

China CE and HA Industry Overview

May 2018

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China Consumer Markets

Worldwide and China Consumer Electronic market

China Home Appliance

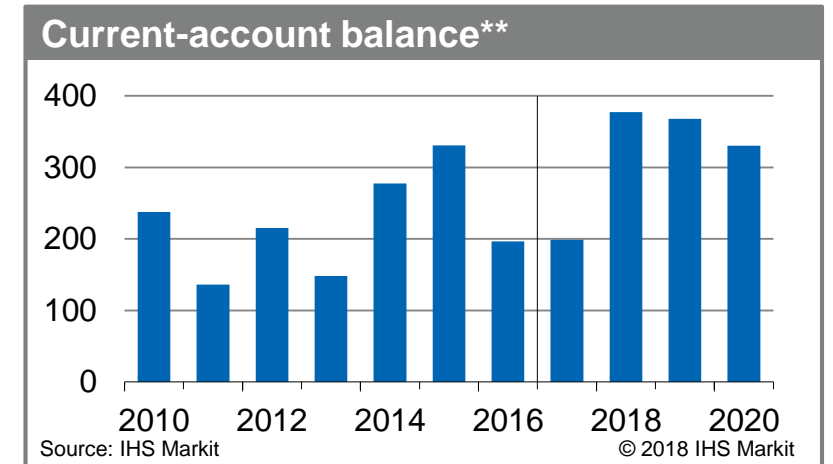
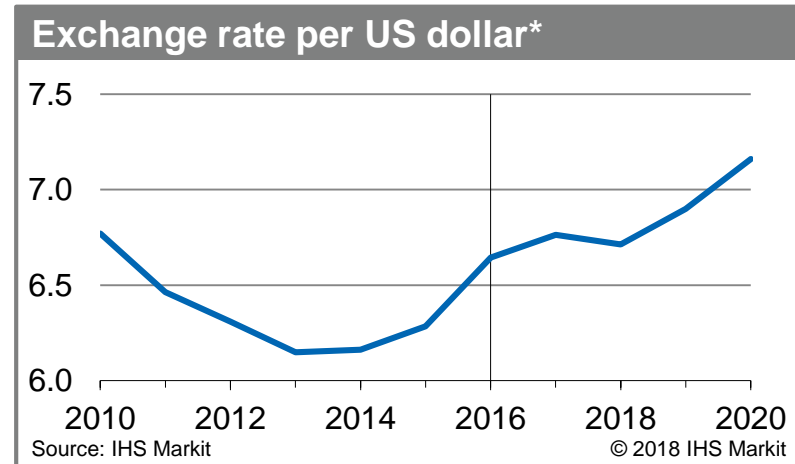
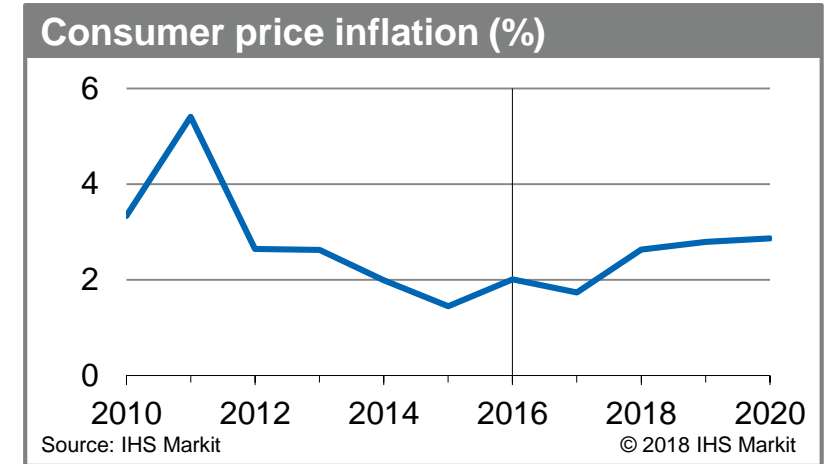
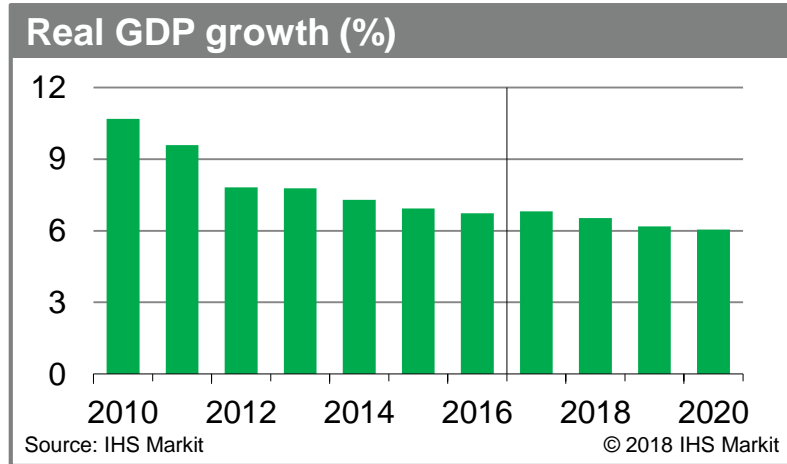
Wrap Up

China Consumer Markets

Economy is the key driving force of consumer market, consumption habits differ greatly in China

China economy outlook summary

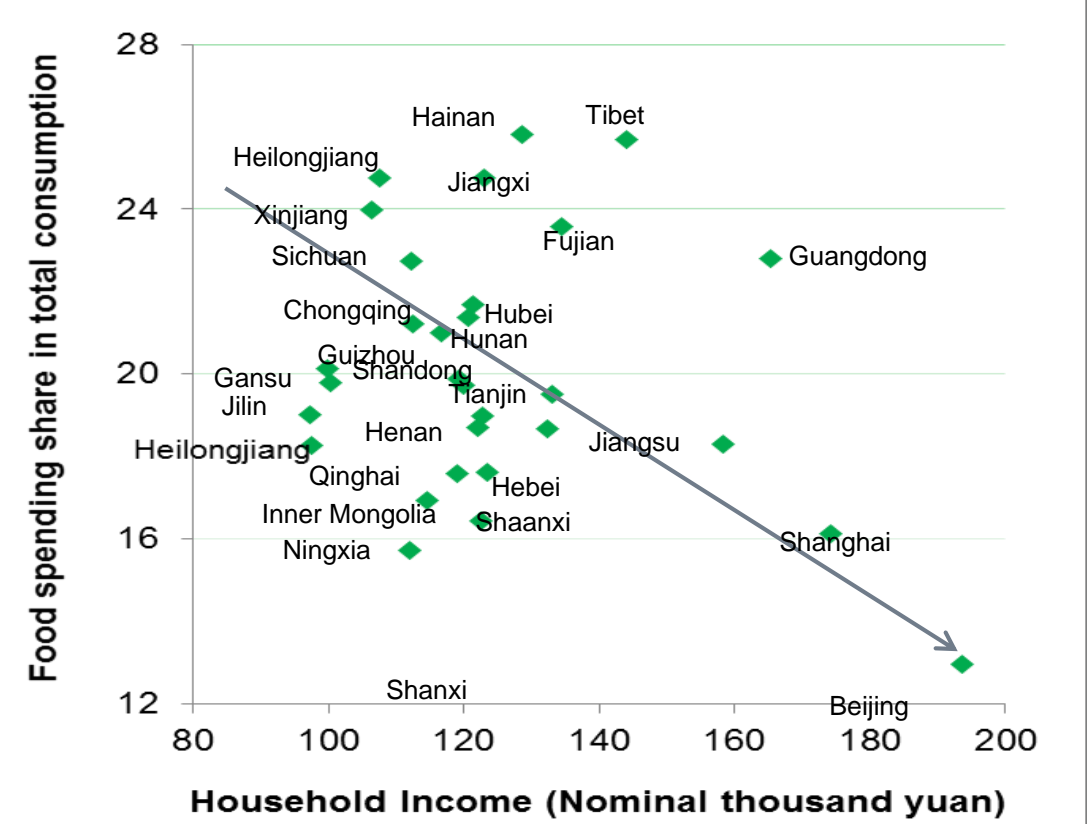
- Real GDP increased 6.9% y/y in 2017, supported by policy stimulus to ensure stability, it is expected to keep increasing the coming years, with higher than 6% y/y.
- Efforts to reduce excess industrial capacity, the anti-pollution campaign, and a housing-market correction will slow real GDP growth from 6.8% in 2017 to 6.5% in 2018 and 6.2% in 2019.
- The yuan is expected to depreciate gradually against the US dollar through 2020.
- Under China's 13th five-year plan, services will account for 70% of incremental growth in 2016–20, up from about 60% in 2011–15.



*Annual average, **Billions of US dollars

China's consumption growth is expected to rise in 2018; Engel's law in action, consumption habits differ greatly between Beijing and in-land provinces

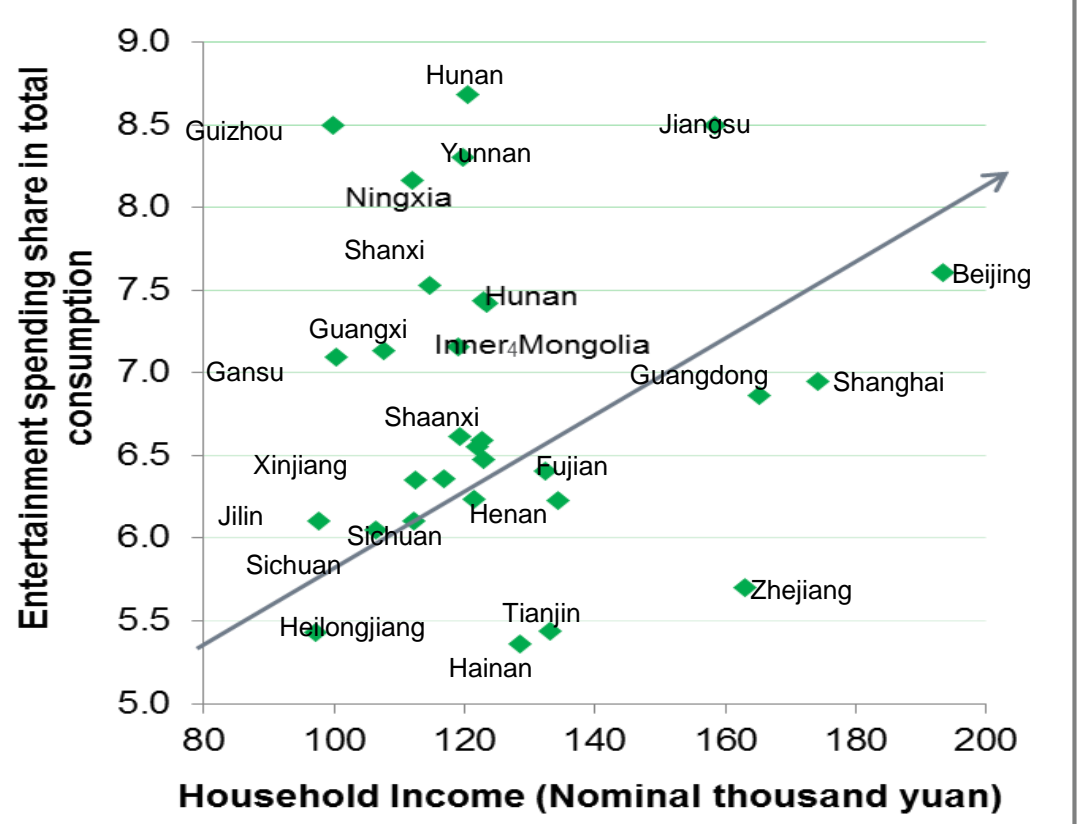
Food spending and household income



Source: IHS Markit

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Entertainment spending and household income



Source: IHS Markit

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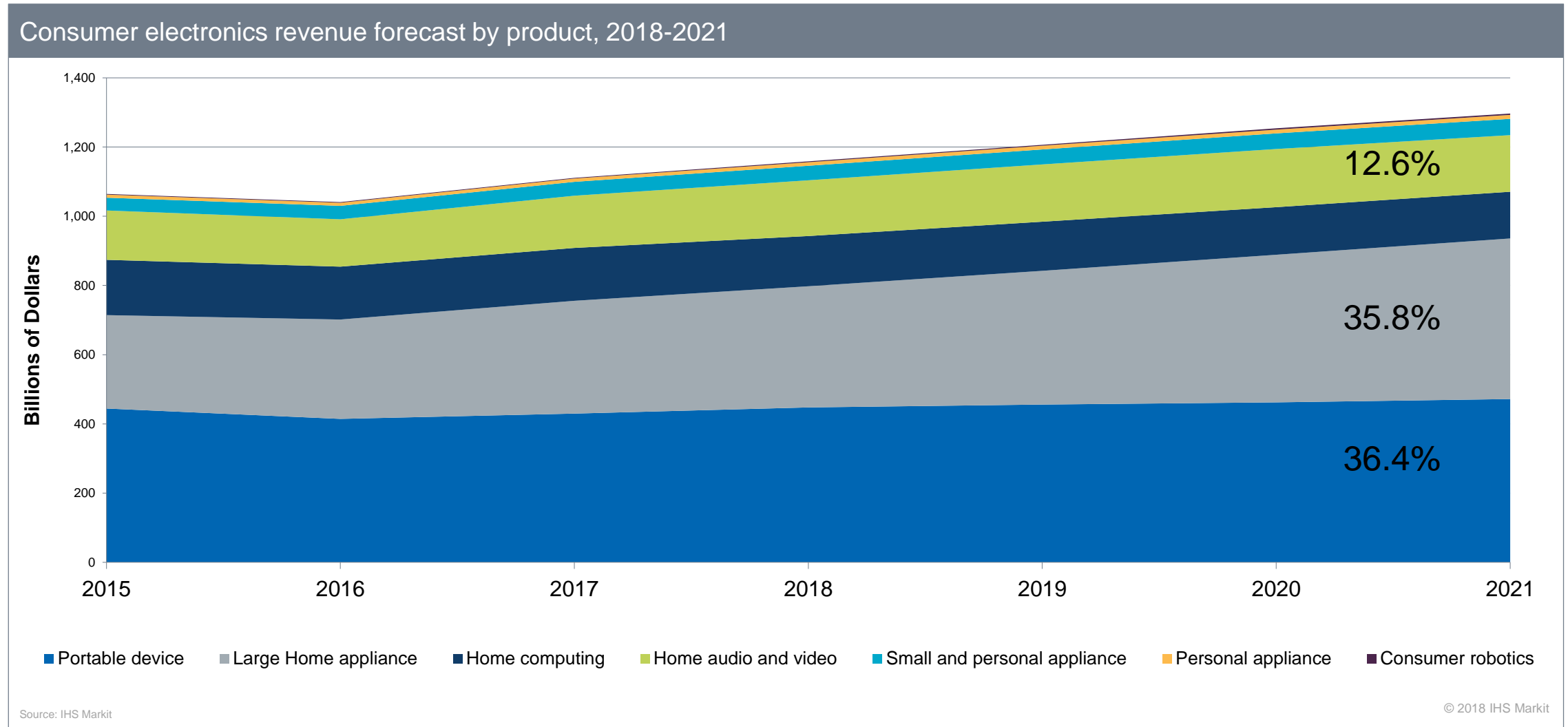
Note: 2016 urban data for 31 provinces and municipalities in China

China Consumer Electronic market

Most consumer devices become commodity with low growth rate, including smart phone.
New tech and value-added service keep driving long-term market

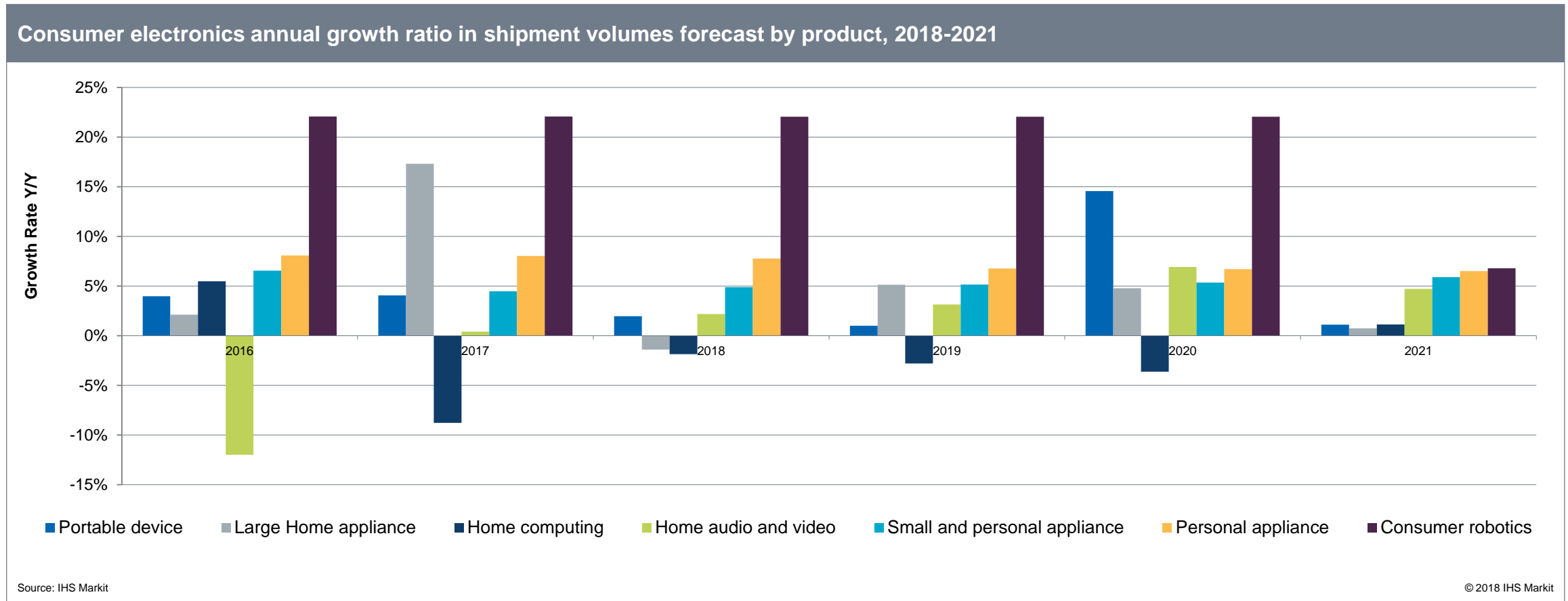
Worldwide Consumer electronics revenue forecast by product, 2015-2021

- Portable device, large appliances, and A/V products contribute to major sales revenue in 2021.



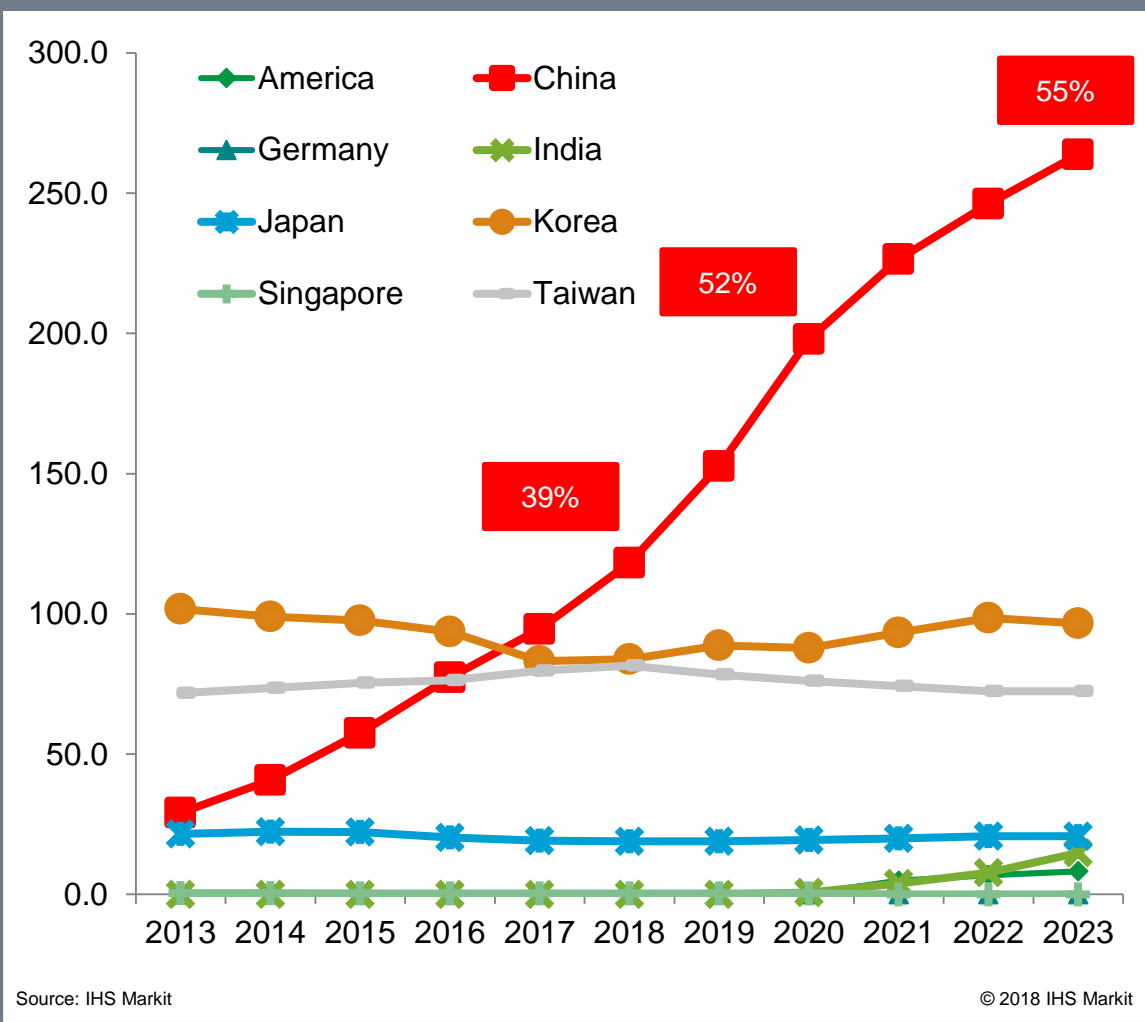
China Consumer electronics annual growth ratio in shipment volumes forecast by product, 2018-2021

- PC market will suffer decline, but other segments will retain unit growth in the future three years

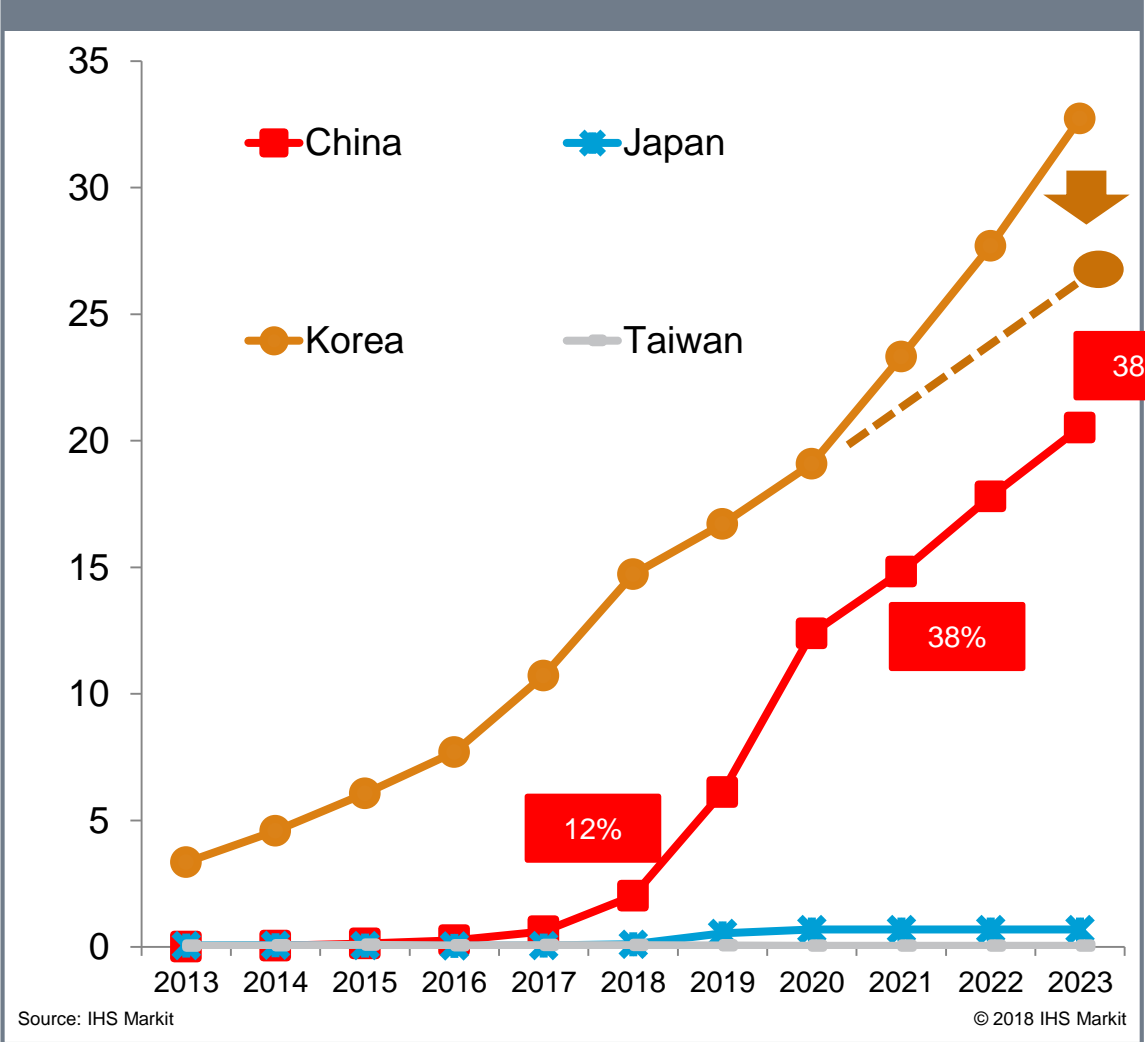


Global Display Capacity Expansion & China Shares

TFT Array (including AMOLED Backplane) Capacity By Countries (Million Sq. Meters)



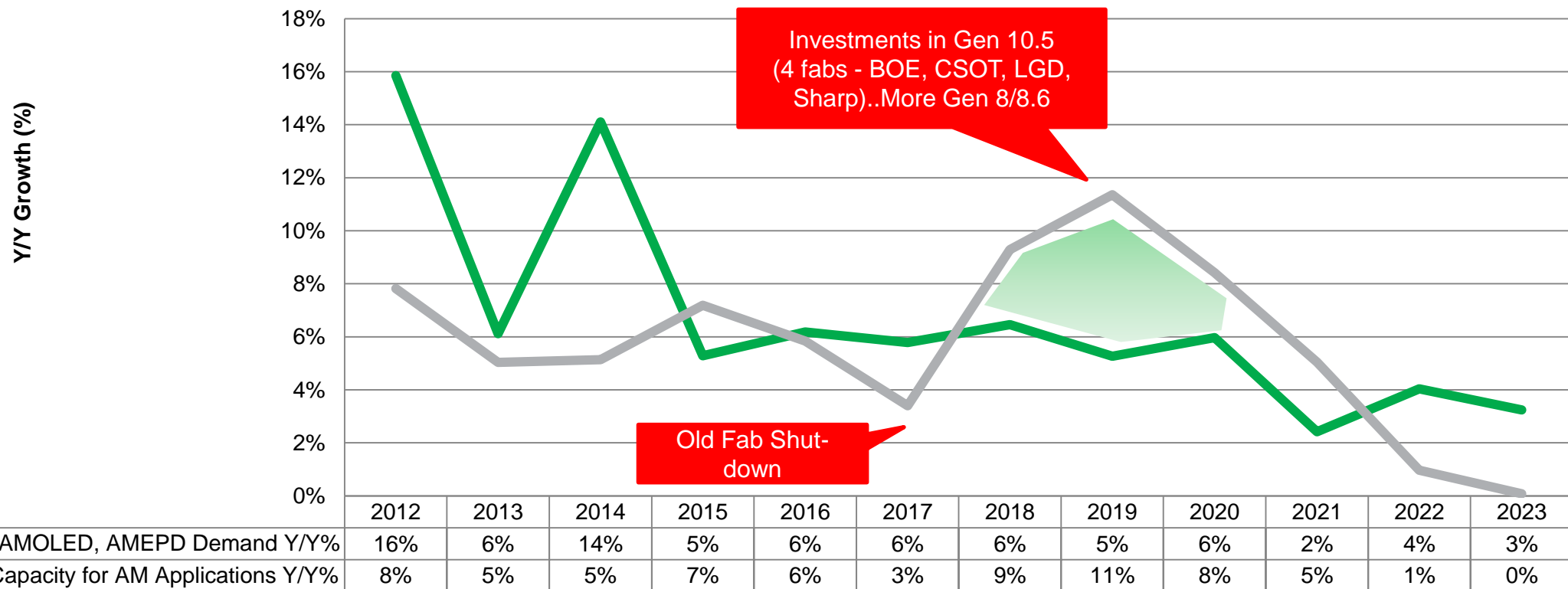
AMOLED Capacity By Countries (K Sq. Meters)



Demand & Capacity Growth Rate

- In theory, it is forecast a three-year over-supply to occur in 2018-2020. But, the first oversupply in H2 2017-H1 2018 may make some new **investments postponed**, and **larger size demand grows as prices go down sharply**.

Total TFT array capacity vs. large-area and small/medium FPD module demand growth rate

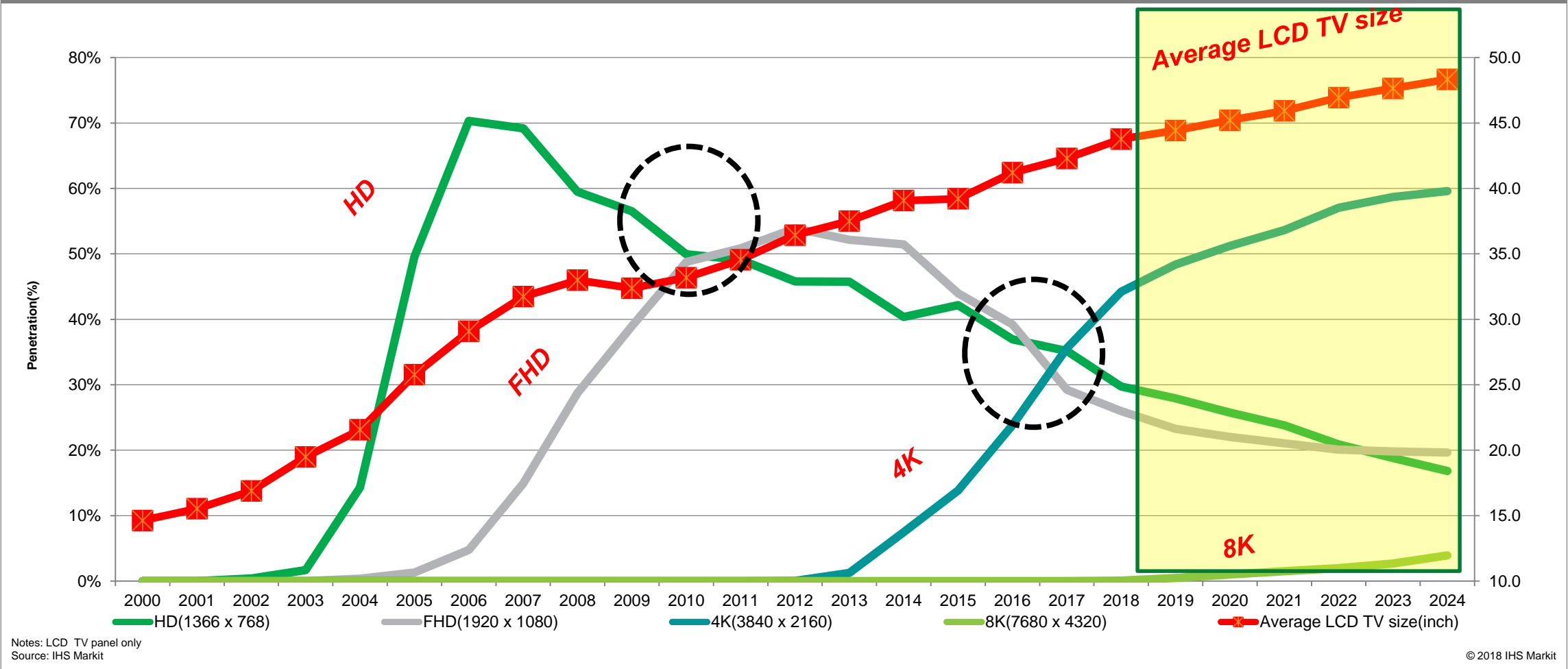


Notes: Demand includes AMEPD, AMLCD, AMOLED, a-Si, LTPS and oxide panels for both large-area and small/medium applications. Capacity includes all ramped capacity for fabs with ≥30% probability for all applications, glass sizes and technologies. Source: IHS Markit © 2018 IHS Markit

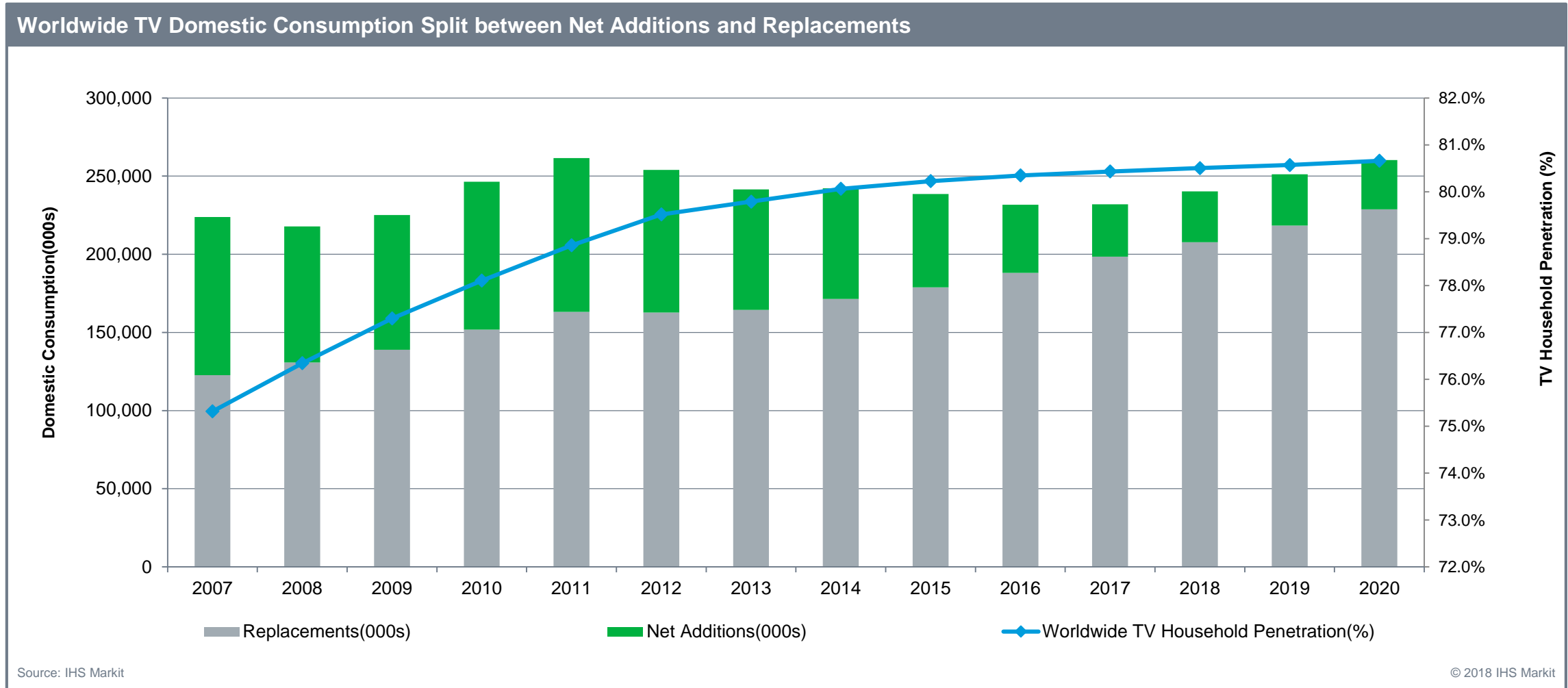
TV Resolution trend changes every 6 years



LCD TV panel penetration forecasting by resolution



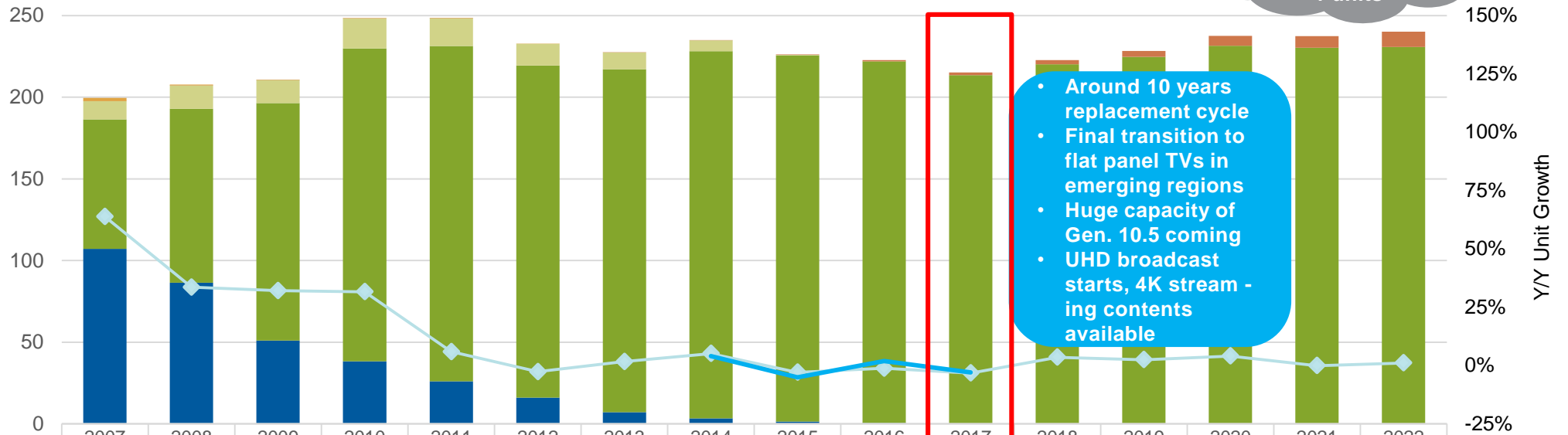
Worldwide TV household penetrations have reached already 80% since 2015 with Net Additions falling quickly, China follow the trend



WW TV Shipment Forecast by Technology ~ Total TV demand flat after a small replacement cycle peak in 2020. OLED TV in 2020-2022 is up by increased capacity.

- LCD TV demand in 2017 fell 213.5M units mostly driven by falling demand in China. OLED TV shipments had 200K units upside on Q4'17 forecast.

WW TV Shipment Forecast by Technology (Million Units)



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	199.5	207.7	210.8	248.4	248.6	232.8	227.4	234.9	226.2	222.7	215.2	222.7	228.3	237.5	237.4	240.1
RP	1.8	0.4	0.2	0.2	0.1	0.1										
OLED	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.7	1.6	2.5	3.6	6.0	7.1	9.4
PDP	11.3	14.4	14.2	18.4	17.2	13.3	10.3	6.6	0.2	0.0						
LCD	79.2	106.4	145.4	191.6	205.3	203.3	209.9	224.9	224.3	221.5	213.5	220.2	224.7	231.5	230.3	230.7
CRT	107.2	86.4	51.1	38.3	26.0	16.1	7.1	3.4	1.3	0.5	0.1					
FP TV Y/Y Growth	63.8%	33.5%	32.1%	31.6%	6.0%	-2.6%	1.7%	5.1%	-2.9%	-1.2%	-3.2%	3.6%	2.5%	4.0%	0.0%	1.1%
Y/Y Growth w/o Mexico Subsidy								4.0%	-5.1%	2.0%	-3.0%					

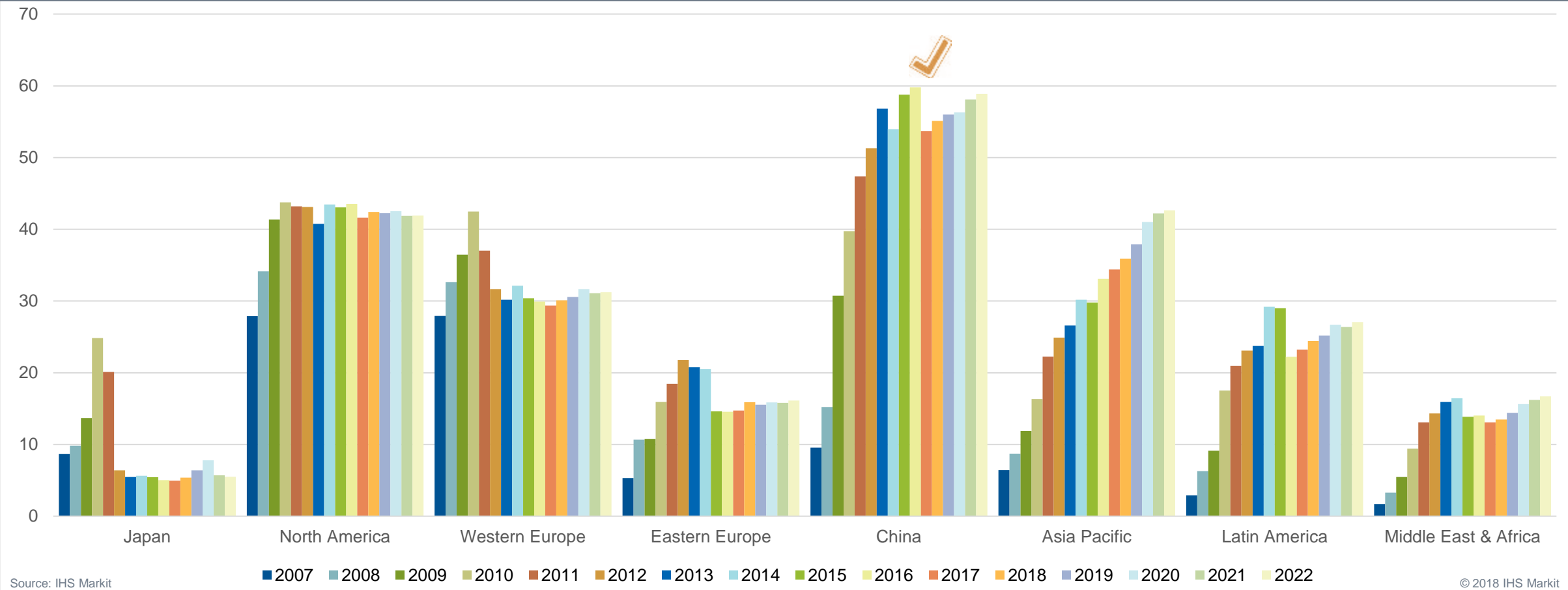
Source: IHS Markit

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Flat panel TV demand in 2017 in North America and China especially was damaged by steep panel price increases. Price sensitivity remains very high in both regions

- In 2016, TV shipments for US and China in 2016 was good, due to better firm consumer spending and currency exchange rate. Demand for both regions in 2017 was weak.

WW Flat Panel TV Shipment Forecast by Technology (Million Units)








Source: IHS Markit

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4K/8K TV Related Highlights toward 2020

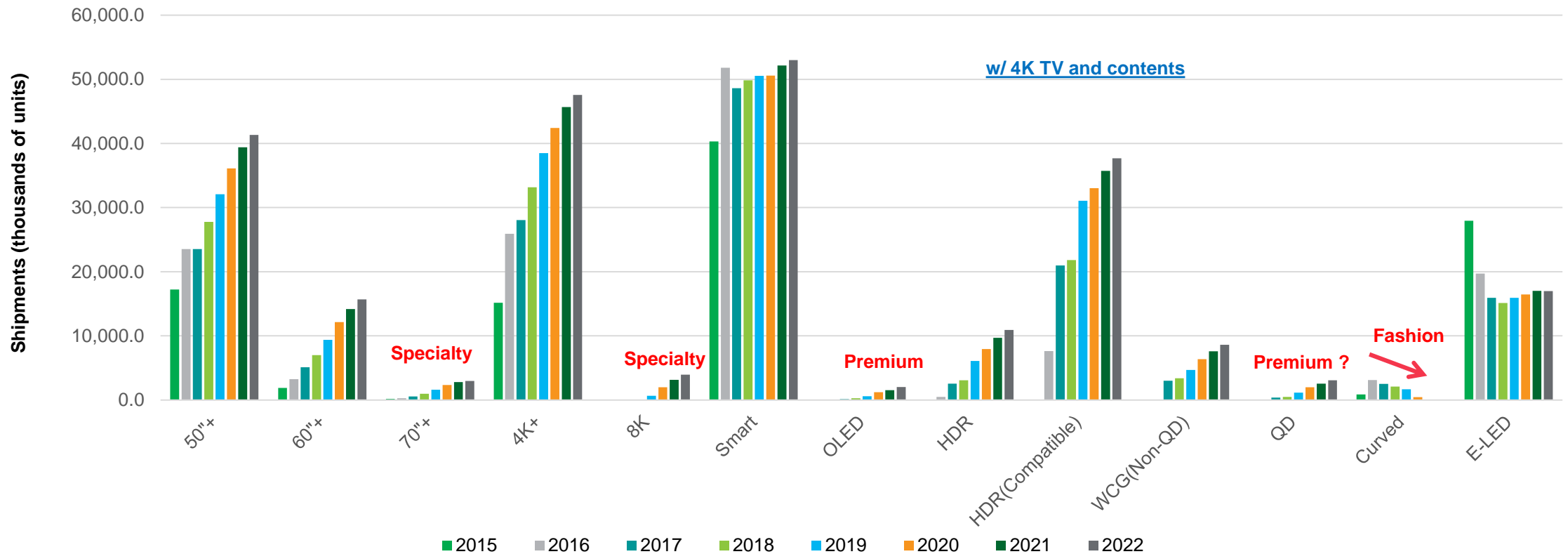
TV Related Highlights Toward 2020 and Beyond

Key Topics	Region	~ 2016	2017	2018	2019	2020	2021~	
4K Broadcasting	Korea, Japan							
8K Broadcasting	Japan (NHK, BS only)	Right Handed		Left Handed	  			
4K/HDR Streaming	WW	Streaming Services & Streaming TVs						
Technology	WW	OLED						Printing
		QD LCD						QLED
8K TV	Japan ~ 120Hz			65"+				
	China ~ 60Hz			65"+				

TV Features Forecast ~ Continued trend of larger sizes, 4K/HDR and Smart TV will drive the demand globally, even faster in China

- Hot topics of features are OLED and 8K TVs from now on

China TV Shipment Forecast by Size Category/Resolution/Features (Millions of Units)

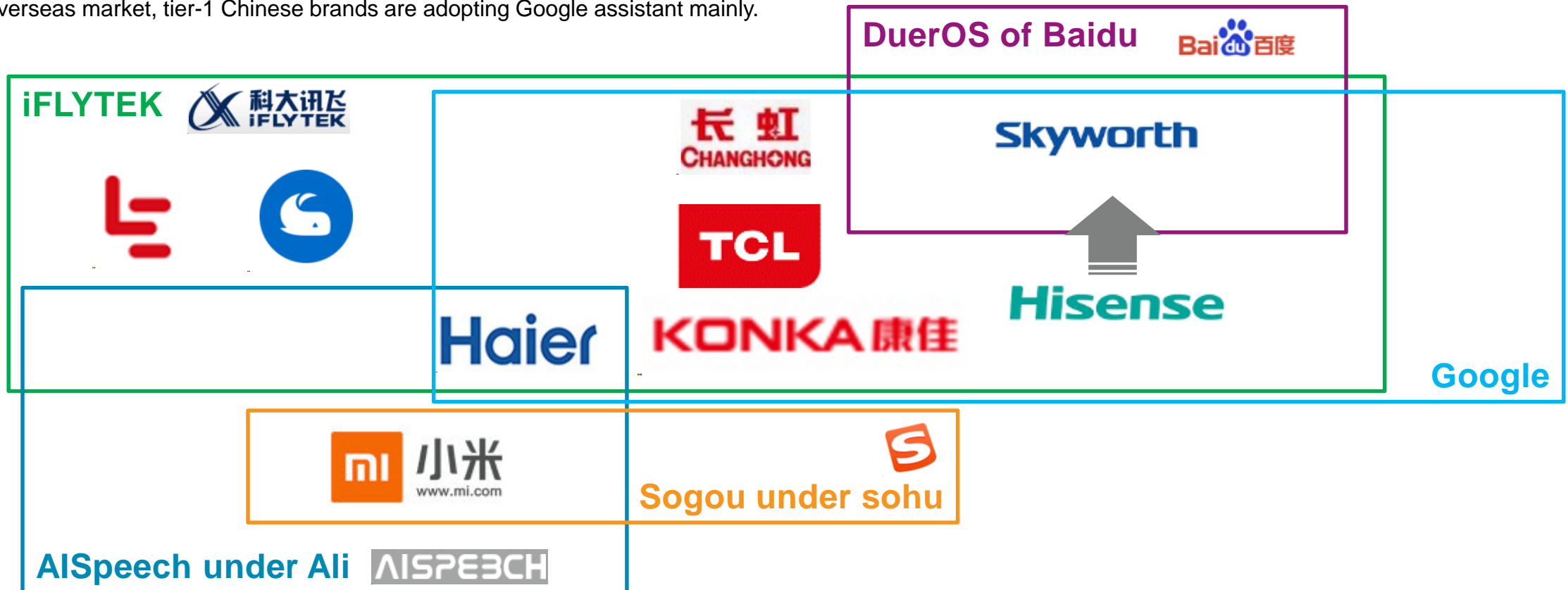


Source: IHS Markit

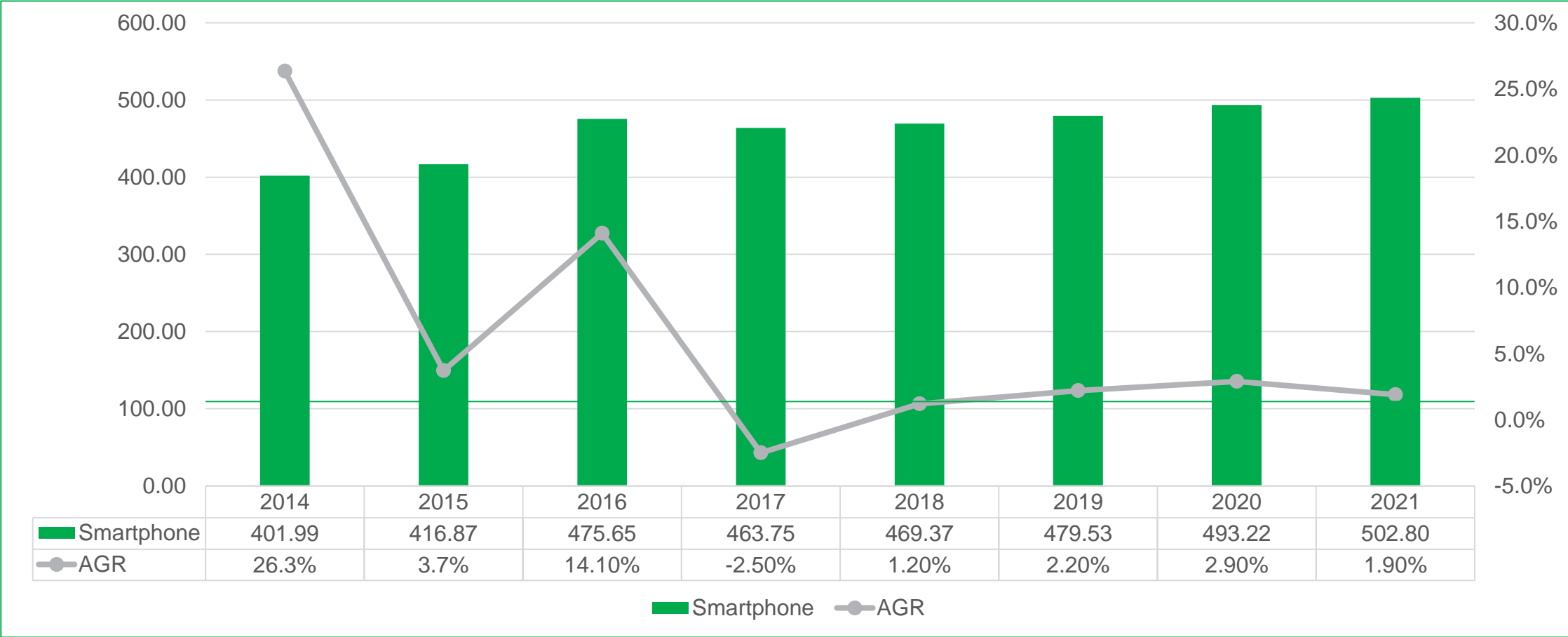
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iFLYTEK dominates voice control and voice assistant in Smart TVs, while DuerOS of Baidu is aggressively to enter this market.

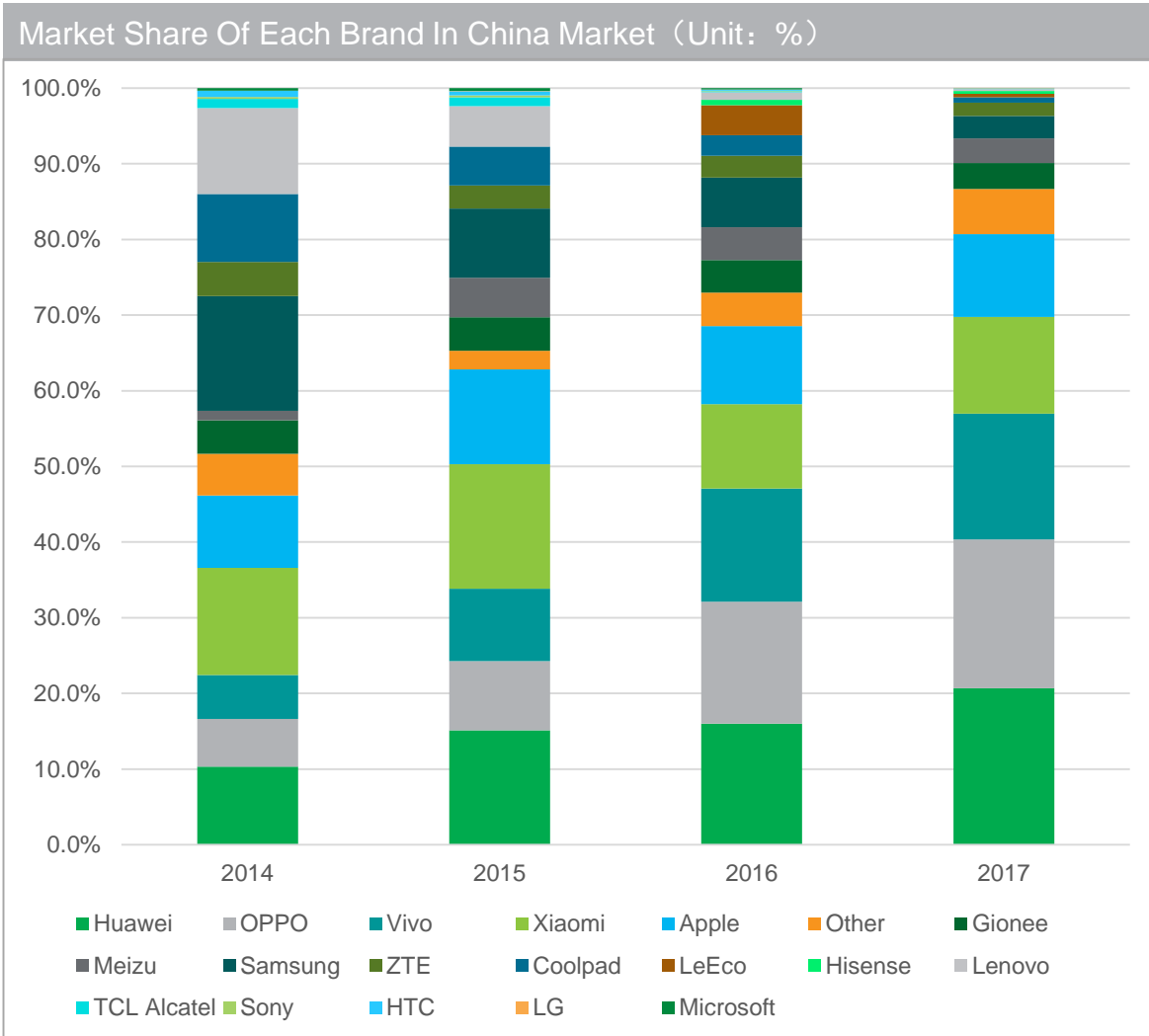
- iFLYTEK is a national key software enterprise dedicated to the research of intelligent speech and language technologies, development of software and chip products.
- Voice control function was very popular several years ago along with the fast adoption of smart TV, major local brands have been adopting iFLYTEK solution for over 5 years, iFLYTEK focus in China market with the advantage of complicated regional languages, in addition to mandarin.
- In overseas market, tier-1 Chinese brands are adopting Google assistant mainly.



China smartphone is saturated, it's couldn't have fast growth in the future years



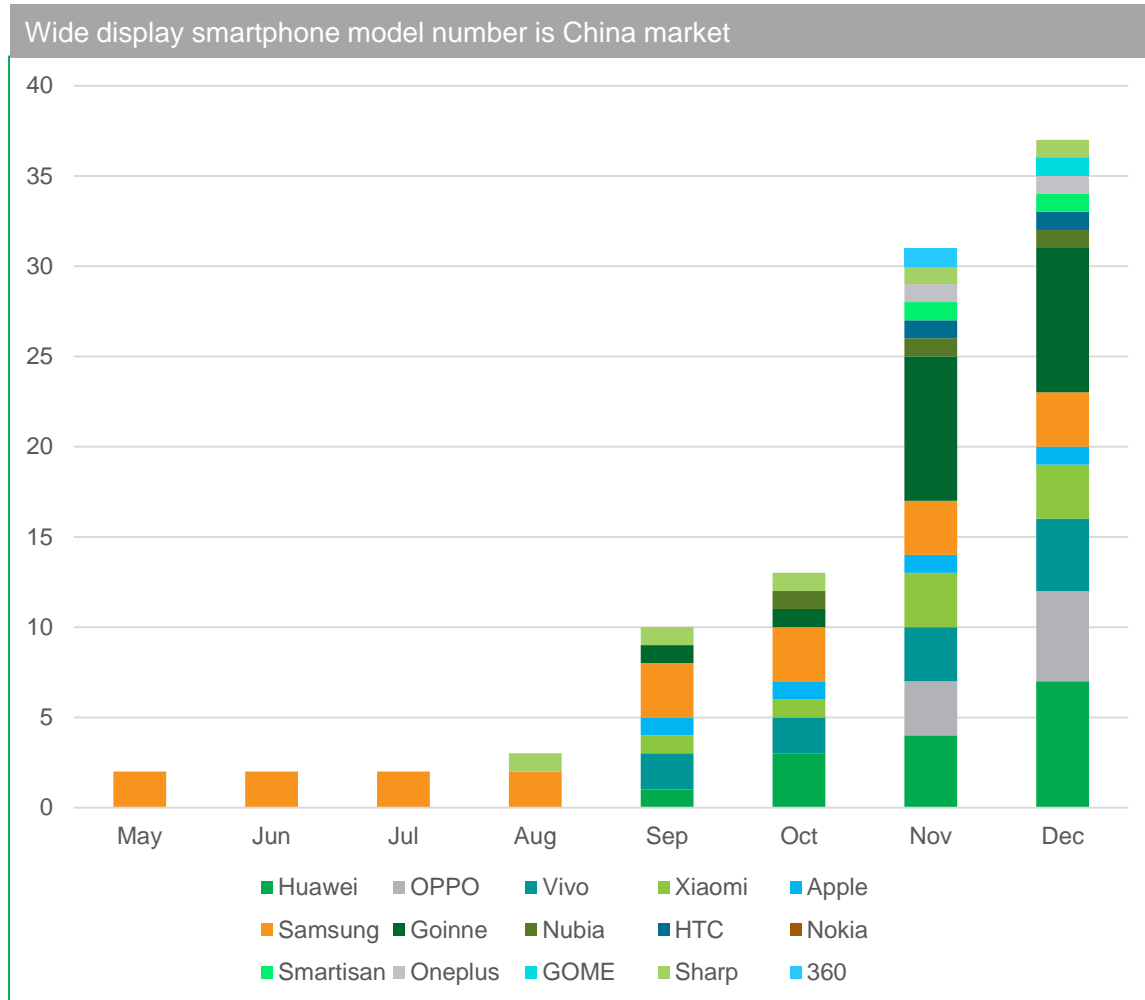
China market is high concentrated, The top 4 players take up about 70% market share and leading growth in China market in 2017



YOY growth by Brand In China Market (Unit: Million/%)

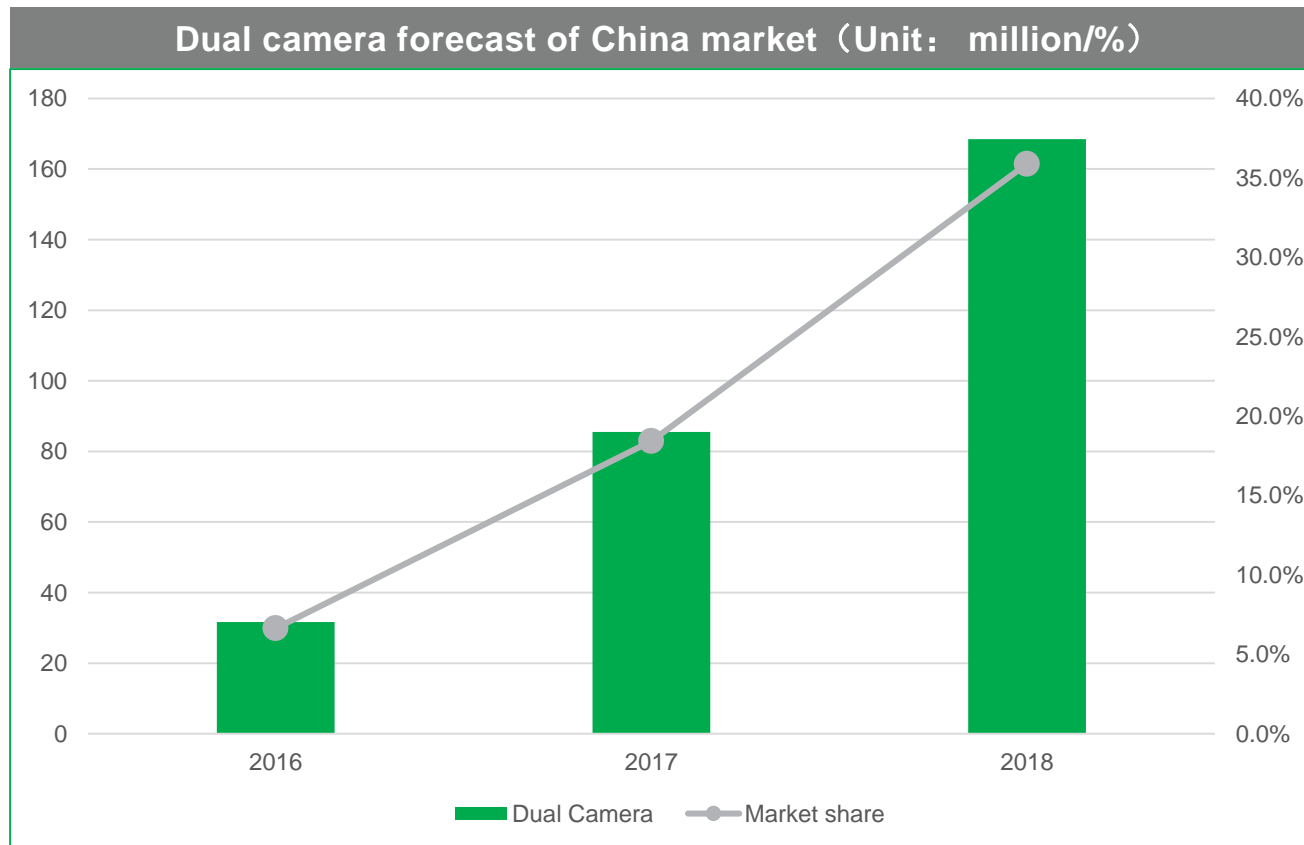
OEM	2016	2017	YOY
Huawei	76.2	90.9	19%
OPPO	76.7	86.3	12%
Vivo	71.1	73.1	3%
Xiaomi	53.0	56.1	6%
Apple	49.1	48.1	-2%
Other	21.0	26.2	25%
Gionee	20.4	15.0	-26%
Meizu	20.7	14.3	-31%
Samsung	31.3	13.1	-58%
ZTE	13.6	7.7	-44%
Coolpad	12.9	3.2	-75%
LeEco	18.9	2.0	-89%
Hisense	3.4	1.7	-51%
Lenovo	4.7	1.0	-80%
TCL Alcatel	0.7	0.3	-63%
Sony	0.4	0.2	-53%
HTC	0.7	0.2	-77%
LG	0.1	0.1	-30%
Microsoft	0.8	0.0	-100%
Total	475.6	439.2	-8%

Chinese brands pushed the 18:9 aspect ratio smartphones to the lower-end segment within about half years



Source: IHS Markit

Dual camera product market share of will reached to 35.9% in 2018, it will little bit higher than world level



- The Chinese brand is very aggressive on Dual camera product, since Huawei launched P9 by corporate with Leica. But the large part of volume is dominated by Apple, LG in the worldwide.
- Most part of Chinese brand launched the Dual camera product in the from 2017Q2, but most of models are flagship model.
- In the second half year, As the Dual camera productivity get mature and it cost down, the dual camera product will extend into lower end product.
- OPPO, vivo and Huawei Leading the shipment on dual camera.

Source: IHS Markit

Camera will keep being upgraded in China market, when UGC (User Generated Content) time is coming

- There are about 150 K short videos being uploaded on these APP in every minutes , most users are female who below 30 years old



There are 280 million by monthly Active Users



The total users reached 700 millions in 2017 November, from the 100million in 2016 June



There are about 200 million users in 2017 October, the average daily use time lasted more than 70 minutes, and the total daily volume exceeded 3 billion.



The team was formed in early 2016, The total community day VV has reached 300 million, with users watching over 100 videos on average every day



The number of active users on June 30, 2017 has reached 152 million, a 33.3% year-on-year growth.



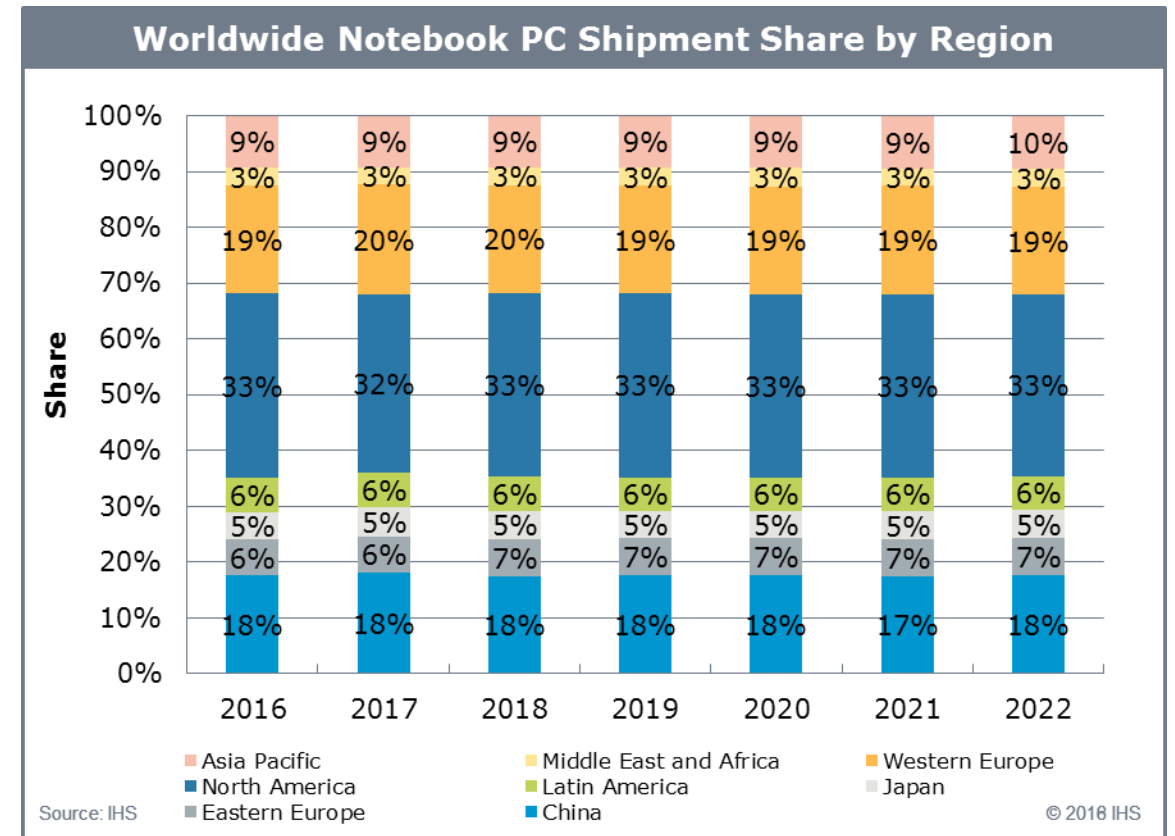
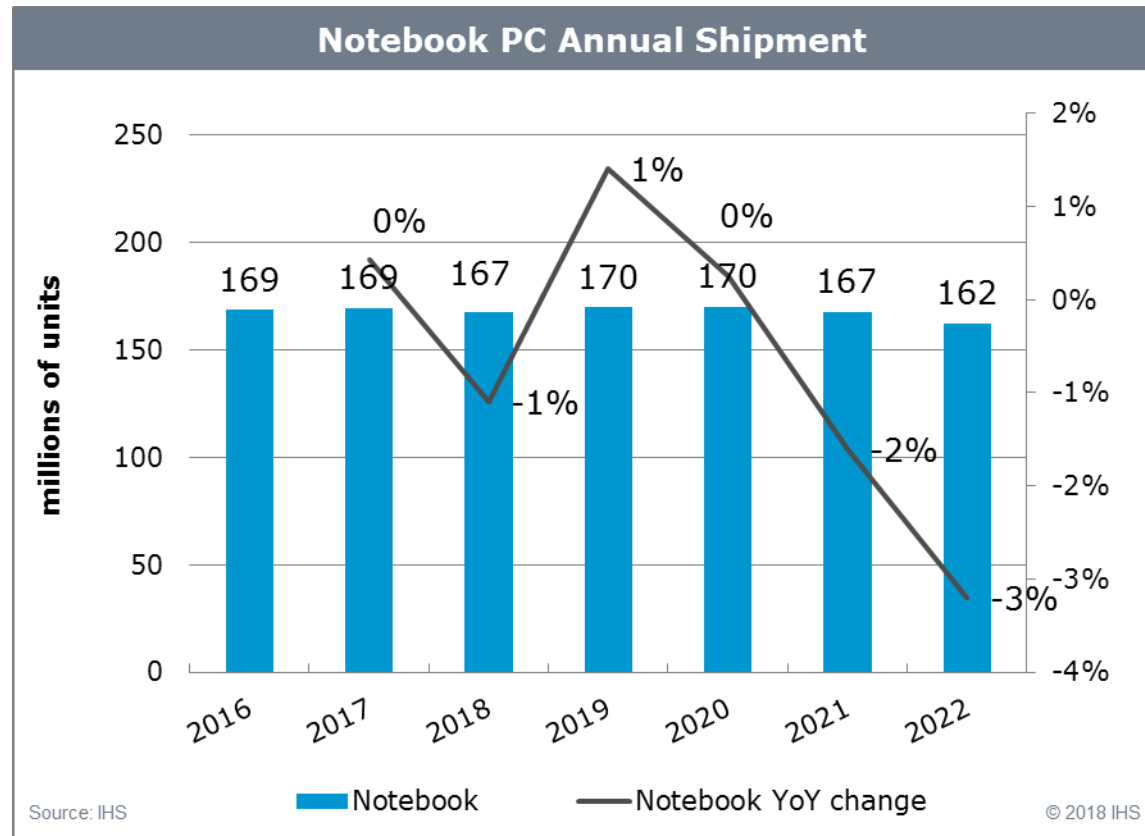
the total platform has grown by more than 12 million users.



the peak performance of the second and little curry shows has exceeded 2.5 billion times, with daily upload volume exceeding 1.5 million and daily coverage of over 70 million users, in December 2016.

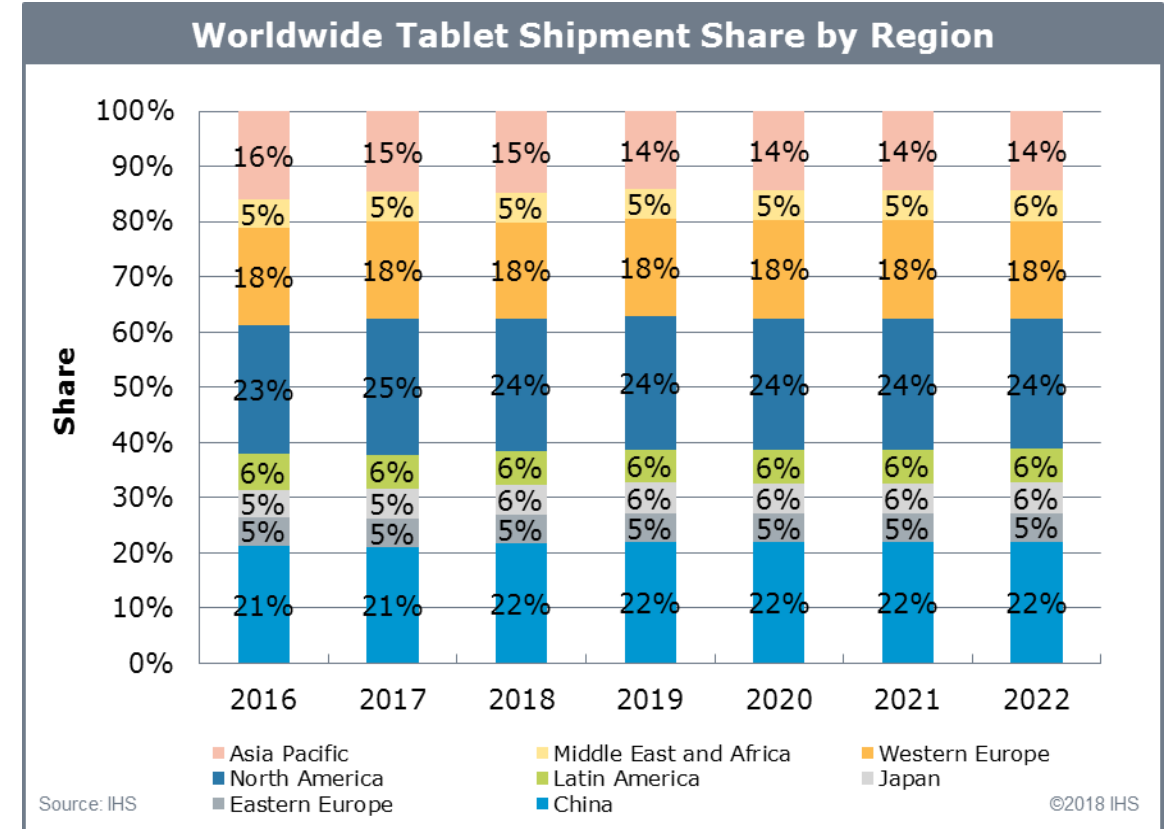
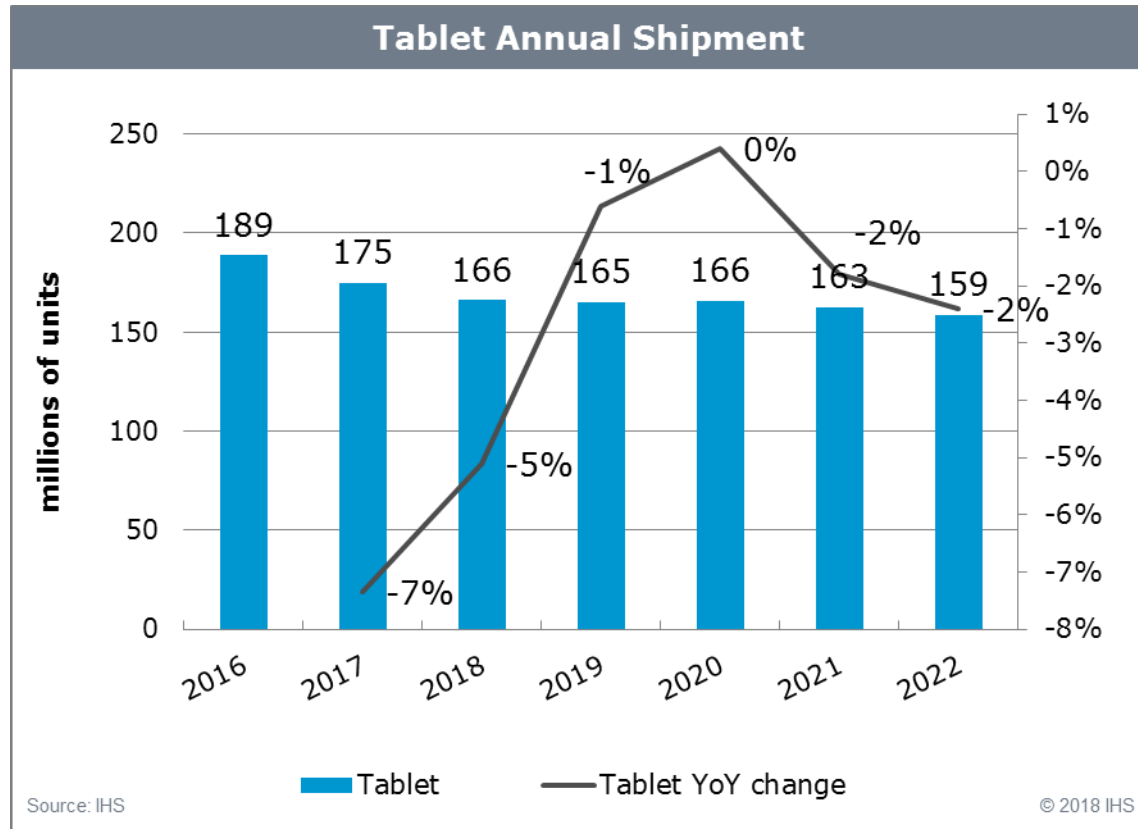
Worldwide and China Notebook PC Shipment Forecast

- Notebook shipments are projected to be 167M units with 1% Y/Y declined in 2018 by component supply constrained impact and return to positive growth in 2019 by PC replacement demand caused by end of support of Win 7 & Win Server 2008 since 2020.



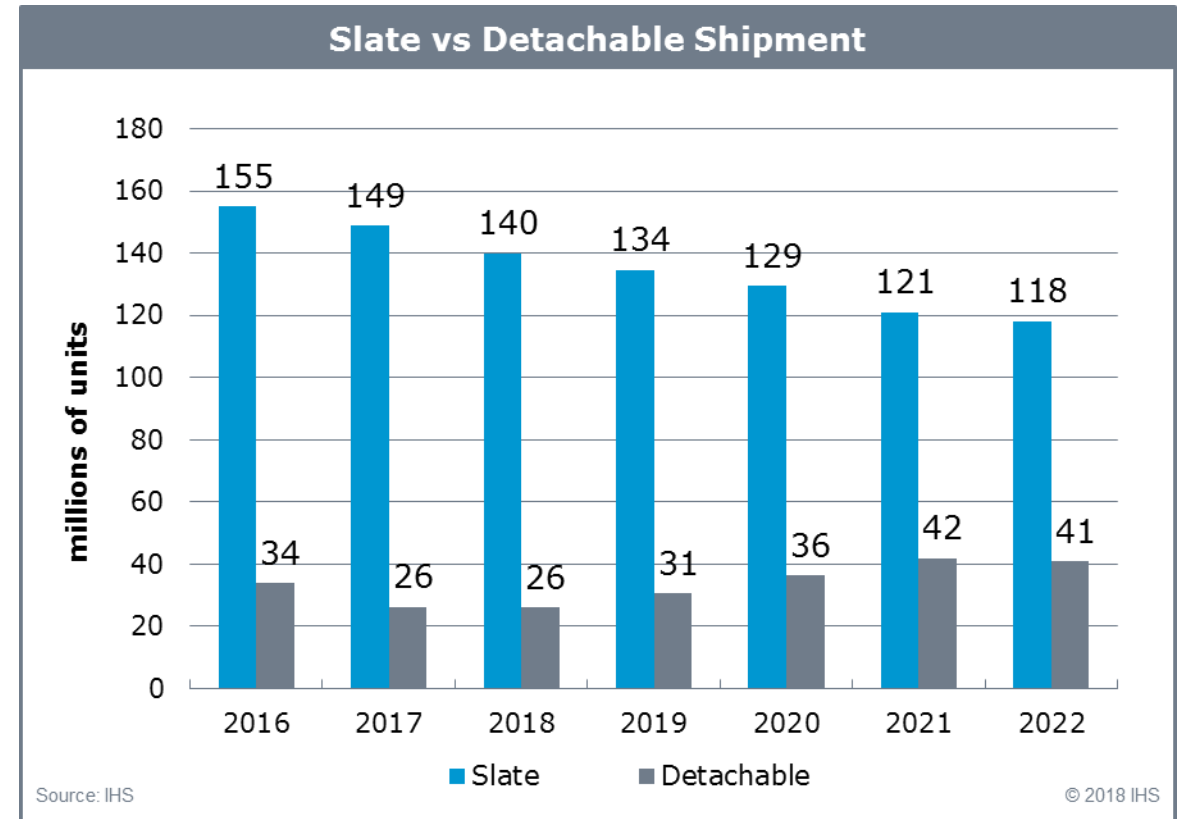
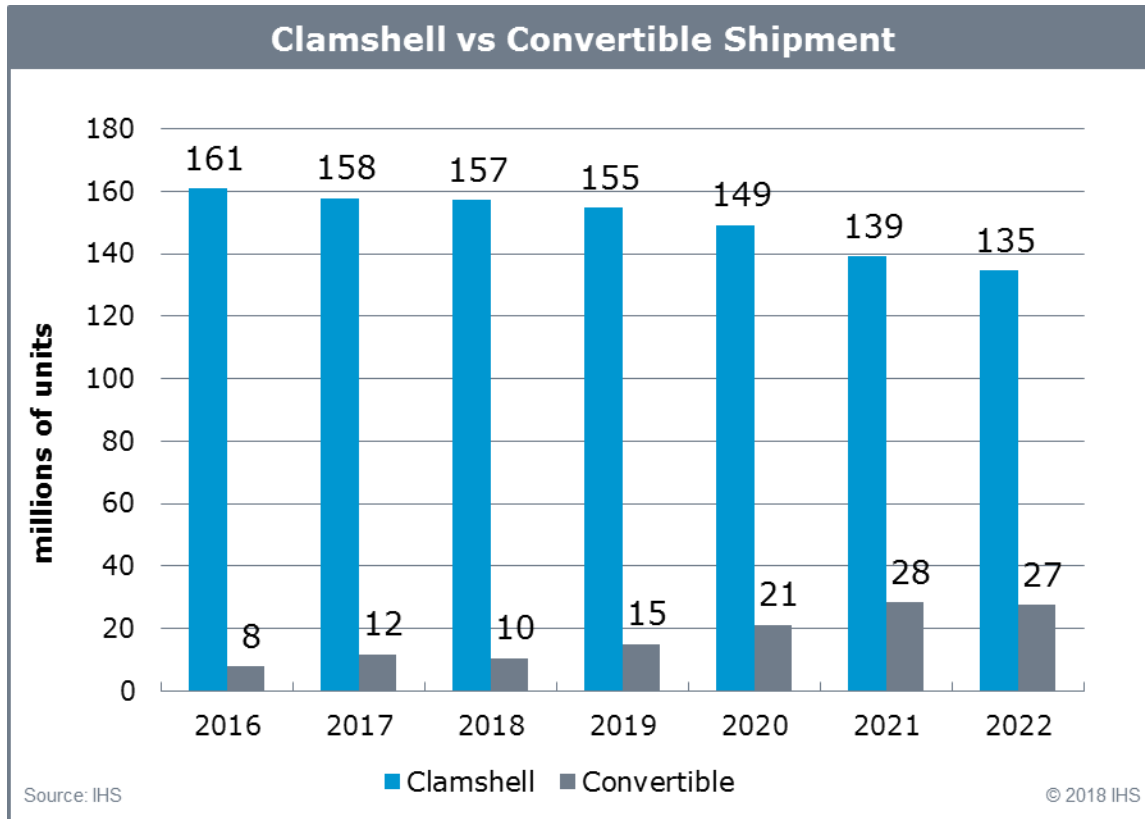
Worldwide and China Tablet PC Shipment Forecast

- Low-priced 9.7" iPad (\$329 starting) helped Apple to gain shares in 2017, but it also impacted non-Apple tablet demand.
- New PC replacement demand of small and medium business in Western Europe comes from smartphones and tablets/detachable PCs, not from desktop PC, when PC brands realize the reason of high monitor inventory in the end of 2017 recently.



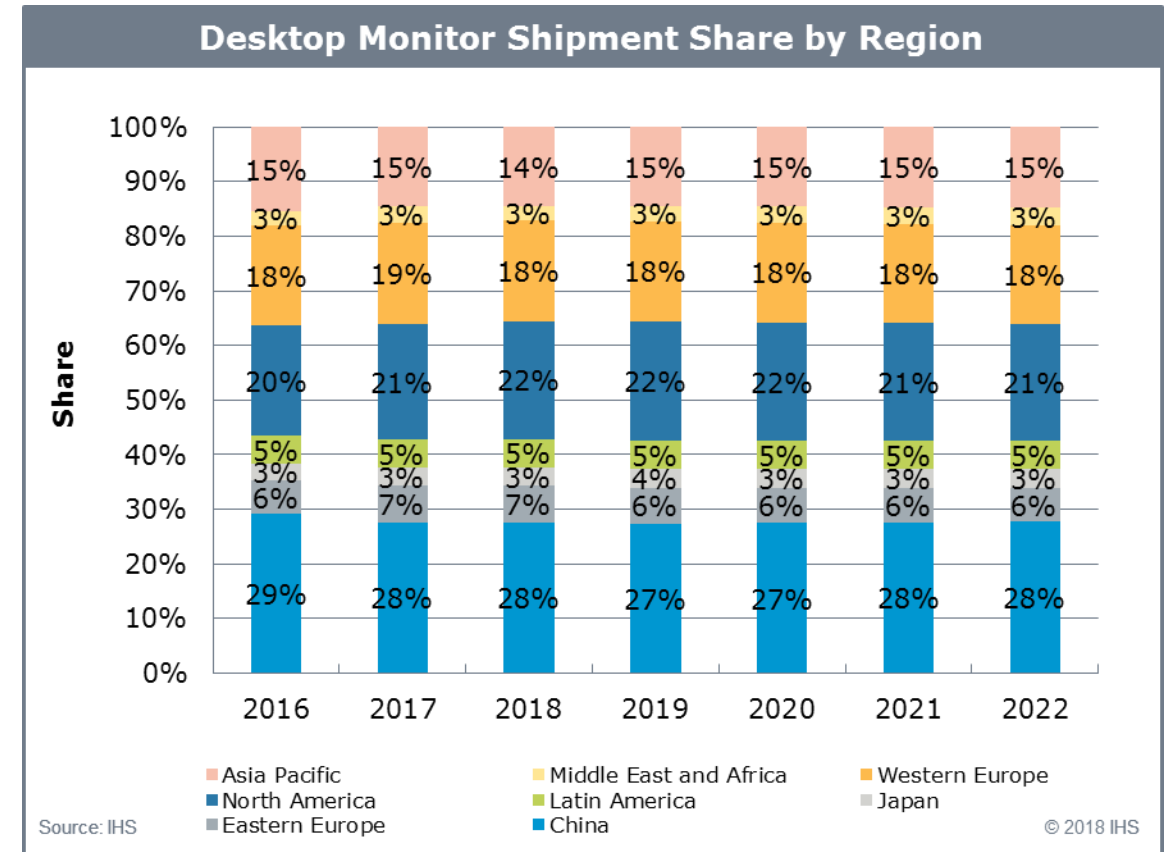
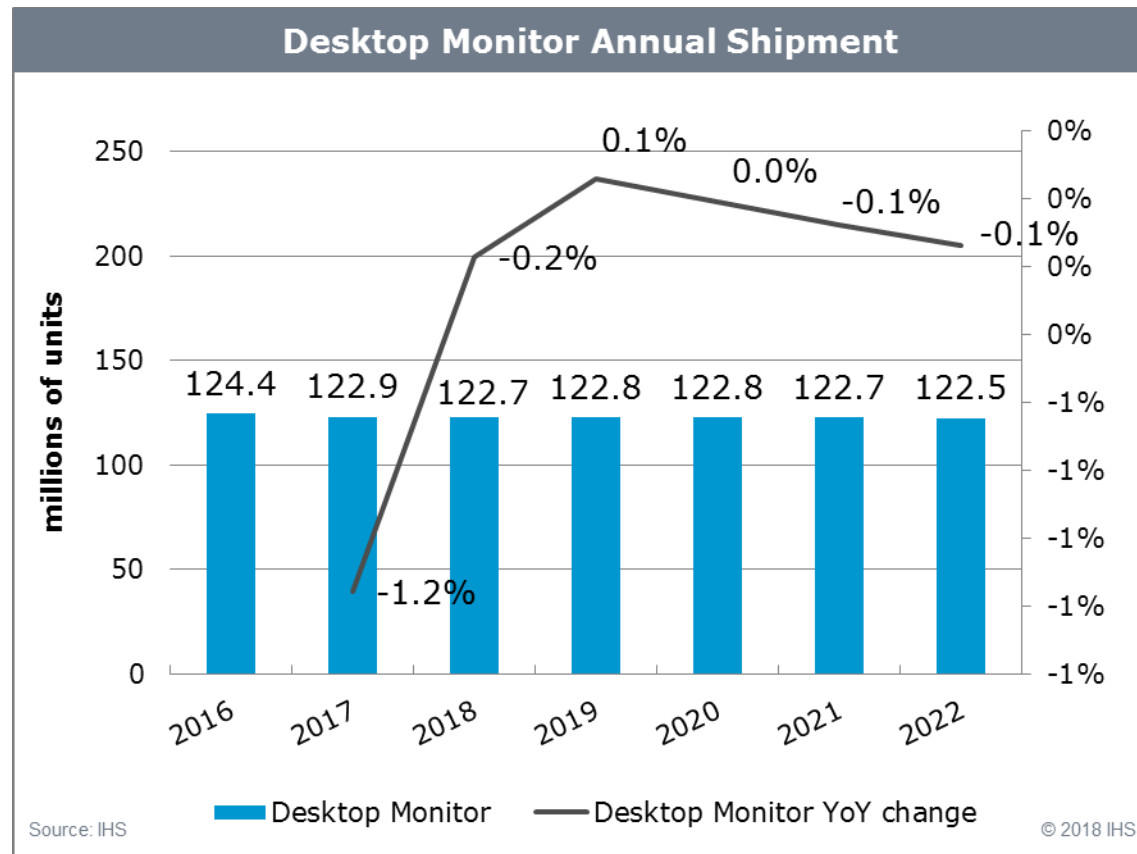
2-in-1 PC Shipment Forecast

- PC brands hope to have closed business relationship with Google because of having tussle over 4K OS fee with Microsoft. Also, convertible PC design is popular with Americans, so some of PC brands (ex: Dell) plan to develop more convertible Chromebooks since 2018.
- Detachable shipment declining in 2017 is expected that Apple and Microsoft 2017 shipments will be less than 2016.



Worldwide and China Desktop Monitor Shipment Forecast

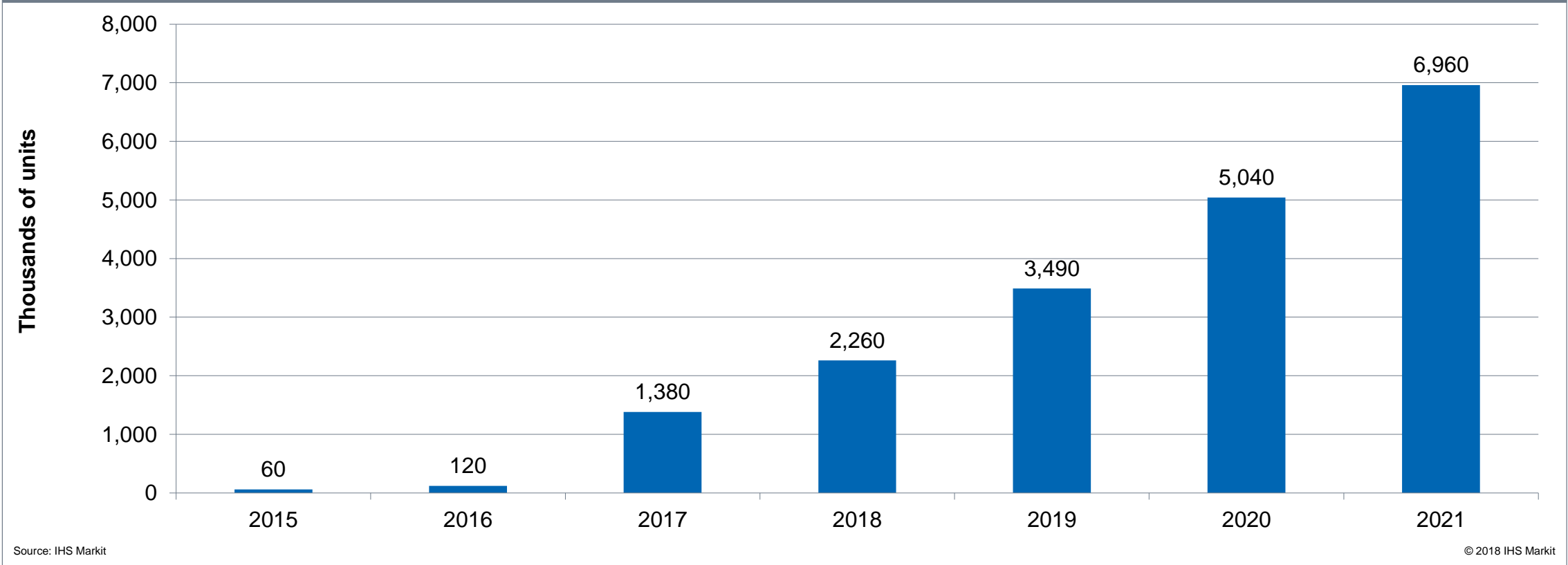
- Desktop monitor shipments are projected to be 122.7M units with 0.2% Y/Y declined in 2018 by component supply constrained impact and return to positive growth in 2019 by PC replacement demand caused by end of support of Win 7 & Win Server 2008 since 2020.



China Smart Speak Market forecast

- IHS Markit expects the China smart speaker domestic market to grow to 540,000 units in 2017 as several new models are expected to be announced in the second half of 2017
- IHS Markit forecast that the China smart speaker domestic market will grow to 1.9 million units in 2018, and 3.4 million units in 2019
- By 2021 this market is expected to reach nearly 7 million units on conservative forecast basis

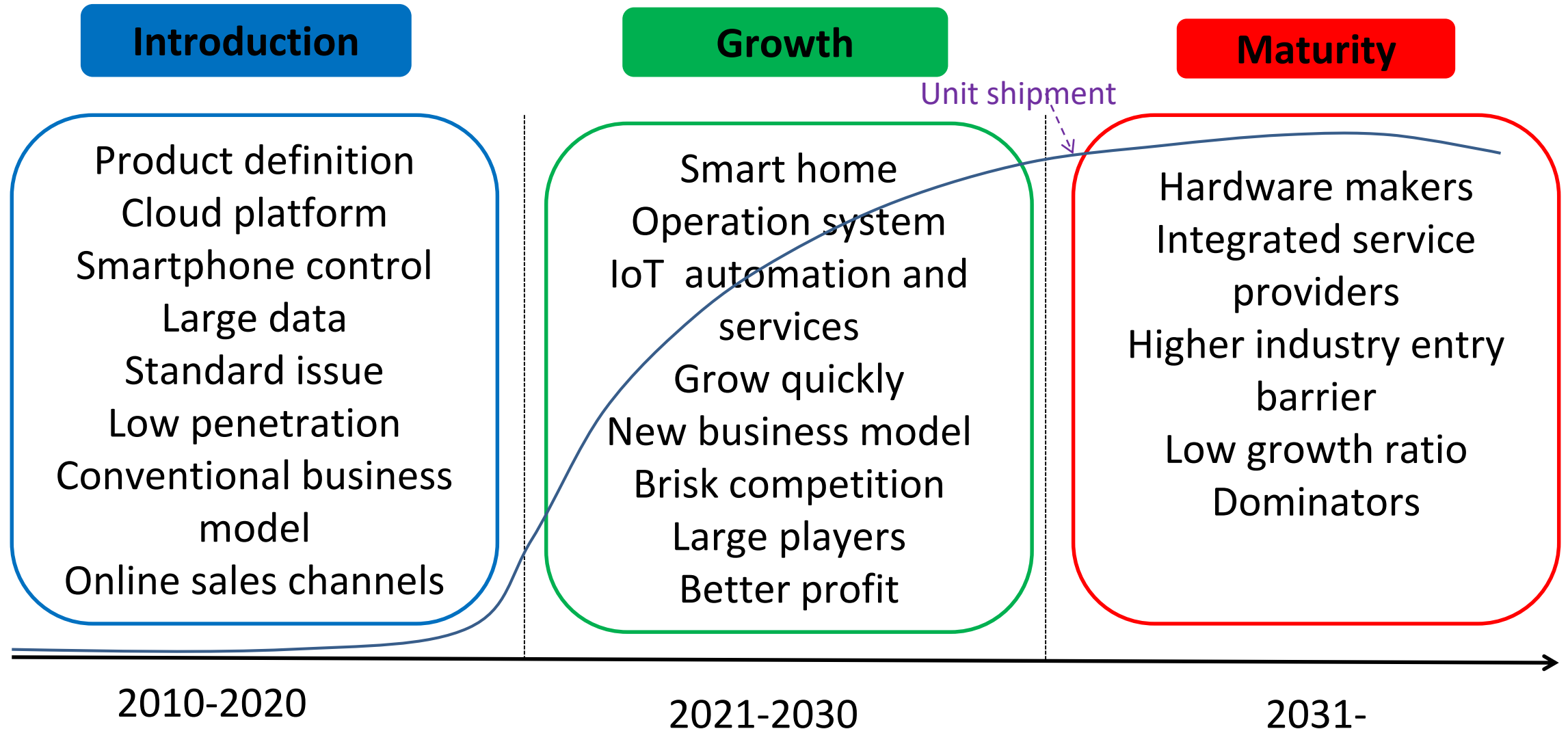
China smart speaker unit shipments forecast in domestic market, 2017–2021



China Home Appliance

China domestic smart home appliance still in initial stage

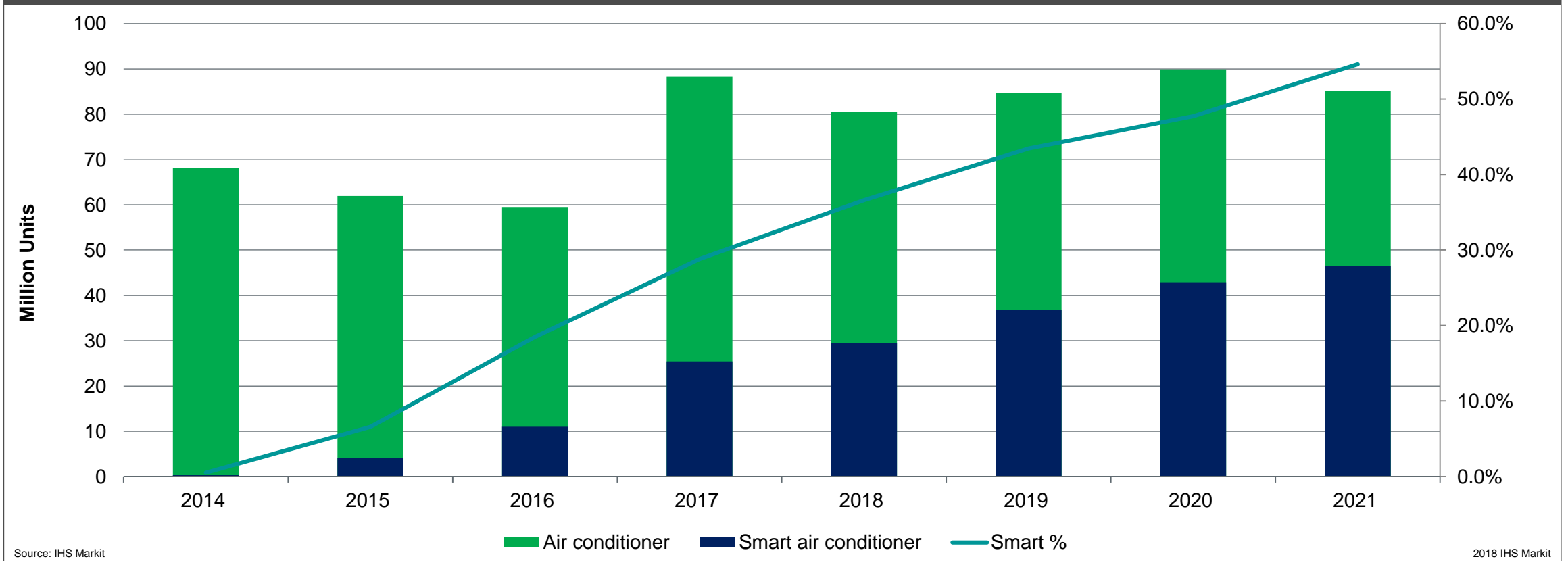
China domestic smart home appliance development trend



China smart room air conditioner market

- Shipment: over 25 mu in 2017, total market soared
- Penetration ratio: nearly 55% by 2021
- Market drivers: low-price, flagship products

China domestic smart connected room air conditioner unit shipments forecast, 2018-2021



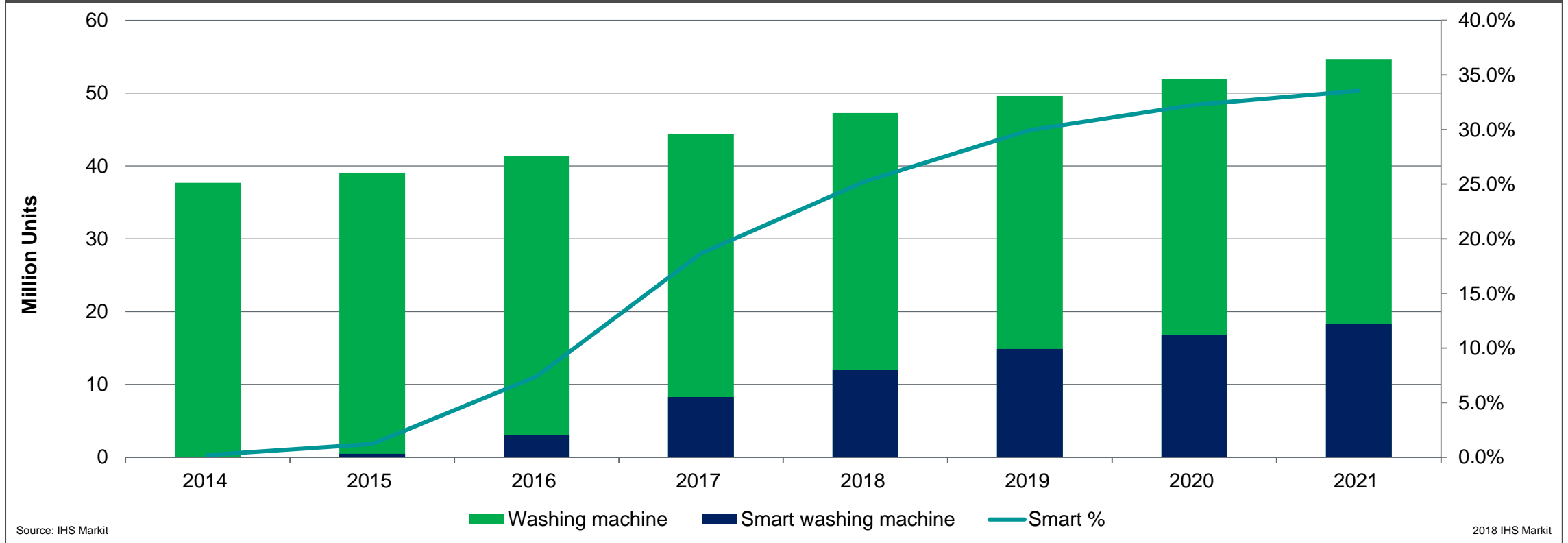
Source: IHS Markit

2018 IHS Markit

China smart washing machine market

- Penetration ratio: nearly 34% by 2021
- Shipment: 8.3 mu in 2017, over 18mu in 2021
- Market drivers: new products, one leader's aggressive strategy

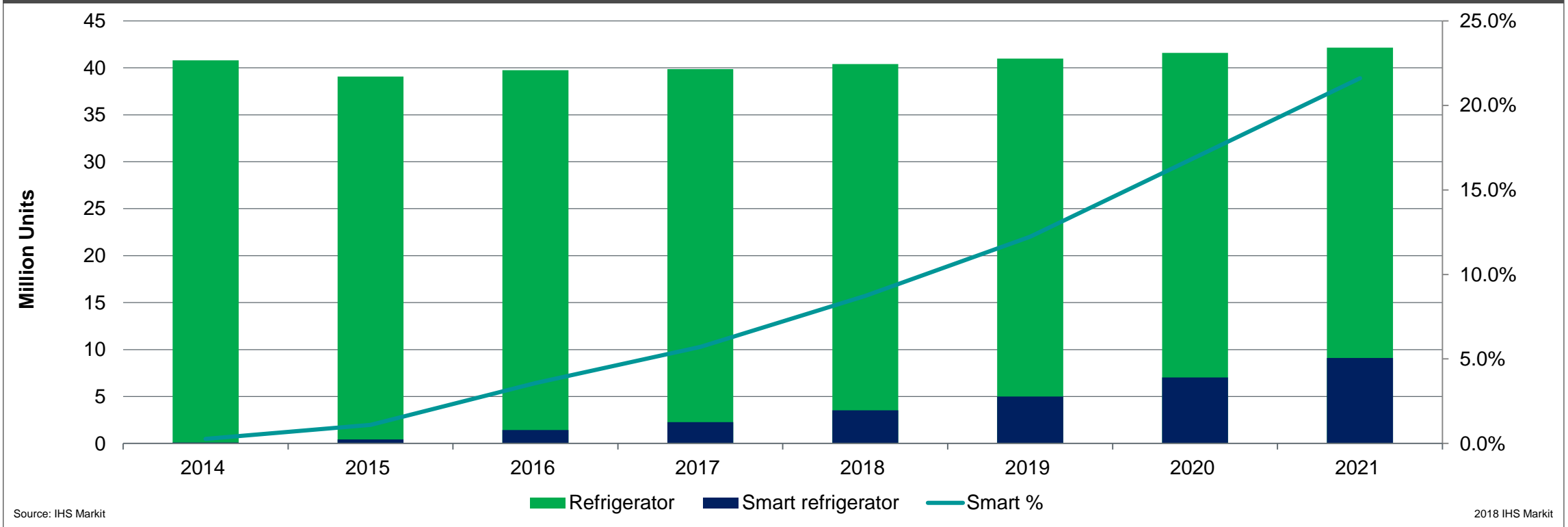
China domestic smart connected washing machine unit shipments forecast, 2018-2021



China smart refrigerator market

- Refrigerator + tablet: control center for smart kitchen
- Penetration ratio: nearly 22% by 2021
- Market drivers: new business model, new ecosystem, high-end

China domestic smart connected refrigerator unit shipments forecast, 2018-2021



White-goods characteristics

- White-goods: weak MMI
 - Single function: cooling, store foods, washing clothes
- Strong MMI: television(set-top box), smartphone, tablet.....
- Connected white-goods: new MMI
 - Smartphone, tablet
- AI white-goods: new MMI
 - Nascence AI
 - Voice control
 - Gesture control
 -
- Improving MMI increase customer loyalty???
- Long-term smart home

Wrap Up

- **Economy** is the key driving force of consumer market, consumption habits differ greatly in China
- Most consumer devices become commodity with low growth rate, including smart phone, but **new tech and value-added service** keep driving long-term market on a revenue basis
- New TFT array (including AMOLED backplane) capacity mainly come from China, high possibility of a three-year **over-supply in 2018-2020**. But, it could make some new investments postponed, and larger size demand grows as prices go down sharply
- Advanced features for most products are popular in China, big differentiation by **OLED** is about “rollable” and “paper like” both for smartphone and TV. Companies to have penetration of platforms have more power even for future smart car, from now on.
- **Gaming** is hot even on saturated notebook PC and monitors
- **AI, IoT, voice assistant** are important elements for platform makers such as amazon/google/apple, etc. and BAT in China
- Home appliance is steady on revenue growth, due to localization.
- How to create less manpower and fun of users are important for the future of consumer devices. If H/W makers force consumer to do something, it will not be successful.

谢谢聆听！



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