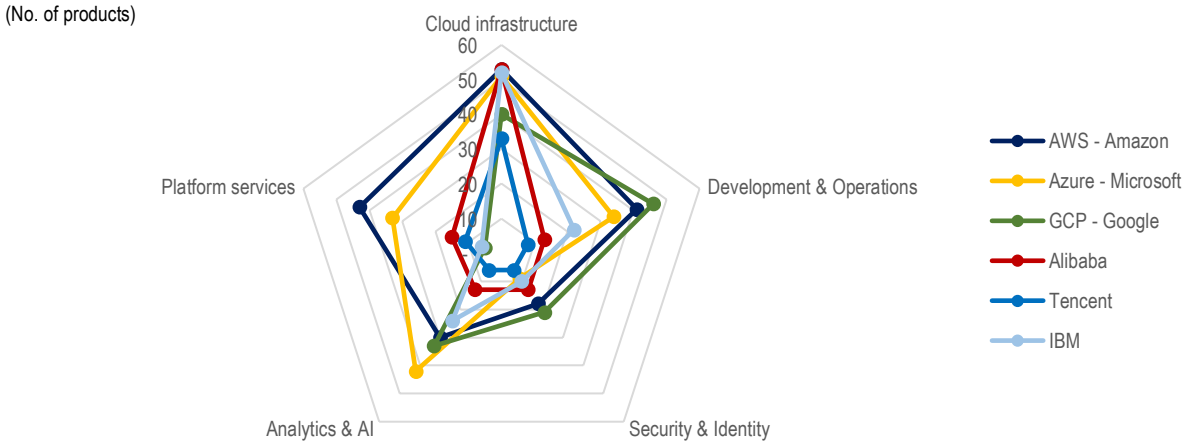
AMTD Global Tech Biweekly

Thursday
5 September 2019

IaaS – Follow the CAPEX to trace the growth and how they build competitiveness

Figure 1: Major cloud (IaaS) vendors' product competitiveness (at the end of Aug 2019)



Source: https://aws.amazon.com, https://azure.microsoft.com, https://cloud.google.com, https://www.ibm.com/cloud, https://www.alibabacloud.com, https://intl.cloud.tencent.com, AMTD Research
Note: Cloud infrastructure includes Compute, Storage, Database, Networking, etc.; Platform services include Mobile & Web, Gaming, Media, IoT, etc.

In this issue, we will discuss the relationship between revenue growth and the corresponding Capex of major cloud (IaaS) vendors and how they build their product competitiveness. AMTD views: To some extent, the number of products a company can offer represents the breadth of the company's business capabilities. Dividing the functionality of cloud services (IaaS) into five areas (as shown in Figure 1), in terms of No. of products, among the 6 major cloud (IaaS) vendors, we found that Amazon's AWS has a comprehensive capability and leads in cloud platform services; Microsoft's Azure has an edge in analytics and AI. Google's GCP has an advantage in development and operations; that's why it is popular among the developers working on enterprise applications. Alibaba Cloud, the leader in China market, have caught up with global leaders in cloud infrastructure, but is still behind in other areas.

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Cloud/IaaS

AWS – Amazon

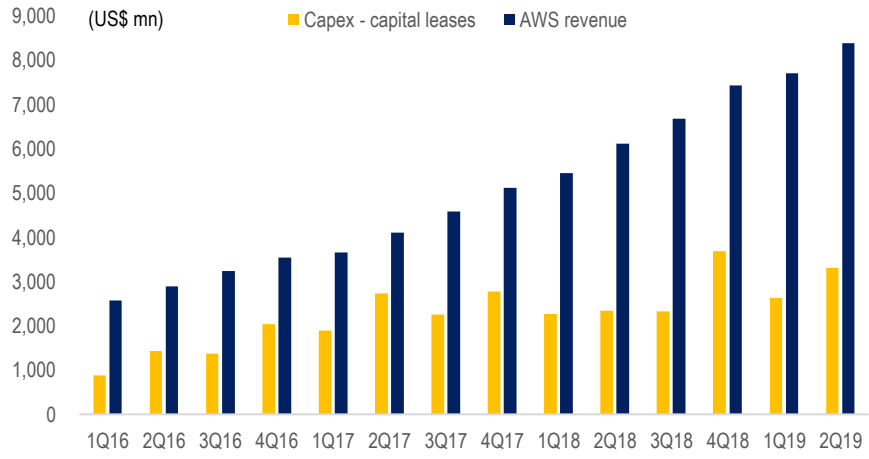
Amazon AWS – breadth and depth leader in IaaS

The driving force of Capex for revenue growth has weakened given its expanding scale

Cloud services (IaaS) vendors invest heavily on infrastructure. They buy or lease property, buildings, computer & IT hardware and other related equipment to build and operate data centers to provide customers with utility-like computing services. Thus, Capex is a good leading indicator of cloud (IaaS) business growth.

For Amazon's AWS, property and equipment acquired under capital leases reflects investments in technology infrastructure for AWS, while capitalized software development costs is not significant to total Capex, according to management. We found that, as shown in Figure 2, the gap between Capex investment (capital leases) and AWS revenue continues to widen during the past three years. In the 12 months of 2016, revenue was US$6.5bn more than Capex investment, and that number jumped to US$18.2bn in trailing 12-month in 2Q19. Obviously, Capex investment can't fully explain the expanding scale of AWS business. We believe the reasons behind are: 1) AWS, publicly launched in 2006, has entered stable and mature stage, in which economy of scale has been achieved; 2) AWS can develop more and more products and services on its current platform to boost revenue.

Figure 2: Trends of AWS revenue and Capex – capital leases



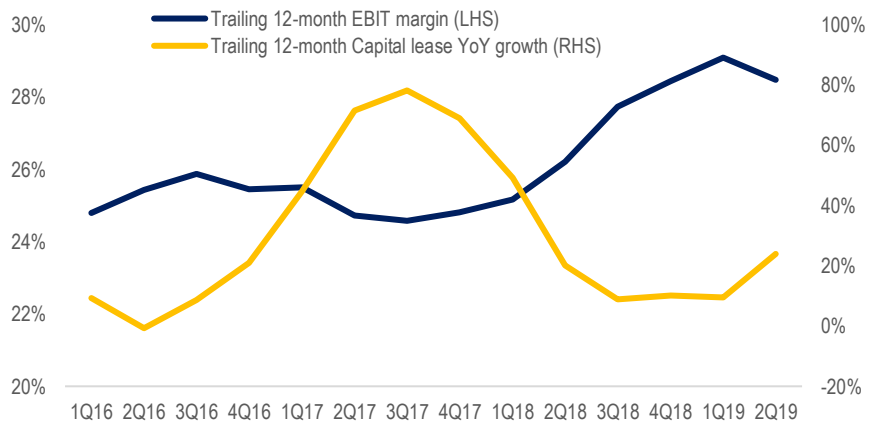
Source: Company data, AMTD Research

But Capex is closely related to expansion and has impact on the margin

Capex investment was higher in 2015 and 2017 (Figure 3), and then 12 and 11 Availability Zones were put into operation in 2016 and 2018 by Amazon AWS, respectively. As end of Aug 2019, the AWS Cloud spans 69 Availability Zones within 22 geographic Regions around the world. With announced plans for 9 more Availability Zones and three more Regions in Cape Town, Jakarta, and Milan, we expect the Capex investment will be stepping up in 2019 and 2020.

On the other hand, Capex investment is negatively correlated with the operating margin. Depreciation and amortization in the current period will incur and affect margin accordingly; in the same time, the addition of sales and marketing personnel and relevant administrative expense will rise when new data centers in new Availability Zones begin operation. For AWS, despite the cyclical changes in Capex, we expect EBIT margin can maintain upward trend in the long run, thanks to its economy of scale.

Figure 3: Trends of EBIT margin and capital lease YoY growth



Source: Company data, AMTD Research

For cloud business, AWS now focuses on platform services targeting frontier industries and applications

Although the driving force of Capex for revenue growth has weakened, AWS continues to enrich its products and services to boost revenue. In terms of depth, it launched 1,430 new features and services in 2017, 1,017 in 2016, and 722 in 2015. In terms of breadth, during the beginning of 2017 to the present, 94 new products were introduced, among which 25, 23, 17 new products were launched in Platform services, Development & Operations, and Analytics & AI field, respectively.

In particular, in re:Invent 2017, AWS introduced several new machine learning (ML) and IoT tools; in re:Invent 2018, AWS announced new on-premises and hybrid offerings, new blockchain services, and new tools in database. AWS has now built up its ability to help businesses keep up with the increasing pace of innovation by focusing on platform services targeting frontier industries and applications. We believe AWS remains breadth and depth leader in cloud services (IaaS).

Figure 4: No. of new products launched from Jan 2017 to Aug 2019

Source: https://aws.amazon.com, AMTD Research

Cloud/IaaS

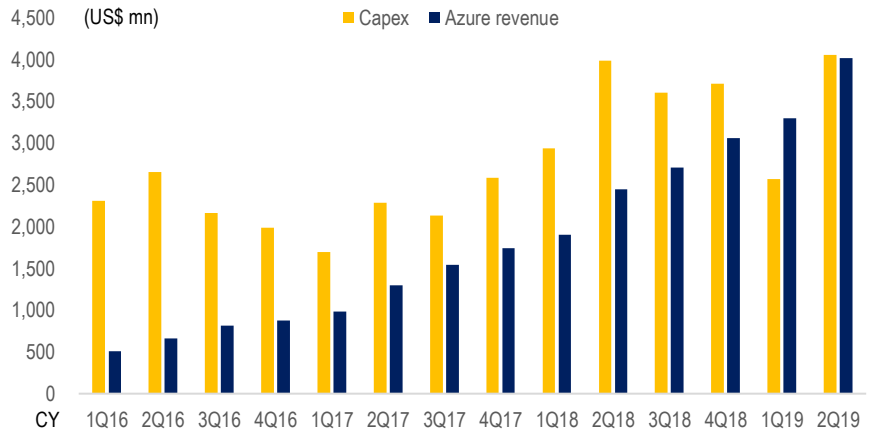
Azure – Microsoft

Microsoft Azure – matches AWS in total number of products despite smaller revenue scale

Azure revenue has increased to the same level as Capex

Microsoft started cloud transition in 2015, moving away from traditional software licensing, which accounted for nearly 70% of its total revenue before 2015, and toward cloud-based services. Microsoft is now deeply involved at all three layers of the cloud (IaaS, PaaS and SaaS). Azure is the cloud for IaaS and PaaS for businesses. Unlike Amazon's AWS, which has been launched for more than a decade, Azure has only been introduced for four years. Azure revenue growth is mainly driven by its Capex, and in the first two quarters of 2019, we saw the revenue from Azure has nearly matched its Capex. Given the business nature of the cloud, Azure revenue is expected to outpace Capex going forward.

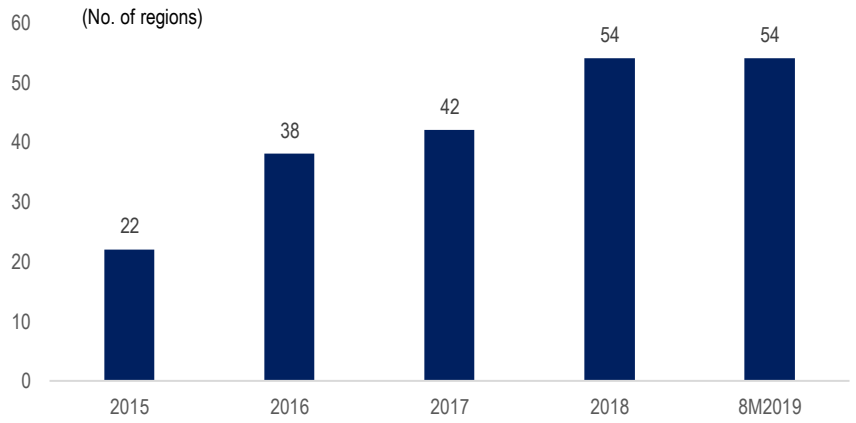
Figure 5: Trends of Azure revenue and its Capex (calendar year)



Source: Company data, AMTD Research

For Azure global infrastructure, Microsoft opened 16, 4, and, 12 new regions from 2016 to 2018, respectively, and Capex rose higher in 2016 and 2018 accordingly. As no new regions have been opened so far this year, we expect expansion will accelerate next year, and capex will increase accordingly. Management also indicated at Q4 2019 earnings call that the operating expense will grow by 11% to 12% in FY20, compared to 8% in FY19.

Figure 6: No. of Azure's global regions at period end

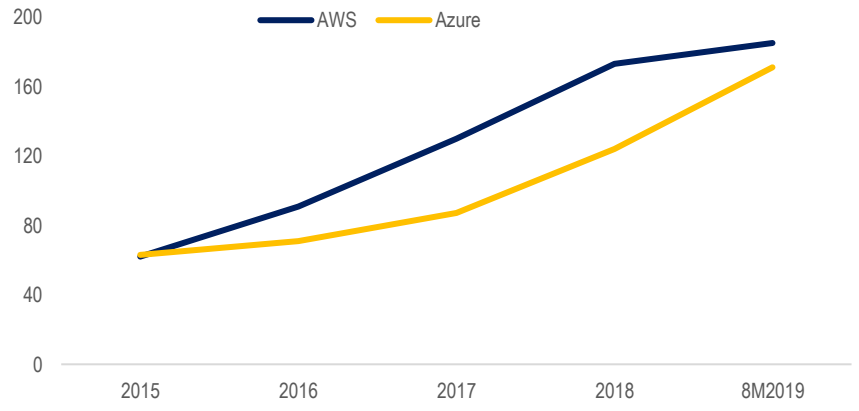


Source: https://azure.microsoft.com, AMTD Research

Azure matches AWS in total number of products

By the end of Aug 2019, both AWS and Azure have more than 170 different products. They offer high performing cloud products and services. For customers, choosing between Azure and AWS is a more of a business decision and depends on the requirements of the organization. AWS can provide a solid IaaS with a diverse set of tools, while Azure can integrate IaaS services seamlessly with its strong commercial PaaS/SaaS products and Windows platform. In addition, hybrid cloud strategy is the key differentiator of Azure. As many large customers are using Microsoft's server operating system in their on-premise data centers, Azure excels in hybrid cloud solution on integration of private and public cloud.

Figure 7: No. of products of AWS and Azure at period end

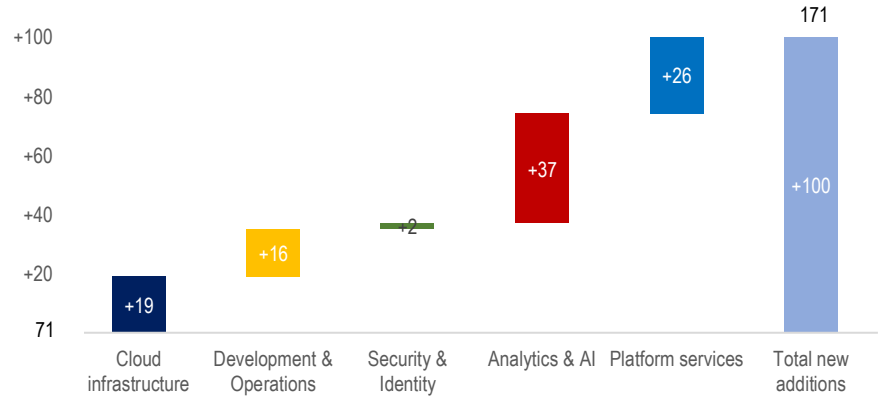


Source: https://aws.amazon.com, https://azure.microsoft.com, AMTD Research

In particular, Azure has put great effort on AI and platform services in recent years

Azure has put great effort on AI and platform services. Over the past two years, Azure introduced 100 new products, among which 37 were Analytics & AI, 26 were platform services. For AI, Microsoft moved Bing AI onto Azure, and are democratizing AI infrastructure, tools and services with Azure Cognitive Services, so developers can embed the ability to see, hear, respond, translate, reason and more into their applications. For IoT, Azure is the only cloud that extends to the edge, spanning identity, management, security and infrastructure. This year, Azure introduced new cloud-to-the-edge services and devices, bringing the full power of Azure to where data is generated.

Figure 8: No. of new products launched from Jan 2017 to Aug 2019



Source: https://azure.microsoft.com, AMTD Research

Google Cloud Platform (GCP) – IaaS newcomer, closing gap with its rivals in cloud infrastructure

Google has begun investing heavily in cloud infrastructure

Google shared its GCP financial data in 2Q19 earnings call. Its cloud business unit has doubled to an US$8bn annualized revenue run rate from US$4bn the company reported in early 2018. Obviously, the rapid growth of cloud computing business was driven by huge Capex investment. Google spent US$25.46bn on Capex in 2018, significantly up 102% over US$12.61bn in 2017, and mostly on data centers and offices, according to management. And also Google announced early this year that it will invest US$13bn in new data centers across the U.S. in 2019. On the other hand, Google grew headcount to 98,771 at the end of 2018, up from 80,110, with most of the growth coming in engineers and product managers, and most of that in cloud.

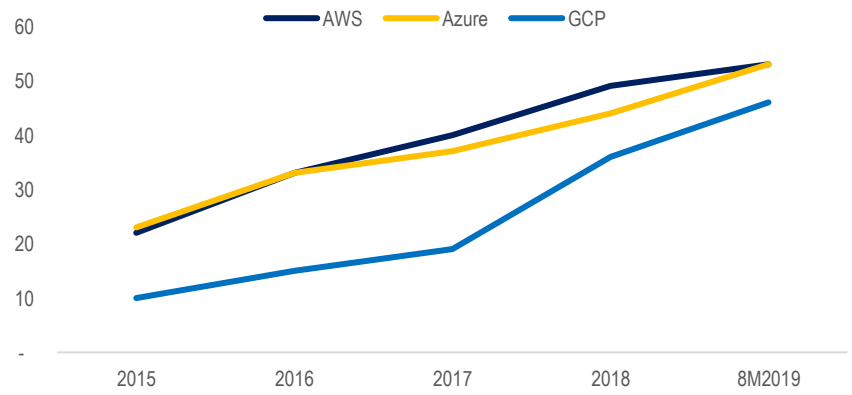
Figure 9: Trailing 12-month Capex YoY growth

Source: Company data, AMTD Research

GCP strives to narrow the gap with its rivals in cloud infrastructure products

By the end of 2017, GCP had only 19 cloud infrastructure products, offering compute, storage, database, migration and networking services. By the end of 2018, GCP had almost doubled the number of cloud infrastructure products to 36, and introduced another 6 hybrid cloud products in 2019. More specifically, for compute, GCP focuses on Kubernetes deployment, which was developed by Google engineers and was adopted by AWS and Azure as well; however, GCP is still lacking storage solutions offerings mainly due to an absence of backup options.

Figure 10: No. of cloud infrastructure (incl. hybrid cloud) products of AWS, Azure and GCP at period end



Source: https://aws.amazon.com, https://azure.microsoft.com, https://cloud.google.com, AMTD Research

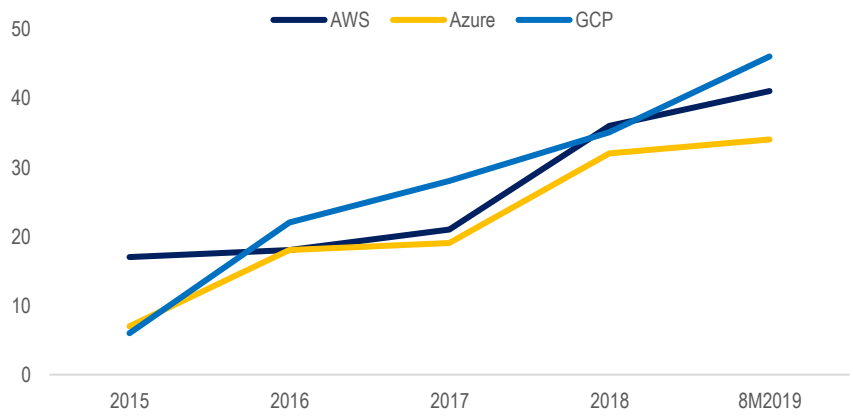
Figure 11: No. of new products launched from Jan 2017 to Aug 2019

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

GCP excels in cloud development & operations given its engineering expertise

Compared to AWS and Azure, GCP is relatively small and still growing. However, GCP is being used mostly by developers who work on all kinds of enterprise applications. GCP has a comprehensive container-based model and is popular within innovative cloud native companies and has a strong position in the open source community. According to Gartner, GCP is increasingly chosen as a strategic alternative to AWS by customers whose business are more open-source-centric or DevOps-centric. We can see that GCP leads AWS and Azure in number of Development & Operations products.

Figure 12: No. of Development & Operations products of AWS, Azure and GCP at period end



Source: https://aws.amazon.com, https://azure.microsoft.com, https://cloud.google.com, AMTD Research

Cloud/IaaS

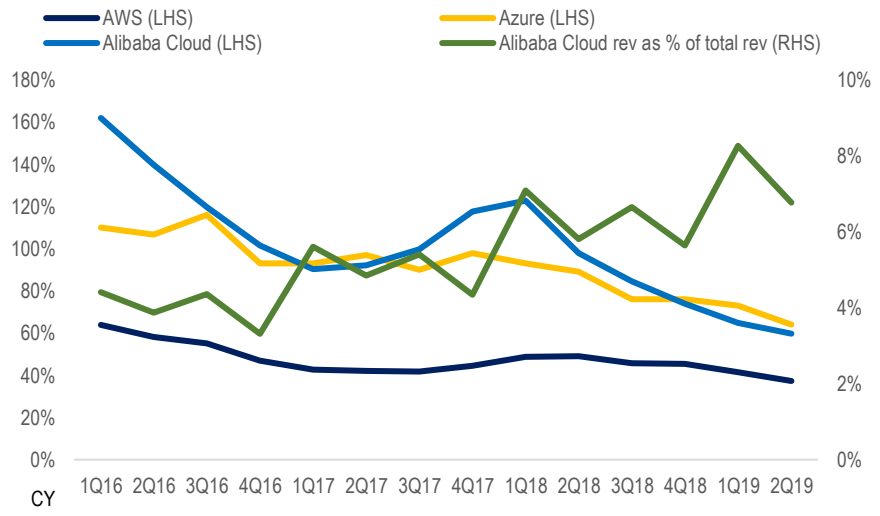
Alibaba Cloud

Alibaba Cloud – Matching global leaders in cloud infrastructure

Alibaba Cloud maintains high revenue growth but has yet to turn a profit

Launched in 2009 and expanded into the U.S. in 2015, Alibaba Cloud is one of the fastest-growing cloud companies in the world. It reported 60% YoY revenue growth in dollar terms for the quarter ended Jun 2019, matching the growth of Azure and ahead of AWS, given its smaller size. Alibaba Cloud revenue is less than 1/3 of Azure's, and 1/7 of AWS's. On the other hand, as Alibaba Cloud revenue contribution continues to grow, reaching 7% in last quarter, it has become one of main drivers of the Alibaba Group's revenue growth.

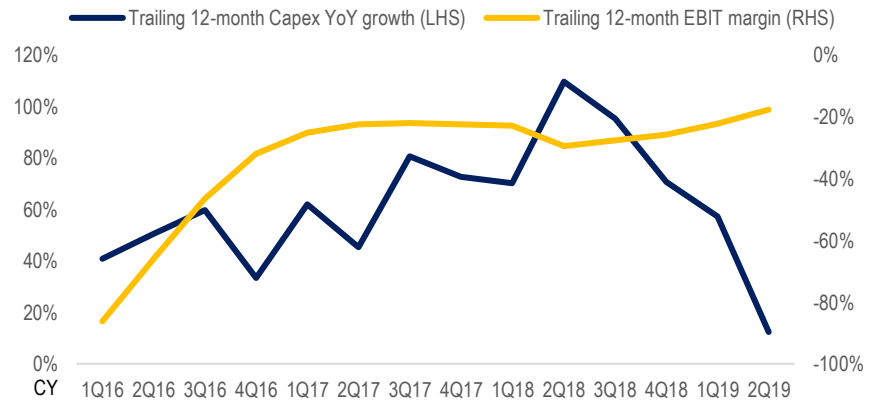
Figure 13: Trends of revenue growth of AWS, Azure, and Alibaba Cloud and Alibaba Cloud revenue contribution



Source: Company data, AMTD Research

Despite the fast growth, Alibaba Cloud has yet to profit from its cloud service. The trailing 12-month GAAP EBIT margin stayed around -25% during 2017, and has been slowly rising along with the sharp decline of Alibaba Group's Capex growth since the second quarter of 2018. Alibaba launched 20 new availability zones in 2018, but only 5 new so far this year, we believe its cloud Capex has slowed down as well, although Alibaba didn't disclose it. Alibaba Cloud margin is expected to be supported by declining Capex in following quarters, however, there's trade-off between topline growth, Capex and the margin given the intensifying competition, in our view.

Figure 14: Trends of EBIT margin and Alibaba Group's Capex YoY growth

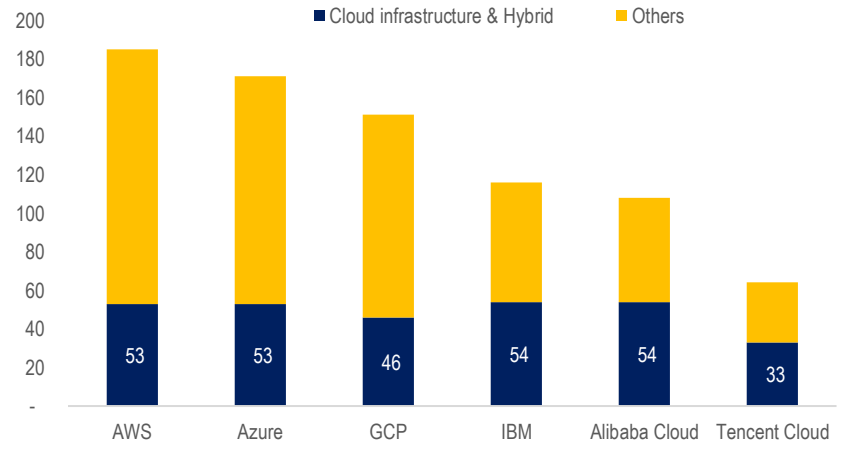


Source: Company data, AMTD Research

Alibaba Cloud is matching global leaders in cloud infrastructure products

Like Amazon, Alibaba is primarily an ecommerce company. Its cloud computing business stems from its IT infrastructure, which is built to support its online retailing business. And Alibaba Cloud business strategy is also very similar to that of Amazon AWS. Alibaba Cloud initially served small-sized ecommerce businesses. After building good track record with SMEs, Alibaba Cloud expanded its business to larger enterprises.

Figure 15: No. of total products by type (at the end of Aug 2019)



Source: https://aws.amazon.com, https://azure.microsoft.com, https://cloud.google.com, https://www.ibm.com/cloud, https://www.alibabacloud.com, https://intl.cloud.tencent.com, AMTD Research

In terms of product, Alibaba Cloud introduced a total of 64 new products since 2018, among which 32 new products were cloud infrastructure. Currently Alibaba Cloud has matched with global leaders, AWS and Azure, in core cloud products, however, it still lags behind in other areas.

Figure 16: No. of new products launched from Jan 2018 to Aug 2019

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

Alibaba Cloud expands product lines by launching All-in-Cloud solution this year
We attended Alibaba Cloud Summit 2019 in Shanghai on July 25. At the summit, Alibaba announced All-in-Cloud solution and invited experts to discuss cloud migration for government and corporates in securities, retailing and logistic industry.

All-in-Cloud solution makes cloud migration easier. Traditionally, the development of enterprise cloud migration involves four stages: infrastructure migration, big data migration, middle office migration, and generation of intelligence cloud. To makes it easier for enterprise customers to migrate onto the cloud quickly and seamlessly, Alibaba Cloud announced All-in-Cloud solution, which includes four product lines:

1) Apsara Cloud Operating System is the only self-developed cloud operating system in China that delivers millions of servers worldwide and serves millions of customers in more than 200 countries.

2) With self-developed computing engine, Apsara Big Data Platform is currently the largest computing platform in China and can scale to 100,000 computing clusters. It can process more than 600 PB of data in a single day.

3) Alibaba Dual Middle Offices helps to realize digitization of business process and creation of business process by data.

4) For AIoT, Alibaba's Pingtou Ge launched its first RISC-V processor "Xuantie 910" for 5G, AI, and IoT at the summit. It realizes edge computing and can be integrated with cloud computing to build an intelligent platform.

News updates

29 Aug 2019

Smartphone

Xiaomi/Redmi

Xiaomi launched Redmi Note 8 series, first Redmi TV and new RedmiBook

Xiaomi officially announced the Redmi Note 8 series. Redmi Note 8 Pro is the company's first-ever 64MP camera smartphone using the Samsung GW1 64MP sensor and the latest MediaTek Helio G90T chipset. Xiaomi also debuted the first Redmi TV, which is 70" with a viewing area 60% larger than 55-inch screens. In the same time, Xiaomi unveiled the enhanced RedmiBook 14 Pro whose overall performance was increased by 13% compared to the last generation. (Source: Xiaomi)

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29 Aug 2019

Cloud/IaaS

Baidu

Baidu Cloud launched Kunlun-powered cloud server and other 17 products

Baidu Cloud unveiled 18 new intelligent computing products. For cloud, Baidu launched the Kunlun cloud server using Baidu's self-developed high-performance Kunlun AI chip. The server's computing power is 30 times higher than FPGA-based AI accelerators. As for AI computing, Baidu unveiled an intelligent computing plan, covering big data engineering, AI, video cloud, IoT, blockchain, Cloud Native, etc. Besides, Baidu also introduced services in the areas of storage, security, operation and video editing and so on, and announced the opening of digital IP platform for enterprises to help build brand identity. (Source: Sina)

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28 Aug 2019

Smartphone

Google

Google to move Pixel smartphone production from China to Vietnam

Google plans to shift its Pixel smartphone production from China to Vietnam starting this year as it builds a cheap supply chain in Southeast Asia, according to Nikkei. The main concerns rose from the increasing labor costs in China and China-U.S. trade uncertainty. Google also plans to move part of its Google Home smart speaker production to Thailand, but will still develop new products and complete initial production for its hardware lineup in China. (Source: NikkiAsianReview)

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28 Aug 2019

Smartphone

OPPO/Realme

OPPO to launch Realme Q series

OPPO sub-brand Realme officially confirmed to launch Realme Q series on September 5. The new phone is expected to feature a high performance of Quad-CCM, 20W VOOC fast charging, and be powered by Qualcomm Snapdragon 712 processor, same as the Realme 5 Pro. In terms of software, the new phone will run Android 9 Pie-based ColorOS 6 on top. (Source: Sina)

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28 Aug 2019

Devices

Fitbit

Fitbit announced the Versa 2 smartwatch with Alexa support

Fitbit has just announced smartwatch Versa 2 with Alexa support. Compared to the previous version, it has a new AMOLED screen with an optional always-on-display and a longer battery life of up to 5 days. The watch will be on sale on September 15 with starting price at US$199.95. It will compete with Apple and Samsung. The two giants now lead the global smartwatch market with a market share of 46.4% and 15.9%, respectively in Q2, according to Strategy Analytics. (Source: Businessinsider)

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27 Aug 2019

Wearables

Huami

Huami unveiled the Amazfit X concept watch with a flexible curved display

Huami unveiled Amazfit X concept watch on 2019 New Product Launch. The watch features a 2.07-inch flexible curved screen and a curved lithium battery lasting up to 7 days, and will be launched for sale in 1H20. Huami also launched two other products, the Amazfit GTS and Amazfit Sports Watch 3. The total shipments of Huami's smart devices have reached 100mn units as of 27 Aug 2019. (Source: Huami)

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26 Aug 2019

Devices

Amazon/Google

Baidu

2Q19 Global smart speaker shipments reached 26.1mn units, up 55.4%

The global smart speaker shipments in 2Q19 reached 26.1mn units, up 55.4% YoY. Amazon maintained its leading position with a market share of 25.4%. Baidu replaced Google to be the No.2 in the market. Its shipment was up 3700% YoY to 4.5mn units, and market share jumped to 17.3% from 0.7% in 2Q18, even though its Xiaodu devices are only sold in China. Among the top 5, Google is the only company that reported a 19.8% decline in shipment with market share going down from 32.3% to 16.7%. In terms of region, China has doubled its quarterly shipment size to 12.6mn units, while the U.S. market showed slight decline of 2.4% with a total shipment of 6.1mn units. (Source: Canalys)

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26 Aug 2019

Smartphone

OPPO

OPPO to launch OPPO Reno 2 in September

OPPO is to launch OPPO Reno 2 on September 10, the company's first phone with Qualcomm's Snapdragon 730G chipset and 20x hybrid zoom Quad-CCM. For selfies, Reno 2 has a 16MP "Shark Fin" rising front camera which could capture live bokeh video. OPPO will debut its noise-cancelling wireless OPPO Enco Q1 earphones on the same day. (Source: Sina)

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25 Aug 2019

AI

Megvii

AI start-up Megvii filed for Hong Kong IPO of at least US$500mn

Chinese AI start-up Megvii has filed for IPO in Hong Kong, targeting proceeds of at least US$500mn. Founded in 2011, Backed by Alibaba, Megvii is known for its facial recognition platform Face++. The company has completed nine rounds of private funding totaling up to US$1.4bn. In 1H19, Megvii booked a loss of RMB5.2bn, mainly due to the fair value changes of its preferred shares and investment in R&D. (Source: Reuters)

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23 Aug 2019

Semiconductor/AI

Huawei

Huawei launched AI processor Ascend 910 and AI framework MindSpore

Huawei launched the world's most powerful AI processor Ascend 910. The Ascend 910 is used for AI model training and its max power consumption is only 310W, much lower than its planned specs (350W). Huawei also unveiled an AI computing framework MindSpore that supports development for AI applications in all scenarios and will be open-source in 1Q20. The combination of Ascend 910 and MindSpore is about two times faster at training AI models than other mainstream training cards using TensorFlow. (Source: Huawei)

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23 Aug 2019

Semiconductor

Innodisk

Innodisk announced InnoAGE SSD embedded with Microsoft Azure Sphere

Innodisk launched its innovative product InnoAGE SSD built with Microsoft Azure Sphere. It is an end-to-end edge and cloud solution that enables smart data analysis, data security and secured communications from the IoT & AIoT devices to the cloud through Azure Sphere. InnoAGE SSD is the first SSD designed for remote recovery from its hardware and software innovation which are under patent secured. InnoAGE SSD will work in unison with real-time monitoring applications. (Source: Innodisk)

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22 Aug 2019

Smartphone

Vivo

Vivo launched iQOO Pro 5G, and NEX3 5G coming in September

Vivo launched its gaming-focused iQOO Pro 5G with starting price at RMB3,798, the cheapest 5G phone in the market. The iQOO Pro 5G is equipped with the Snapdragon 855+ chipset and ultrawide triple-rear cameras, supporting in-display fingerprint scanning as well as face wake. Besides, Vivo also teased it NEX3 5G with "waterfall" display and an elevating camera, coming in September. (Source: engadget, theverge)

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22 Aug 2019

5G/Infrastructure

China

Chinese mobile carriers plan to share 5G networks

China Telecom and China Unicom has agreed on a "co-built, co-shared" 5G infrastructure, mainly to cost-cutting. The three main carriers in China are cautious about large investments in 5G. China Mobile plans to invest RMB24bn, lower than the number reported in June, and the other two carriers plan to invest RMB17bn in total this year. China plans to construct over 50,000 base stations covering 50 cities in 2019. In addition, 5G service is expected to be officially commercialized in September this year, but the peak period of 5G investment could be between 2020 and 2022. (Source: NikkiAsianReview)

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22 Aug 2019

Semiconductor/AI

Alibaba

Alibaba unveiled self-developed AI voice FPGA chip Ouroboros

Alibaba's DAMO unveiled the new-gen self-developed AI FPGA chip Ouroboros. It is the first AI FPGA chip designed for speech synthesis algorithms. It can generate 1 second of voice within 0.3 seconds, while the CPU and GPU with WaveNet algorithm need 50 seconds complete the same task. Outoboros also supports AI speech recognition, and will probably first be used in TmallGenie. (Source: Sina)

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21 Aug 2019

Module

Apple/BOE

Apple to test BOE for cutting-edge iPhone screens

Apple is said to be in the final stage of certifying cutting-edge iPhone screens from BOE Technology to cut reliance on Samsung and reduce costs. BOE has supplied the display to Huawei's foldable Mate X. Apple is expected to produce at least two iPhones with OLED displays in 2020. Apple will decide whether to take BOE on as a supplier of flexible OLED displays by the end of this year. It could be the first time that Apple source this display technology from China. (Source: NikkiAsianReview)

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20 Aug 2019

Semiconductor/AI

Intel

Intel unveiled first AI chip Spring Hill

Intel unveiled its high-performance AI accelerator NNP-I (Spring Hill) for inference. The chip is based on a 10nm Ice Lake processor that allows it to deal with high workloads using minimal amounts of energy. It is designed for large computing centers to accelerate deep learning deployment at scale. It is said that Facebook has started to use the product. (Source: Reuters)

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20 Aug 2019

Semiconductor

MediaTek/TSMC

TSMC

MediaTek booked 7nm production capacity from TSMC for its 5G chip

MediaTeck is said to have booked the 1Q20 production capacity from TSMC. 12,000 units of 7nm production capacity is expected to produce MediaTek's first 5G chip MT6885. Because one of its customers requires earlier shipment, MediaTek hopes to reserve more capacity from TSMC – up to 20,000 units. MediaTek has won 5G mobile phone orders from OPPO and Vivo, and is seeking Huawei's order for its low-end 5G phones. (Source: Sina)

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19 Aug 2019

Module

Samsung

Samsung to cut LCD production and shifted to QD-OLED displays

Samsung is said to cut LCD production and put more efforts on QD-OLED panels. The company now produces 250,000 LCD panels in South Korea every month, but will shut down one of its Gen 8.5 LCD lines with monthly capacity of 90,000 units this month, and cut 30,000 units at another line next month, due to the falling profitability and oversupply. According to the media report, Samsung Display would invest around KRW10tn in QD-OLED. This self-emissive panel would first be used for TVs. (Source: Koreaherald)

IMPORTANT DISCLOSURES

Analyst Certification
We, Brian Li and Michelle Li, 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.

Firm Disclosure
AMTD Global Markets Limited has an investment banking relationship with Xiaomi Corporation and/or its affiliate(s) within the past 12 months.

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