will provide cross-selling opportunities and to gain exposure to fast-growing segments that allow for shortened time-to-market or add capabilities difficult to build organically; in addition, targets can have very high valuations without much profit or cash flow contribution, such as the recently announced acquisition of Slack Technologies Inc. by Salesforce.com Inc. Still, we have not downgraded many companies due to acquisitions. Many can fund acquisitions with cash flows while others have used substantial equity, such as AMD’s pending acquisition of Xilinx, Analog Devices’ pending acquisition of Maxim, and NVIDIA’s pending acquisition of Arm Ltd. Finally, for other companies that are known to use their balance sheets to finance acquisitive growth strategies, such as Broadcom, we have included cushion within their ratings to accommodate their appetite.

In the speculative-grade space, we are seeing an increase in newly rated financial-sponsored companies following a slow summer as economies recover after lockdowns amid signs of progress on treatments for COVID-19, which has opened leveraged loan markets to new issuers. Among these deals, capital structures are as aggressive, if not more, as they were before the pandemic, with high debt-to-EBITDA ratios and very modest cash flow, aided by historically low interest rates. Most are rated ‘B-’, which indicates that we believe these capital structures are sustainable despite weak credit metrics, often because of solidified competitive positions, unique intellectual property, high recurring revenue, or low capital intensity. We expect rates to remain low over the next few years and the macroeconomic headwinds to gradually recede, but these companies do not have much cushion to absorb execution missteps. We currently expect leveraged loan markets to be accommodative to more highly leveraged technology buyouts into 2021.

Chart 8

2020 global technology rating actions by month

Source: S&P Global Ratings.
## Key risks or opportunities around the baseline

1. **We expect heightened event risks for hardware and semiconductors**

   While M&A may not be a top priority for many in today’s environment, we expect the semiconductor industry to consolidate further, recognizing the increasingly higher R&D investment requirements, the benefits of scale efficiencies, as well as potentially using high stock valuation as currency. Faced with cloud migration trends, accelerated by the COVID-19 pandemic, and underwhelming stock prices valuations, legacy hardware vendors could find themselves evaluating M&As, spin-offs, divestitures, or financial policy changes in search for growth and higher equity valuation.

2. **Legacy technology providers will be challenged in 2021**

   Legacy technology providers face challenges as cloud migration accelerates amidst the pandemic and their growth rates lag those generated by cloud-focused companies. Legacy tech companies are confronting the headwind by focusing on the hybrid cloud environment, but public cloud providers will likely account for an increasing share of overall IT spending. This may force legacy tech providers to acquire high-growth companies or divest declining businesses, which would introduce execution risk and potentially heighten credit risks.

3. **Pace of IT recovery will be determined by COVID-19 trajectory**

   Our 2021 IT spending growth expectations assumes a vaccine or effective treatment will be widely available around mid-2021 and the global economy rebounds to a 5% GDP growth rate but there is high degree of uncertainty as to the evolution of the coronavirus pandemic. We continue to pay close attention to countries that are still struggling to contain their first waves (e.g. the U.S. and India), and the new national restrictions placed on certain European countries, which may not only dampen economic activity in the fourth quarter of 2020 but into early 2021. If Asia, in particular China, relapses and the manufacturing and transporting of goods are disrupted or shutdown, the impact to the tech sector could be more severe.

### We expect heightened event risks in hardware and semiconductors

Following two years when the escalating U.S.-China trade tension had discouraged semiconductor companies from M&A considerations, a flurry of large-scale M&A transactions announced in 2020 seems to have confirmed that the benefit of industry consolidation may outweigh the costs. Rapidly increasing R&D investment requirements, the importance of scale and product diversification to spread the higher R&D costs, as well as consolidating customer bases are reasons in favor of industry consolidation. High equity valuation at many semiconductor firms—e.g. Nvidia Corp., Analog Devices Inc., and Advanced Micro Devices Inc.—also allows the use of stock as currency and provide justification for the deal premium.

We believe the semiconductor industry, over the longer term, will outpace global GDP growth because of its secular growth trends and the increase in electronic content. We anticipate each of the semiconductor subsegments to consolidate further but for different reasons: analog (product diversification), memory (high capital intensity), and microprocessors (end market and customer diversification).

We find legacy hardware companies to be confronted with cloud migration industry headwinds, which has been accelerated by the COVID-19 pandemic, in addition to underwhelming stock prices valuations. IBM Corp., for example, plans to spin-off its
managed infrastructure services business by the end of 2021. Dell is exploring a potential spin-off of its 81% ownership stake in VMware Inc. As workloads continue to shift to the cloud, software-defined storage and networking continue to open up competition beyond traditional hardware vendors, and as digital transformation alters outdated business processes and hardware requirements, we anticipate greater chances of M&A, spin-offs, divestitures, and financial policy changes by legacy hardware vendors.

Legacy technology providers will be challenged in 2021

Legacy technology providers face challenges as cloud migration accelerates amidst the pandemic. Aside from a temporary boost to sales of PCs and peripherals, legacy hardware providers have seen revenue declines in enterprise servers, storage, and networking products, and IT service providers have seen reduced demand for their consulting services. Legacy software providers, such as Oracle Corp. and SAP SE, continue to lose market shares to born-in-the cloud companies, such as Salesforce.com Inc. and ServiceNow Inc.

In contrast, cloud providers, especially hyperscale players, continue to generate record revenues and are spending aggressively to expand their footprints, with capex likely to increase over 20% in 2020. These companies design most of their own hardware and software and manufacture them through ODMs, bypassing branded hardware providers such as Dell and HPE along the way. IDC forecasts that total spending on cloud services, including hardware, software, and services, will exceed $1 trillion by 2024 with a 15% compound annual growth rate. IDC also expects that 80% of enterprises will accelerate their shift to public and hybrid cloud during 2021—a rate twice as fast as before the pandemic.

Many legacy technology companies are confronting the headwind by focusing on the hybrid cloud environment. While this is an attractive opportunity, public cloud providers will continue to account for a greater share of overall IT spending and legacy tech companies may face a shrinking total addressable market. Although we expect IT budget to improve in 2021, corporate budgets will remain heavily scrutinized, especially if COVID-19 continues to be widespread. We believe legacy tech companies may look to acquire high growth companies or opt to divest declining businesses in the future, which would introduce execution risk and potentially heighten credit risk.

Pace of IT recovery will be determined by COVID-19 trajectory

While the threat from COVID-19 persists, the tech sector has fared better than most, especially for software firms capable of providing cloud-based, remotely serviced offerings. Vendors that offer communication and collaboration tools, IT security, and educational software received a temporary boost and capitalized on enterprises’ spending priorities. On the other hand, enterprise hardware sales and large software implementation and IT services projects, get the brunt of the impact when customers prioritize capital preservation and are reluctant to commit to sizable IT commitments.

We acknowledge a high degree of uncertainty about the evolution of the coronavirus pandemic. The current consensus among health experts is that COVID-19 will remain a threat until a vaccine or effective treatment becomes widely available, which could be around mid-2021. We are using this assumption in assessing the economic and credit implications associated with the pandemic and formed our base case of a gradual recovery from here. We continue to pay attention to countries that are still struggling to contain their first waves (e.g. the U.S. and India), and the new national restrictions placed on certain European countries as coronavirus cases continue to rise, which may not only dampen economic activity in the fourth quarter 2020 but into early 2021. If Asia, in particular China, relapses and the manufacturing and transporting of goods are disrupted or shut down, the impact to the tech sector could be more severe given the already weakened state of the enterprise customers.
Related Research

- 2020 Global IT Spending Outlook Improves Through COVID-19 Disruption, Sept. 21, 2020
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- E-Commerce Shift Puts Omnichannel And Digital Payment Providers In Gear, Aug. 27, 2020
- U.S. Firms Face Calls To Cut Chinese Supply Chains But See Few Options, July 30, 2020
Industry forecasts

Global Technology

Chart 9
Revenue growth (local currency)

Chart 10
EBITDA margin (adjusted)

Chart 11
Debt / EBITDA (median, adjusted)

Chart 12
FFO / Debt (median, adjusted)

Source: S&P Global Ratings. Revenue growth shows local currency growth weighted by prior-year common-currency revenue-share. All other figures are converted into U.S. Dollars using historic exchange rates. Forecasts are converted at the last financial year-end spot rate. FFO—Funds from operations.
Cash, debt, and returns

Global Technology

Chart 13
Cash flow and primary uses

- Capex
- Dividends
- Net Acquisitions
- Share Buybacks
- Operating CF

Chart 14
Return on capital employed

Chart 15
Fixed versus variable rate exposure

- Variable Rate Debt (% of Identifiable Total)
- Fixed Rate Debt (% of Identifiable Total)

Chart 16
Long term debt term structure

- LT Debt Due 1 Yr
- LT Debt Due 2 Yr
- LT Debt Due 3 Yr
- LT Debt Due 4 Yr
- LT Debt Due 5 Yr
- LT Debt Due 5+ Yr
- Val. Due In 1 Yr [RHS]

Chart 17
Cash and equivalents / Total assets

Chart 18
Total debt / Total assets

Source: S&P Global Market Intelligence, S&P Global Ratings calculations. Most recent (2020) figures are using last twelve months (LTM) data.