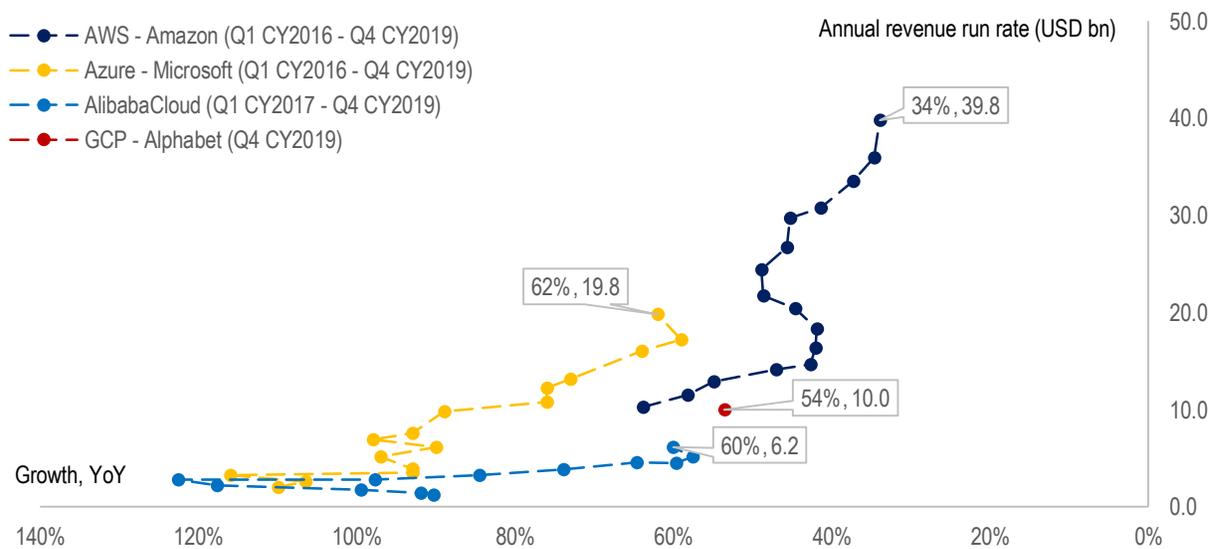




Cloud computing (IaaS) – growth vs scale

Figure 1: annual revenue run rate vs growth rate, YoY



Source: Company data, AMTD Research estimates

**AMTD views:** major IaaS vendors have posted their latest results. AWS is still leading the competition with an annual revenue run rate of US\$39.8bn (growth rate of 34%, YoY), followed by Azure, GCP (incl. G Suite), and Alibaba Cloud at run rate of US\$19.8bn (+62%, YoY), US\$10.0bn (+54%, YoY), US\$6.2bn (+60%, YoY) in Q4 CY2019, respectively. From the growth curves above, we found that AWS has managed its growth pace between 30-40% since its run rate reached above US\$15bn. Today, Azure’s run rate has entered this range but it seems to have a high growth rate. There’s always a trade-off between growth and scale, however, deeper and wider-range portfolio could make the growth curve much steeper here, in our view.

**AMTD Research**  
**Brian Li**  
 +852 3163-3384  
 brian.li@amtdgroup.com

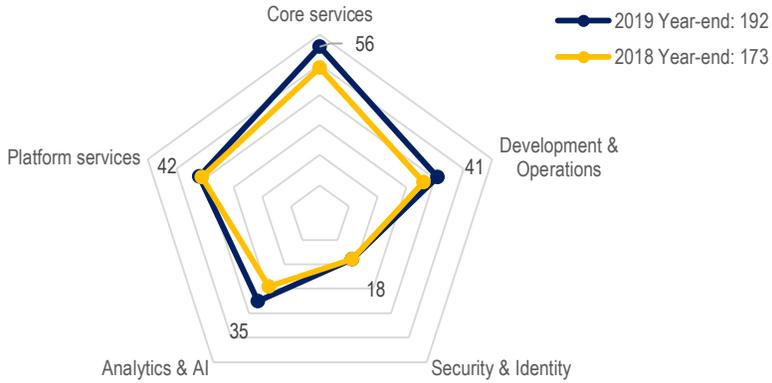
**AMTD Research**  
**Michelle Li**  
 +852 3163-3383  
 michelle.li@amtdgroup.com

**AMTD Research**  
**Roy Wu**  
 +852 3163-3242  
 roy.wu@amtdgroup.com

**AWS – well balanced leader in IaaS**

AWS is a well-balanced leader in IaaS in terms of number of products and revenue. As of the end of 2019, AWS offered more than 190 different types of products, an increase of about 20 from the end of last year and has expanded products and services in various aspects. In re:Invent 2019, AWS unveiled new chips for cloud computing and several new features for machine learning, hoping to strengthen its leading position by leveraging its balanced product mix. (please see our note: [AMTD Global Tech Biweekly vol.14](#) for details)

**Figure 2: product mix of AWS at period end (total no. of products)**

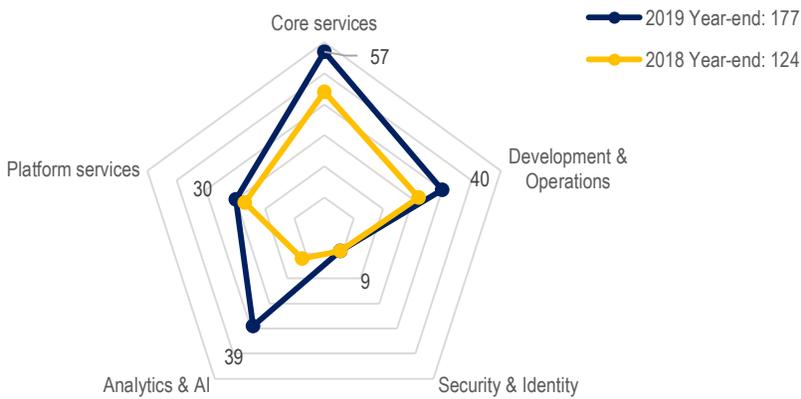


Source: <https://aws.amazon.com/>, AMTD Research  
 Note: Core services include Compute, Storage, Database, Networking, etc.; Platform services include Mobile & Web, Gaming, Media, IoT, etc.

**Azure – full speed chaser in IaaS**

From the chart on front page, we find that Azure is above the growth curve of AWS, which, we believe, is attributable to the depth of Azure’s product mix. Over the past year, Azure has strengthened its products in cloud core services and development & operations, and in particular, has made great progress in AI field. Despite slightly behind AWS in portfolio breadth, Azure is currently catching up AWS in the total number of products offered. For customers, choosing between Azure and AWS is a more of a business decision and depends on the requirements of the organization. Given the half sales scale of the AWS and growing TAM of cloud computing, Azure has a great growth potential, in our view.

**Figure 3: product mix of Azure at period end (total no. of products)**

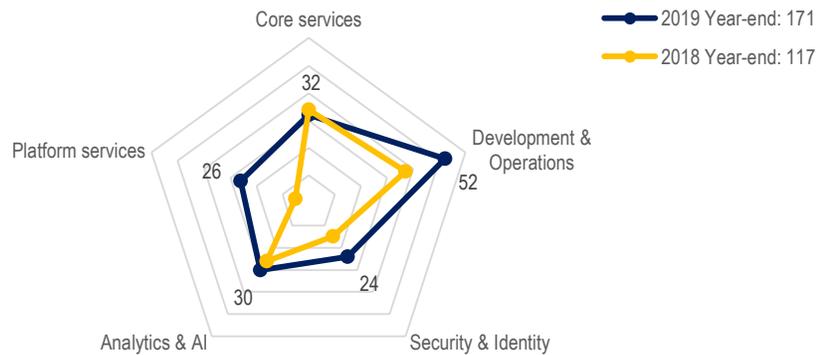


Source: <https://azure.microsoft.com/>, AMTD Research  
 Note: Core services include Compute, Storage, Database, Networking, etc.; Platform services include Mobile & Web, Gaming, Media, IoT, etc.

**GCP – internet behemoth moving to cloud computing**

Given the momentum in cloud computing, internet behemoth Google started accelerating investment in this field. Over the past year, GCP strived to narrow the gap with its rivals by launching nearly 60 new products and services, 50% more than the total at the end of 2018. Google continues the leading position in development & operations, thanks to its engineering expertise. As a result, GCP is increasingly chosen as a strategic alternative to AWS by customers whose business are more open-source-centric or DevOps-centric. In addition, GCP has made a breakthrough in platform services, in particular, in healthcare and life sciences. In 2019, GCP worked with hospitals and healthcare providers to develop better systems for diagnosis and detection of disease, and with the help of AI and cloud technologies, GCP partnered with the industry leaders to improve clinical trials, research and drug development.

**Figure 4: product mix of GCP at period end (total no. of products)**



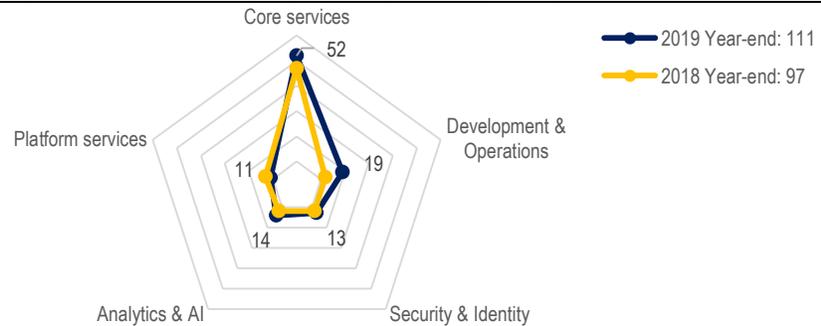
Source: <https://cloud.google.com/>, AMTD Research

Note: Core services include Compute, Storage, Database, Networking, etc.; Platform services include Mobile & Web, Gaming, Media, IoT, etc.

**Alibaba Cloud – regional leader in Asia Pacific**

Launched in 2009, Alibaba Cloud only began to generate meaningful revenue in recent years. According to Gartner IT Service Report 2018, Alibaba Cloud ranked No.1 in Asia Pacific IaaS market with a market share of 19.6%. Today, Alibaba Cloud can be compared with those global leaders in cloud core services, such as compute, storage, and database, while still lags behind in product portfolio breadth. In 2019, Alibaba Cloud announced All-in-Cloud solution with support of Apsara Cloud Operating System, and rolled out new business architecture with Data and Operation Platform (Dual Middle Office), hoping to improve efficiency between front and back office and to meet increasingly complex demands from digital transformation.

**Figure 5: product mix of Alibaba Cloud at period end (total no. of products)**



Source: <https://www.alibabacloud.com/>, AMTD Research

Note: Core services include Compute, Storage, Database, Networking, etc.; Platform services include Mobile & Web, Gaming, Media, IoT, etc.

## News update

12 Feb 2020

SaaS/eCommerce

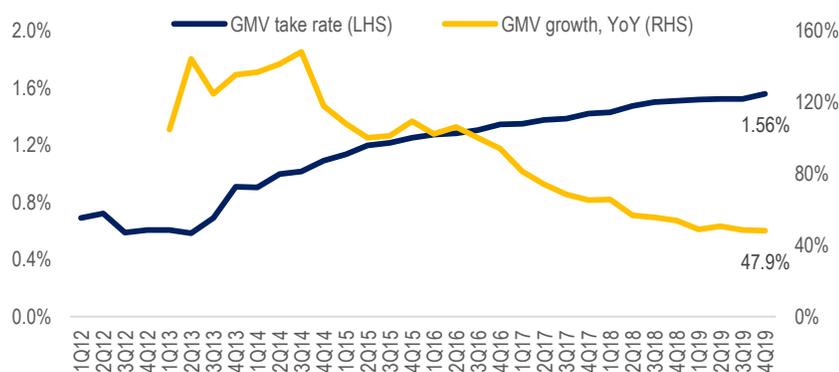
Shopify

### Solid topline growth but customer acquisition efficiency declining

Shopify reported solid Q4 revenue of US\$505mn, up 29.3% QoQ/46.9% YoY. Non-GAAP operating income came in at US\$23.7mn with operating margin at 4.7%, compared to 2.3% last quarter and 5.8% the same quarter last year. For the next quarter, management expected revenue to be in the range of US\$440mn to US\$446mn, with an adjusted operating loss between US\$30mn and US\$34mn. For the full year of 2020, the revenue was guided to be US\$2.13bn to US\$2.16bn with an adjusted operating loss between US\$20mn. Capex was expected to be around US\$80mn in 2020. (Source: [Shopify](#))

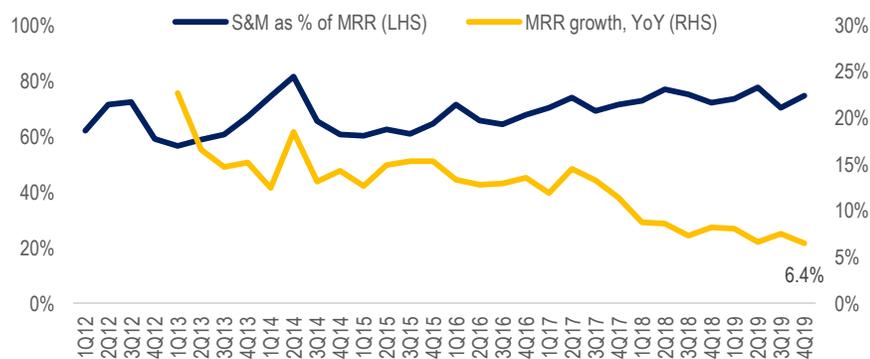
**AMTD views:** solid topline growth was mainly driven by the further monetization of merchants' GMV. Total GMV grew 47.9% YoY to US\$20.6bn in Q4 with the take rate improved to 1.56%. Except for established solutions like Shopify Payments (GMV penetration improved to 43% in Q4) and Shopify Capital, newly acquired 6 River Systems (fulfillment solutions) would add new revenue streams to the company. On the other hand, although Shopify Plus (with higher monthly fee)'s contribution to MRR rose to 27% compared with 25% of MRR in Q4 2018, overall MRR growth rate decelerated to 6.4% YoY in Q4 2019. It is not difficult to find that customer acquisition efficiency, measured by S&M/MRR, has been declining. Along with increasing investment on GMV monetization, it could be detrimental to margin going forward, in our view.

Figure 6: GMV growth, YoY and GMV take rate



Source: Company data, AMTD Research

Figure 7: MRR growth, YoY and S&M as % of MRR



Source: Company data, AMTD Research

13 Feb 2020

Semiconductor

NVIDIA

### Results beat on data center strength

Nvidia beat consensus on both revenue and EPS in Q4. Total revenue was US\$3.11bn, up 3.0% QoQ/40.8% YoY, and 5% ahead of consensus, led by data center strength. Adjusted gross margin was 65.4%, compared with 64.1% from last quarter and 56.0% the same period of last year. Non-GAAP EPS came in at US\$1.89, well above consensus of US\$1.65. By taking coronavirus potential impact into account, management lowered Q1 revenue outlook by US\$100mn to US\$3.0bn (+/- 2%) and adjusted gross margin was guided to be 65.4% (+/- 50 bps). (Source: [NVIDIA](#))

**AMTD views:** data center revenue was US\$968mn, up strongly 33.3% QoQ/42.6% YoY. As the number of breakthroughs in AI, including deep recommendation systems, the natural language understanding, the conversational AI all happened last year, those evolving AI workload was driving the strong demand for Nvidia training and inference products. In addition, AI in vertical industries, such as logistics, retail, and warehousing, and edge AI, which was being talked about a lot recently, were also the important drivers for growth. On the gaming side, Nvidia reported revenue of US\$1.49bn, up 56.3% YoY and down 10.1% sequentially. As nCov would dampen the gaming demand in China, management saw the headwinds in Q1, which was factored in reduced Q1 outlook.

7 Feb 2020

Semiconductor

MediaTek

### Solid Q4 results with soft Q1 20 guidance on nCoV risk

MediaTek reported solid Q4 results. Total revenue was NT\$64.7bn, down 3.7% QoQ/up 6.3% YoY, and 1% ahead of consensus. Gross margin was 42.5%, up 0.4ppt QoQ/3.6ppt YoY. Operating income came in at NT\$6.2bn, down 11.4% QoQ/up 61.7% YoY. Operating margin was 9.6%, compared with 10.5% in the previous quarter and 6.3% in the same period last year. Total EPS for 2019 was NT\$14.69 compared with NT\$13.26 in 2018. For the first quarter of 2020, the revenue was guided to be in the range of NT\$50.2bn to NT\$55bn, down 7% to 15% QoQ/up 4%-14% YoY. Gross margin could be hold at 42% (+/-1.5%) and operating expense ratio was expected to be 34.5% (+/-1.5%). (Source: [MediaTek](#))

**AMTD views:** management expected the total global 5G smartphone shipment to be around 170mn to 200mn units in 2020. For MediaTek, major volume will start in the late second quarter, extending into the second half; therefore, the impact of coronavirus on its 5G business will be limited. Flagship 5G chip, Dimensity 1000, is being shipped already; mid-tier Dimensity 800 will be shipped in the second quarter; and the mass-market SoC was expected to be shipped in mid to late third quarter. Over the lifetime of the 5G, management targeted 40% of the SAM. On the other hand, the blended gross margin will improve due to the 5G rollout toward the second half of this year despite the gross profit of the mobile phone sector is still lower than the company's average. Overall, revenue growth will be driven by new products including 5G, ASIC, and auto, which was expected to contribute 15% of total revenue in 2020. In addition, on 10 Feb, MediaTek announced January net sales of NT\$19.8bn, down 10.3% MoM/up 22.0% YoY.

5 Feb 2020

Semiconductor

Qualcomm

### Results beat thanks to new 5G strategy

Qualcomm reported F1Q20 total Non-GAAP revenue of US\$5.06bn, up 5.3% QoQ/5.0% YoY. Non-GAAP EPS was US\$0.99, beating consensus by US\$0.14. QCT revenue was US\$3.6bn back on 155mn MSM shipments, driven by strength in QCT across 5G, RF Front End and adjacent platforms. EBT margin was 13%, above the high end of its guidance range. QTL revenue was US\$1.4bn, up 21.2% QoQ/37.9% YoY, with EBT margin of 72%. Qualcomm post soft F2Q revenue/Non-GAAP EPS guidance of US\$4.9bn-US\$5.7bn/US\$0.80-US\$0.95, respectively. (Source: [Qualcomm](#))

**AMTD views:** on QCT, new 5G strategy of bundle sale with the RF content to customers began to contribute meaningful revenue as it drove up ASP (or revenue per MSM) substantially. For Q2 outlook, management forecasted 16% sequential revenue growth at the midpoint back on MSM shipment projection of 125mn to 145mn, which implied a 13% sequential decline at the midpoint. QCT's EBT margin was guided to expand to 15%-17% in Q2, supported by its current premium- and high-tiers product mix at early stage of 5G. When the company goes into mid- or even low-tier later eventually, operating leverage improvement will offset the detrimental effect on margin, in our view. QLT remains stable. The company has over 80 5G licensees, up from 75 last November, including two key agreements with Chinese OEMs in 1Q. Overall, for the calendar 2020, management forecasted 1.75bn to 1.85bn devices globally, including 175mn to 225mn 5G devices.

18 Feb 2020

Smartphone

Apple

### Apple won't meet quarterly revenue target due to coronavirus

Apple doesn't expect to meet its revenue guidance for the March quarter because of work slowdowns and lower smartphone demand, showing that the virus outbreak in China is taking a bigger-than-predicted toll on one of the world's most valuable companies. The company said that the iPhone, which generates the bulk of Apple's revenue, is temporarily constrained due to production ramping up more slowly than anticipated. In addition, demand for iPhones has been reduced because stores in China have been closed or operating with reduced hours and few customers. (Source: [Sina](#))

17 Feb 2020

Semiconductor

Huawei/TSMC

### U.S. mulls cutting Huawei off from global chip suppliers like TSMC

The Trump administration is considering changing U.S. regulations to allow it to block shipments of chips to Huawei Technologies from companies such as Taiwan's TSMC, the world's largest contract chipmaker. The new trade restrictions on China would limit the use of American chip-making equipment, as it seeks to cut off Chinese access to key semiconductor technology. The measure would be a blow to the world's No.2 smartphone maker as well as to TSMC, a major producer of chips for Huawei's HiSilicon. (Source: [WSJ](#))

14 Feb 2020

Device

Apple

### 5G iPad Pro with 5nm A14 chip to be launched in second half of 2020

Apple plans to release its first iPhone and iPad Pro models supporting 5G technology in the second half of 2020. The report shows that these devices will be equipped with a 5nm-based A14 chip (the iPad Pro is expected to be equipped with A14X) and support mmWave and frequency combinations sub-6GHz. Apple 5G iPhone is expected to use the Snapdragon X55 modem, but the report does not mention which modem the 5G iPad Pro will use. (Source: [Mydrivers](#))

14 Feb 2020

Device

### Amazon and Google topped the global smart speaker market

On February 14, the latest data from Strategy Analytics showed that globally winners of the smart speaker market were still Amazon and Google. China's Baidu, Alibaba and Xiaomi relied on price advantages to prevail in shipments, while Apple's HomePod only ranked sixth. Amazon was the world's largest supplier of smart speakers in the fourth quarter of 2019 with 15.8 million shipments and 28.3% market share. Google occupied 24.9% of the market with 13.9 million shipments, ranking second. Chinese brands Baidu, Alibaba and Xiaomi followed. (Source: [C�Beta](#))

13 Feb 2020

Smartphone

Xiaomi

### Xiaomi launched flagship 5G smartphone Mi 10 series and three new products

Xiaomi launched its premium smartphone Mi 10 Pro and Mi 10. The Mi 10 series is among the first to feature Qualcomm's flagship 5G platform Snapdragon 865, and uses the latest Wi-Fi 6 technology which provides a 2.7x increase in speed compared to Wi-Fi 5. Mi 10 series sports a 6.67" AMOLED curved DotDisplay, and both models are equipped with a quad-camera setup, including a 108MP main camera, supporting 8K ultra-clear video recording. Mi 10 starts at RMB3,999, while Mi 10 Pro starts at RMB4,999.

Xiaomi introduced three other new products at the same event:

- 1) Mi AIoT Router AX3600: it is Xiaomi's first router to support Wi-Fi 6 and feature Qualcomm platform. The router provides leading connection speeds of up to 3,000 Mbps. It is priced at RMB599.
- 2) Mi Type-C 65W Fast Charger with GaN Tech: with the novel semiconducting material GaN, the new charger is 48% smaller than regular Mi Laptop adapter, and can fully charge Mi 10 Pro in 45 minutes. The price is RMB149.
- 3) Mi Bluetooth Speaker with Wireless Charging: the device incorporates a built-in wireless charging function that capable of charging Qi compatible devices, and is priced at RMB249. (Source: [Xiaomi](#))

13 Feb 2020

Semiconductor

Broadcom

### Broadcom ships the first Wi-Fi 6E chip for mobile devices

Broadcom has announced BCM4389, the world's first Wi-Fi 6E chip for mobile devices, supporting 160MHz-wide channels in the 6GHz wireless spectrum that the FCC could soon open up for use in the United States. It will be ideal for flagship smartphones and AR/VR devices of the future. According to Broadcom, the BCM4389 should be shipping and available in client devices by late fall, 2020. (Source: [PCWorld](#))

11 Feb 2020

5G/Infrastructure

### China granted spectrum licenses for 5G indoor coverage

China granted licenses to China Telecom, China Unicom and China Broadcasting Network, to share the 3,300-3,400MHz spectrum for 5G indoor coverage, according to the MIIT. It is the first time for China to license public mobile communication frequency resources to multiple firms for shared use. The three companies will leverage the co-development and sharing of 5G indoor access networks to cut costs and boost efficiency. (Source: [Xinhuanet](#))

11 Feb 2020

Smartphone

Huawei

### Huawei Mate 30 Pro went on sale in the UK from Feb 20, sans Google services

Huawei's flagship Mate 30 Pro, which was announced in September last year, is finally launching in the UK next week. The Huawei Mate 30 Pro will go on sale in the UK starting February 20 for £899. It will only be sold by Carphone Warehouse. Huawei will be offering just a single variant of the Mate 30 Pro in the UK – featuring 8GB of RAM and 256GB UFS 3.0 storage. Only the Space Silver color option is being launched. (Source: [AndriodCentral](#))

10 Feb 2020

Semiconductor

TSMC

### TSMC's revenue reached over NT\$100 bn for the sixth consecutive month

TSMC announced January 2020 results, with its revenue reaching NT\$103.68 bn, up 0.4% MoM/32.8% YoY, exceeding NT\$100 bn for the sixth consecutive month. The company guided 1Q revenue at US\$10.2-10.3 bn, gross margin at 48.5%-50.5%. According to TSMC, its orders did not reduce against the coronavirus outbreak, and the management saw a strong demand of 5G smartphones. TSMC planned to invest US\$6.74 bn in production facilities to raise productivity. TSMC will start producing 5nm chips in the middle of 2020, which will be used in 5G smartphones of Apple, Huawei and other brands. (Source: [TSMC](#))

---

10 Feb 2020

AI

Facebook

### Facebook acquires computer vision startup Scape Technologies

Scape Technologies, the London-based computer vision startup working on location accuracy beyond the capabilities of GPS, has been acquired by Facebook, according to a regulatory filing. Facebook now has majority control of the company (more than 75%), and the transaction price may be about 40 million US dollars. Further filings show that Scape's previous venture capital representatives have resigned from the Scape board and are replaced by two Facebook executives. Founded in 2017, Scape Technologies was developing a "Visual Positioning Service" based on computer vision which lets developers build apps that require location accuracy far beyond the capabilities of GPS alone. (Source: [Techcrunch](#))

---

10 Feb 2020

Semiconductor

AMD

### AMD introduced Radeon Pro W5500 workstation graphics

AMD announced the Radeon Pro W5500 workstation graphics card for modern design and engineering professionals. Radeon Pro W5500 is based on AMD RDNA architecture and 7nm process; it has 22 compute units and 1,408 stream processors, offering 10x better workflow performance under a multitasking load than the competition. The graphics card delivers exceptional power efficiency and leadership performance for 2D and 3D design applications, enabling better visualize and interact with designs in real time. It will be available from leading retailers beginning mid-February 2020, for an SEP of US\$399. AMD introduced the Radeon Pro W5500M GPU at the same time. (Source: [AMD](#))

---

8 Feb 2020

Panel

### Global display panels shipment down 5.2% YoY in 2019

In 2019, global display panels shipments were 140mn, down 5.2% YoY, area shipments were basically flat YoY. In terms of shipments, BOE, LGD, AUO, Innolux and SDC ranked top five with shipments of 34.5mn, 31.5mn, 25.6mn, 23.6mn and 16.2mn respectively. In terms of area shipments, LGD, BOE, AUO, Innolux and SDC ranked top five with area shipments of 5.1mn square meters, 5mn square meters, 4mn square meters, 3.3mn square meters and 3.2mn square meters, respectively. In 2020, the volume of display panels worldwide is projected to reach 167 million. (Source: [Sigmaintell](#))

---

8 Feb 2020

Smartphone

Apple/Foxconn

### Next iPhone's March launch may be delayed

The launch of Apple's next iPhone, originally scheduled for March, will probably be delayed, given the NCP outbreak in China. Key iPhone supplier Foxconn's plan to resume production on 10 Feb was blocked due to the high risks of coronavirus infection, and the restart date is still unknown. Foxconn has already reduced its internal forecast for revenue growth from up to 5% to under 3%. iPad supplier Compal Electronics also postponed its plans to resume work. The extended shutdown may bring Apple into inventory shortage as the inventory of iPhones has been running low, especially the iPhone 11. (Source: [NikkiAsianReview](#))

---

7 Feb 2020

Smartphone

OPPO

### OPPO Find X2 to come on 22 February

OPPO confirmed the 22 February launch of OPPO Find X2. The phone will have a 6.5-inch QHD+OLED display with curved edges, offering 65W Super VOOC fast charging. OPPO Find X2 will be the company's first to feature Snapdragon 865 processor, along with custom M1 co-processor, supporting dual mode 5G. It will probably sport the new Sony IMX689 and IMX708 sensor, and enable high-speed autofocus. The selling price may start from over RMB5,000. (Source: [Android Authority](#))

---

6 Feb 2020

TV

Apple

### New Apple TV with A12 chip or later uncovered in tvOS 13.4 Beta

A refreshed Apple TV with an A12 Bionic chip or newer appears to be in development, according to 9to5Mac, which uncovered an unreleased model with the codename "T1125" in the tvOS 13.4 beta seeded. Details about the new Apple TV are slim beyond the faster chip and its maximum supported resolution remaining 4K with HDR. (Source: [Sina](#))

---

5 Feb 2020

AI

Amazon

### Amazon to help businesses develop custom voices for Alexa

Businesses will be able to customise their own text-to-speech voice for Alexa, Amazon has announced. This is part of a new capability within Amazon Polly called 'Brand Voice'. Polly is a department of AWS that comprises linguists and AI research scientists who build neural text-to-speech (NTTS) technology that can match the speaking styles of a person. It uses deep learning models that can interpret intonation patterns from natural speech data and reproduce the acquired voice in a similar style or tone. The service has already been used by National Bank Australia, as well as KFC. (Source: [Sohu](#))

---

4 Feb 2020

Cloud

Oracle

### Oracle broadens geographic reach with five new cloud data centres

Oracle is expanding its cloud data centre footprint in a bid to draw in customers by providing them with data sovereignty. The corporation announced that it has successfully added cloud data centres in Jeddah, Saudi Arabia and has expanded on existing centres in Japan, Australia, Canada, and the Netherlands. This falls into Oracle's plan to open 36 locations by the end of 2020, which it hopes will broaden its target audience. (Source: [Cloudpro](#))

---

4 Feb 2020

TV

Realme

### Realme will unveil its first Smart TV at the MWC

Realme CMO Francis Wang is teasing a Smart TV announcement for the MWC. He confirmed that Realme's first smartband is arriving this month, event saying that it will be unveiled before the TV (MWC starts on February 24). The Realme TV will target the Indian market, the brand's strongest region. Also true to form, the TV will aim for the budget price segment. There's no official word on size or capabilities, however. (Source: [Ofweek](#))

---

30 Jan 2020

Semiconductor

Western Digital

### Western Digital and Kioxia announced BiCS5 3D NAND technology

Western Digital has successfully developed its fifth-gen 3D NAND technology, BiCS5, with Kioxia. BiCS5 is built on TLC and QLC technologies with 112 layers of vertical memory capability, and could offer up to 40% more bits of storage capacity per wafer and 50% faster I/O performance compared to BiCS4. BiCS5 is designed for connected cars, mobile devices and artificial intelligence. (Source: [Western Digital](#))

---

---

## IMPORTANT DISCLOSURES

---

### Analyst Certification

We, Brian Li, Michelle Li and Roy Wu, hereby certify that (i) all of the views expressed in this research report reflect accurately our personal views about the subject companies and their securities; and (ii) no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed by us in this research report, nor is it tied to any specific investment banking transactions performed by AMTD Global Markets Limited.

As of the date the report is published, Brian Li holds financial interest in the securities of Amazon mentioned in the report.

---

### AMTD Global Markets Limited

**Address:** 23/F - 25/F, Nexxus Building, 41 Connaught Road Central, Hong Kong

**Tel:** (852) 3163-3288 **Fax:** (852) 3163-3289

---

## GENERAL DISCLOSURES

---

The research report is prepared by AMTD Global Markets Limited and is distributed to its selected clients.

This research report provides general information only and is not to be construed as an offer to sell or a solicitation of an offer to buy any security in any jurisdiction where such offer or solicitation would be illegal. It does not (i) constitute a personal advice or recommendation, including but not limited to accounting, legal or tax advice, or investment recommendations; or (ii) take into account any specific clients' particular needs, investment objectives and financial situation. AMTD does not act as an adviser and it accepts no fiduciary responsibility or liability for any financial or other consequences. This research report should not be taken in substitution for judgment to be exercised by clients. Clients should consider if any information, advice or recommendation in this research report is suitable for their particular circumstances and seek legal or professional advice, if appropriate.

This research report is based on information from sources that we considered reliable. We do not warrant its completeness or accuracy except with respect to any disclosures relative to AMTD and/or its affiliates. The value or price of investments referred to in this research report and the return from them may fluctuate. Past performance is not reliable indicator to future performance. Future returns are not guaranteed and a loss of original capital may occur.

The facts, estimates, opinions, forecasts and any other information contained in the research report are as of the date hereof and are subject to change without prior notification. AMTD, its group companies, or any of its or their directors or employees ("AMTD Group") do not represent or warrant, expressly or impliedly, that the information contained in the research report is correct, accurate or complete and it should not be relied upon. AMTD Group will accept no responsibilities or liabilities whatsoever for any use of or reliance upon the research report and its contents.

This research report may contain information from third parties, such as credit ratings from credit ratings agencies. The reproduction and redistribution of the third party content in any form by any mean is forbidden except with prior written consent from the relevant third party. Third party content providers do not guarantee the timeliness, completeness, accuracy or availability of any information. They are not responsible for any errors or omissions, regardless of the cause, or for the results obtained from the use of such content. Third party content providers give no express or implied warranties, including, but not limited to, any warranties of merchantability of fitness for a particular purpose or use. Third party content providers shall not be liable for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including lost income or profits and opportunity costs) in connection with any use of their content. Credit ratings are statements of opinions and are not statements of fact or recommendations to purchase, hold or sell securities. They do not address the suitability of securities for investment purposes, and should not be relied on as investment advice.

To the extent allowed by relevant and applicable law and/or regulation: (i) AMTD, and/or its directors and employees may deal as principal or agent, or buy or sell, or have long or short positions in, the securities or other instruments based thereon, of issuers or securities mentioned herein; (ii) AMTD may take part or make investment in financing transactions with, or provide other services to or solicit business from issuer(s) of the securities mentioned in the research report; (iii) AMTD may make a market in the securities in respect of the issuer mentioned in the research report; (iv) AMTD may have served as manager or co-manager of a public offering of securities for, or currently may make a primary market in issues of, any or all of the entities mentioned in this research report or may be providing, or have provided within the previous 12 months, other investment banking services, or investment services in relation to the investment concerned or a related investment.

AMTD controls information flow and manages conflicts of interest through its compliance policies and procedures (such as, Chinese Wall maintenance and staff dealing monitoring).

**The research report is strictly confidential to the recipient. No part of this research report may be reproduced or redistributed in any form by any mean to any other person without the prior written consent of AMTD Global Markets Limited.**