



Financial performance and trends in the Telecom industry

Applied Value

Q4 2019

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Applied Value Telecommunications Practice

Telecommunication has been a core practice area for Applied Value since our inception in 1997. Over the last 20 plus years, we have supported a wide range of clients across the telecommunications value chain and across continents.

We generate client value and provide tangible results by applying an unbiased perspective, having a hands-on approach and by recognizing the importance of delivering value fast.

About this report

The purpose of this report is to track the financial performance of major players in the telecommunications industry, from operators to infrastructure OEMs and mobile device makers.

We hope that you find this report insightful, and we welcome feedback or opportunities for further discussions.

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Applied Value's telecom report tracks the financial performance of major players in the industry

Operators



Infrastructure OEMs



Device OEMs



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- About Applied Value



Executive summary

Key takeaways per segment

Operators	› Annual revenue growth is up 8% from 2016 driven by strong performance in Q4 '19 › Global operator yearly EBITDA margin remain steady at 34%, whereas the quarterly margin has declined by 2 pp. to 32% compared to Q1 '19 › The Y-o-Y ROIC development continues to vary significantly between firms, with Proximus experiencing the largest decline of 3.1 pp. while Veon saw the largest ROIC increase of 3.0 pp. to 14.2%
Infrastructure OEMs	› Carrier segment revenue is in 2019 on par with 2016 levels, across the industry › Ericsson is the top performer of the quarter, reporting a significant ROIC improvement in 2019 reaching 17.3% compared to 7.2% in 2016 › Ericsson also increased its NOPAT margin by 4 pp. in 2019 reaching 7.4% while Nokia saw NOPAT margin decline by 0.8 pp. compared to 2018 reaching 3.5%
Device OEMs	› Xiaomi increased its global share of the smartphone market by nearly 1% in Q4 '19 driven by a strong demand in India › Apple remains the most profitable company within the device OEM industry, with a NOPAT margin of 18% › Apple saw slight decline in ROIC in the last quarter, however, still performing best-in-class with a ROIC of 98%

Top performers

Quarter	
Year	
Quarter	
Year	
Quarter	
Year	



Roundup of telecommunication forecasts

Apple grabbed the top position in global smart phone market in Q4 2019 with delivery of 73.8 million iPhones. iPhone 11 series launched particularly well in developed regions like the US and Europe, while iPhone XR series remained popular globally. In December 2019, iPhone 11 was the top selling model globally and the other three new models were the top selling model throughout the entire quarter. **Apple is expected to maintain its leading position in the global smartphone market going forward with the expected release of a cheaper “SE” model aimed mainly at gaining market share in emerging markets.**

Source: IDC, Apple Press & News Reporting

By year end 2019, estimated global 5G subscriber reached 20 million with 13 million in China. In 2019, many large telecom operators activated initial 5G services in selected regions with additional rollout planned in 2020. **Ericsson predicts that by 2023, global 5G subscriber will reach 1 billion and 2.6 billion by the end of 2025.** Given the large momentum behind 5G, subscription uptake is expected to be significantly faster than that of LTE. **74% of mobile subscription in North America is expected to be 5G by 2025, while East Asia is expected to reach 56% and Europe 55%.**

Source: Ericsson Press & News Reporting

India smartphone market started slow in fiscal year 2019, but saw significant market growth of 14% in Q4 2019 with total shipment of 39 million units. Xiaomi is the leading smartphone brand in India with Q4 '19 shipment reaching 11.2 million units and 42.9 million units throughout the year. Online sales have been the main boosting point for smartphone sales, through websites such as Flipkart and Amazon.

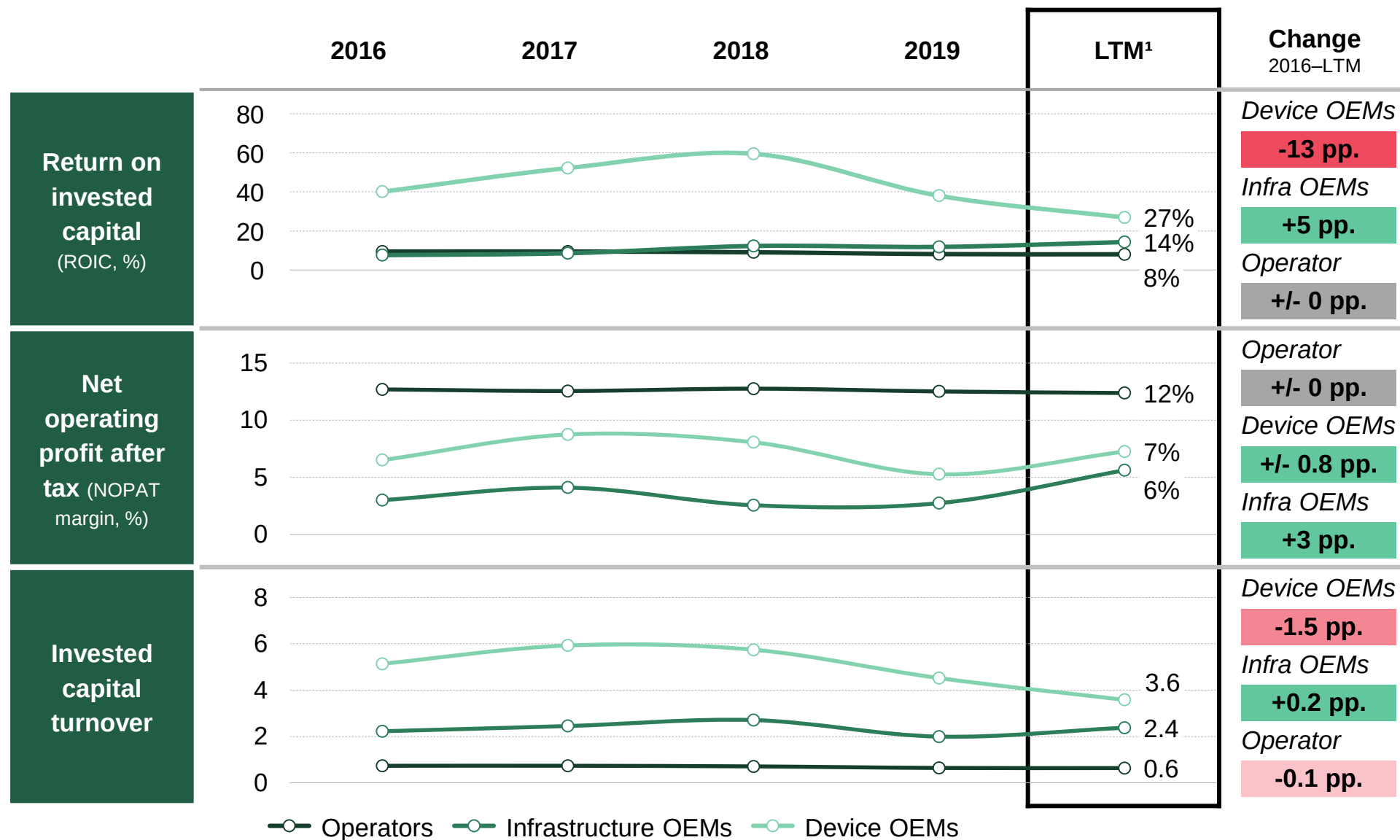
Source: Canalys

The United Kingdom has given permit for Huawei equipment to be used in national 5G network following security review, while the European Union recommended to its member states limiting but not banning Huawei in national 5G network developments. However, major European telecom operator will still incur additional indirect costs if choosing Huawei as its 5G partner.

Source: Various Press & News Reporting



Financial overview (1/2): Yearly performance



Note: 1. LTM refers to Q1-Q4 2019 for most companies included in the report while 2019 refers to companies' reporting fiscal year 2019

Note: Deviations due to different selection of operators and restated company financials. Telecom report data is based on fiscal years and calendar quarters.



Financial overview (2/2): Quarterly performance

	Segment	Q4 '19	Q3 '19	Q2 '19	Q1 '19
Sales Y-o-Y (% change)	Operators	0.5%	-1.1%	3.5%	0.3%
	Infrastructure OEMs ¹	-3.5%	-3.0%	15.4%	-9.1%
	Device OEMs ²	2.9%	-4.3%	-1.6%	-8.8%
Net operating profit after tax (NOPAT) Y-o-Y (pp. change)	Operators	0.8 pp.	-1.4 pp.	1.1 pp.	0.1 pp.
	Infrastructure OEMs ¹	1.0 pp.	1.5 pp.	9.4 pp.	0.2 pp.
	Device OEMs ²	-1.0 pp.	-1.9 pp.	-2.1 pp.	-3.4 pp.
EBITDA Y-o-Y (pp. change)	Operators	2.1 pp.	-1.3 pp.	2.2 pp.	0.1 pp.
	Infrastructure OEMs ¹	2.6 pp.	2.5 pp.	11.6 pp.	0.8 pp.
	Device OEMs ²	-0.8 pp.	-1.9 pp.	-2.4 pp.	-3.4 pp.

Note: Q4 report differs from Q3 report due to changed selection of operators and restatement of Infrastructure and Device OEM financials.

Notes: 1,2. Excluded Huawei (reports annually). Telecom report data is based on fiscal years and calendar quarters.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



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Key takeaways from the operator segment

Key takeaways

Creating Shareholder Value	› Over the last 12 months ROIC performances varied between 2% and 17% › Veon had the largest ROIC improvement of 3.0 pp. while Proximus had the largest ROIC decline of 3.1 pp. in Q4 '19
Revenue Performance	› Global quarterly revenue reached the highest level throughout the year in Q4 '19, with the strongest regions being EU and MEA › Yearly revenues increased by 8 pp. in 2019 compared to 2016, mainly driven by strong revenue growth in EU and LATAM
Margin Performance	› Global operator EBITDA margin remains steady at 34% however Q4 '19 EBITDA margin fell from 34% to 32% between Q1 '19 to Q4 '19 › All regions except MEA reported increased EBITDA margins in Q4 '19 while NA and MEA saw decline in NOPAT margin during the same period
Capital Expenditure	› The global CAPEX slightly declined during Q1-Q3 '19, but recovered in Q4 '19 CAPEX, making CAPEX back at the same level as Q4 '18 › APAC region saw the largest CAPEX decline of 3 pp. compared to 2016 levels

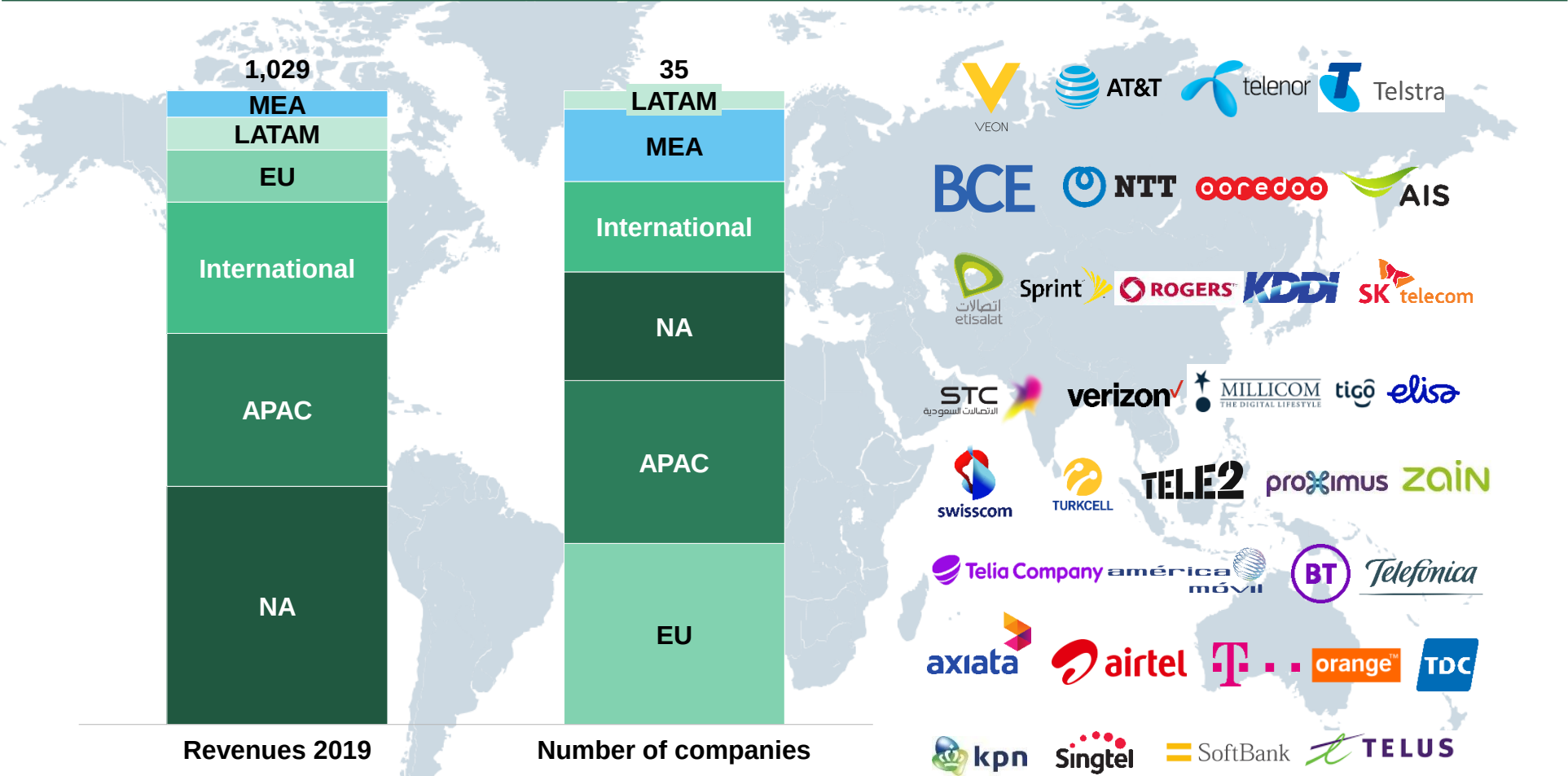
Top performers

Quarter	
Year	
Quarter	
Year	
Quarter	
Year	
Quarter	
Year	



The Q4 2019 report covers 35 of the largest operators globally, accounting for over 1 Trillion USD in revenues

Report overview
Revenue in BUSD

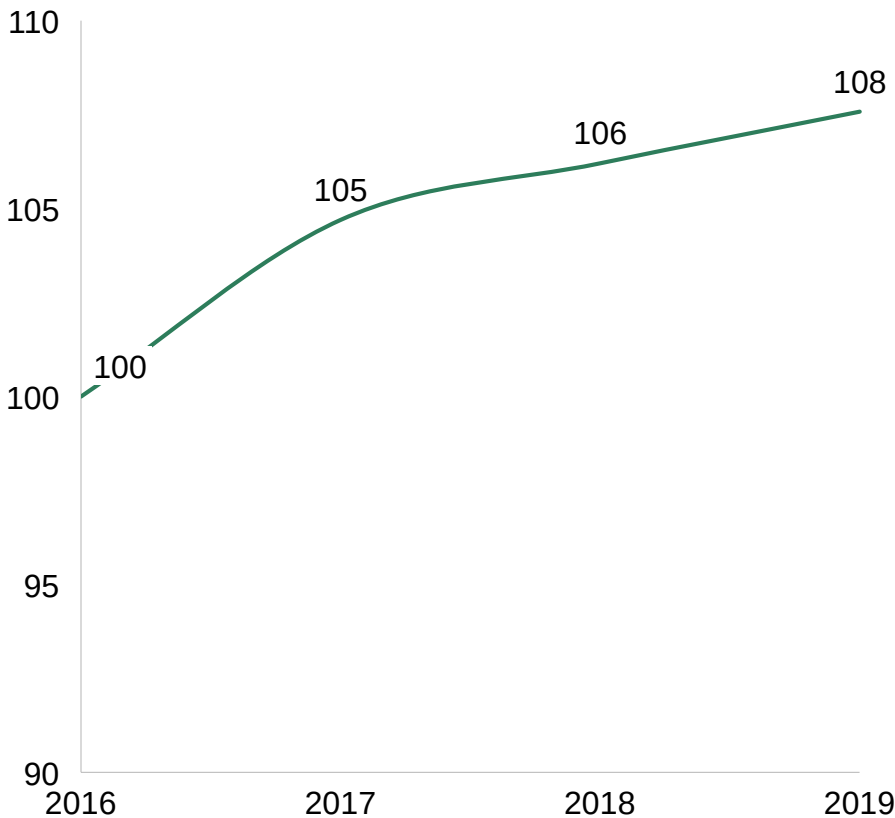


Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

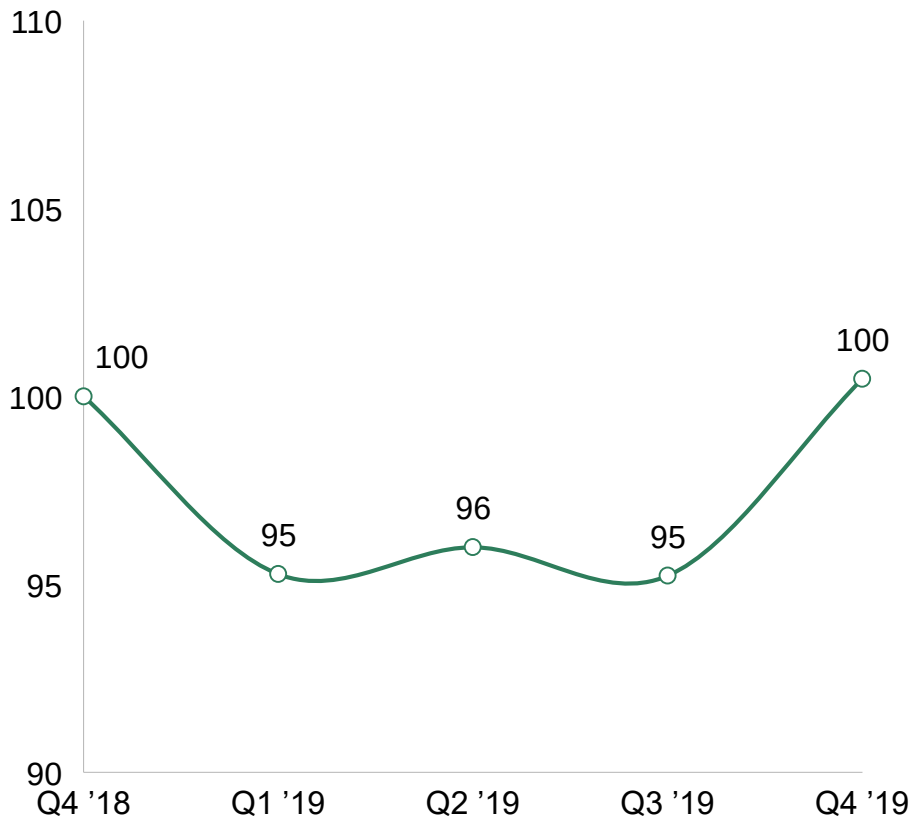


Yearly revenue growth is up 8% from index in LTM, while the quarter over quarter revenue was at the same level as Q4 2018

Yearly revenues
2016 - LTM (index 2016=100)



Quarterly revenues
Q4'18 - Q4'19 (index Q4'18=100)

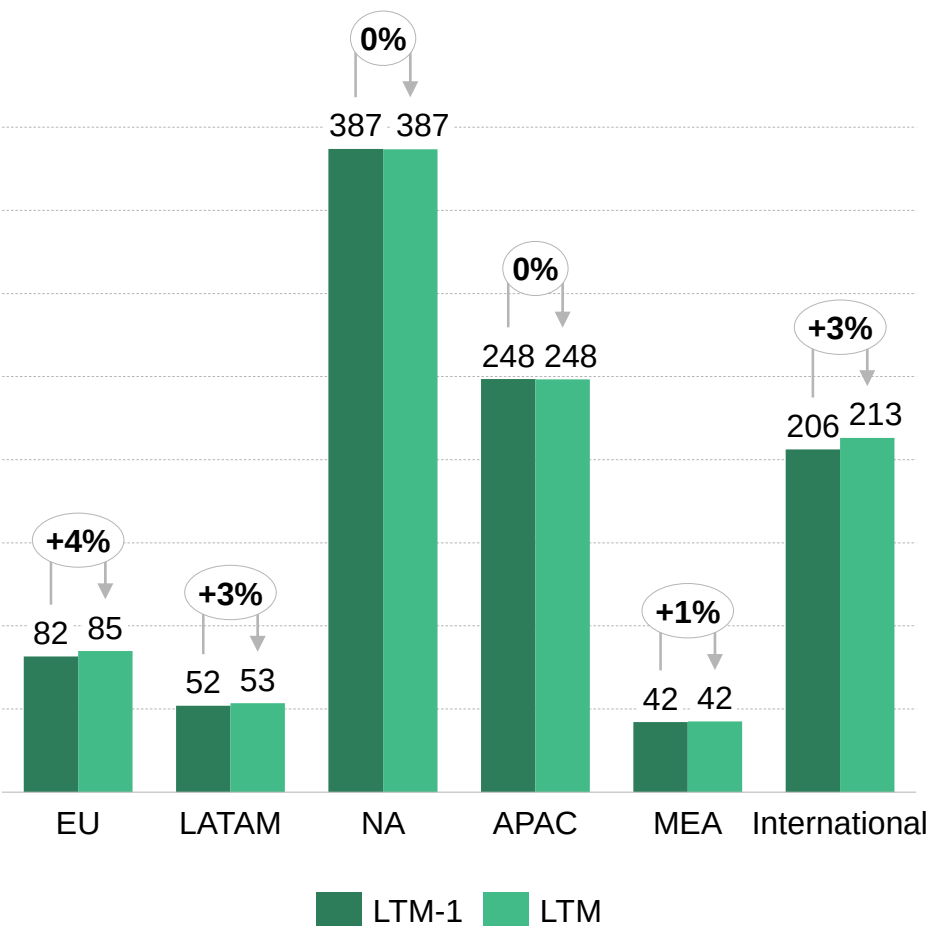


Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

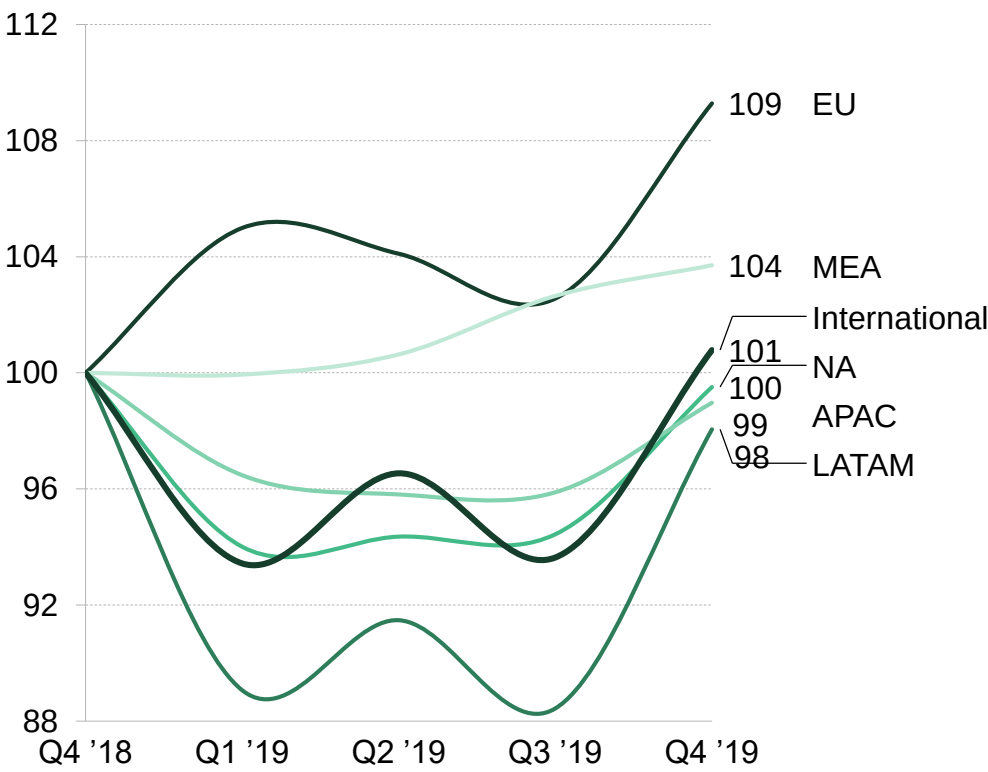


Annual revenue for NA and APAC operator remained the same in 2019 while operators in the rest of world saw a revenue decline between 1% and 4%

Yearly revenues by region
LTM-1 (Q1'18 - Q4'18), to LTM (Q1'19 - Q4'19), BUSD



Quarterly revenues by region
Q4'18 to Q4'19 (index Q4'18=100)

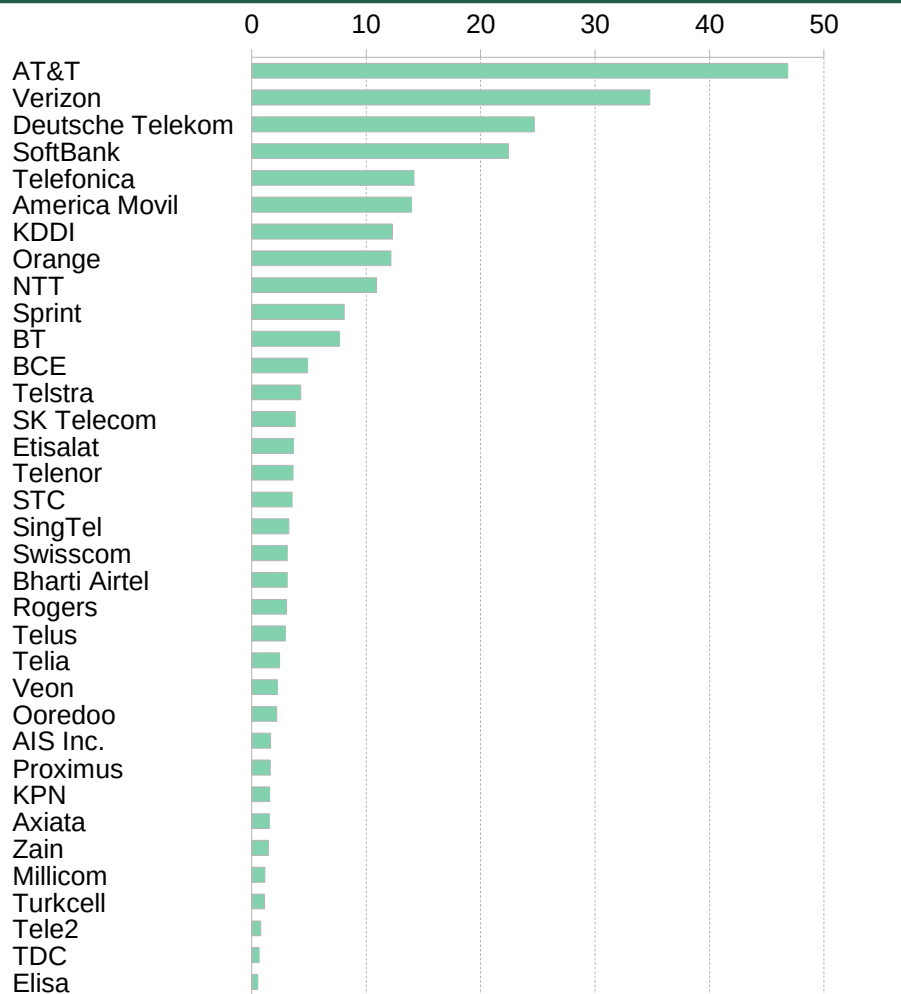


Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

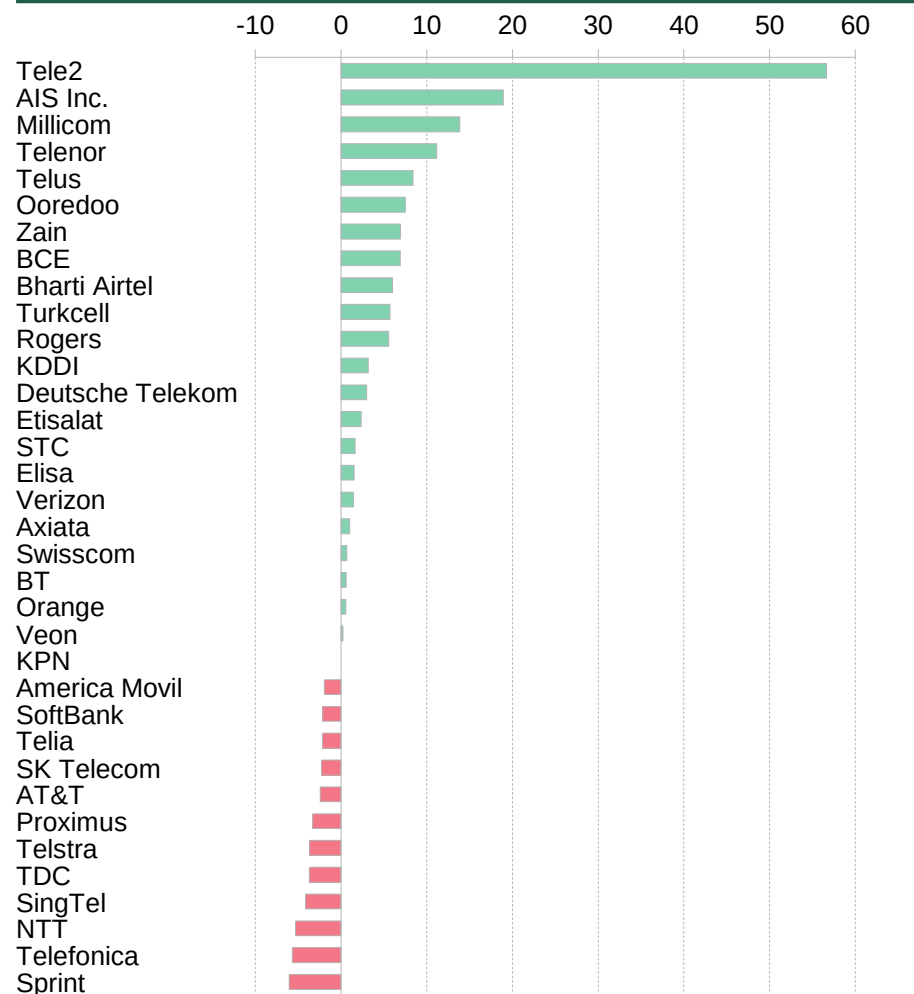


Majority of operators improved its revenue with an industry average of 3.6%, Tele2 saw the greatest Year on Year revenue growth in Q4 2019

Revenue by operator
Q4'19, BUSD



Revenue development by operator
Delta (Q4'19 vs. Q4'18), %



Note: The included companies differ from previous quarter.

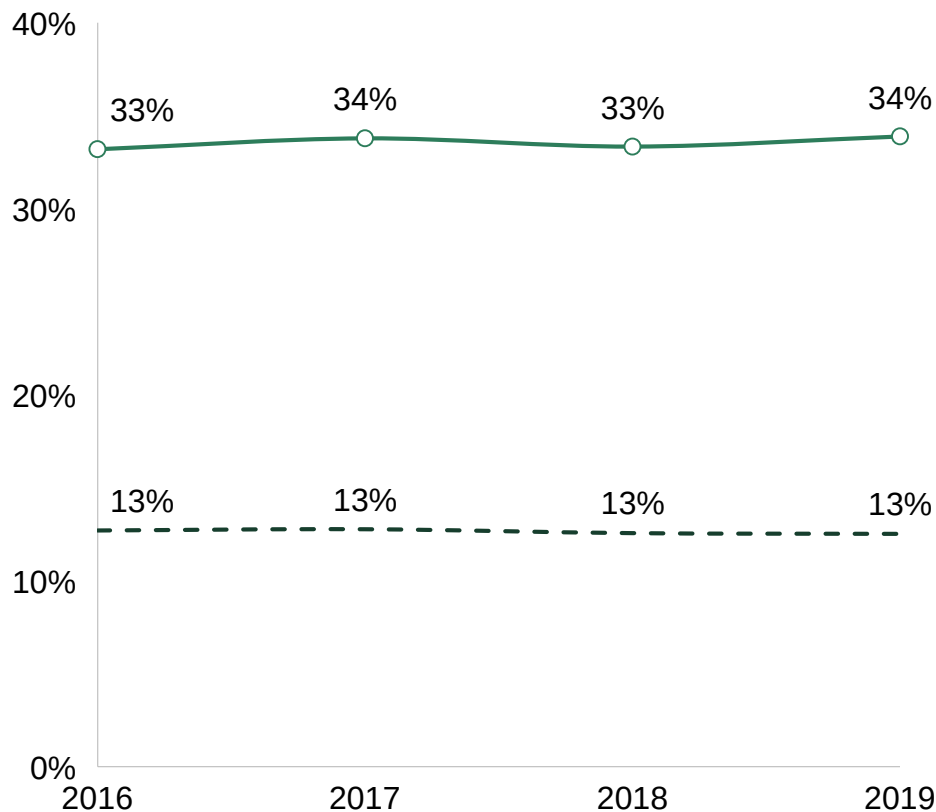
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Global operator EBITDA margin has improved slightly quarter over quarter but declined by more than 2 pp. compared to Q1'19

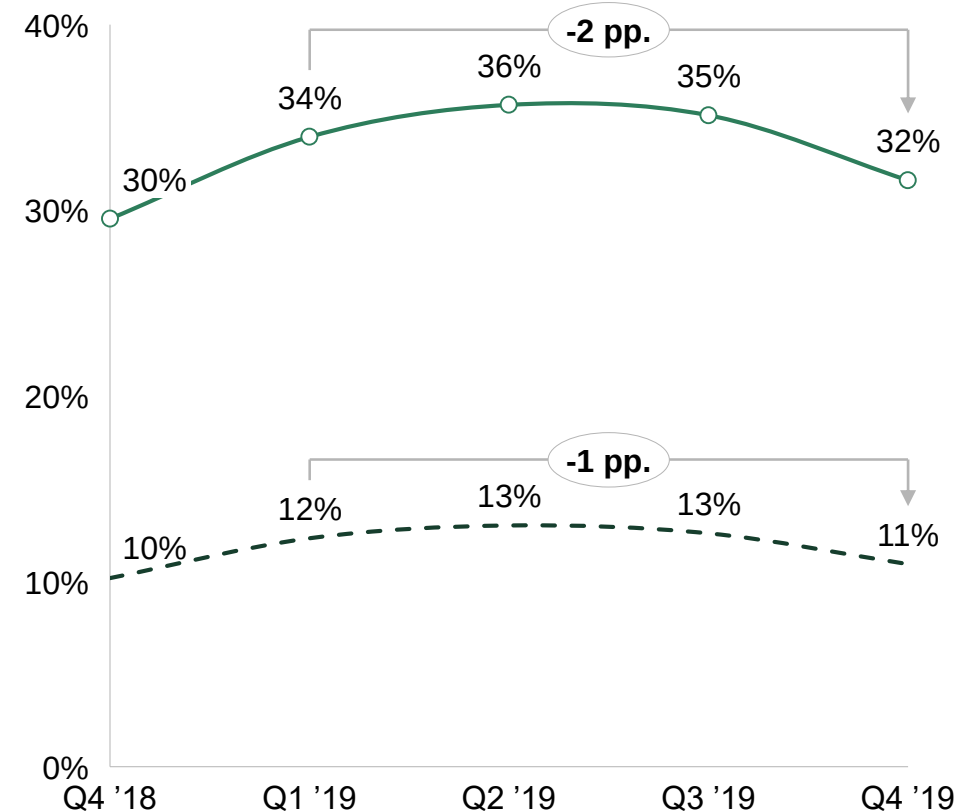
Yearly profitability development

2016 - LTM, %



Quarterly profitability development

Q4'18 - Q4'19, %



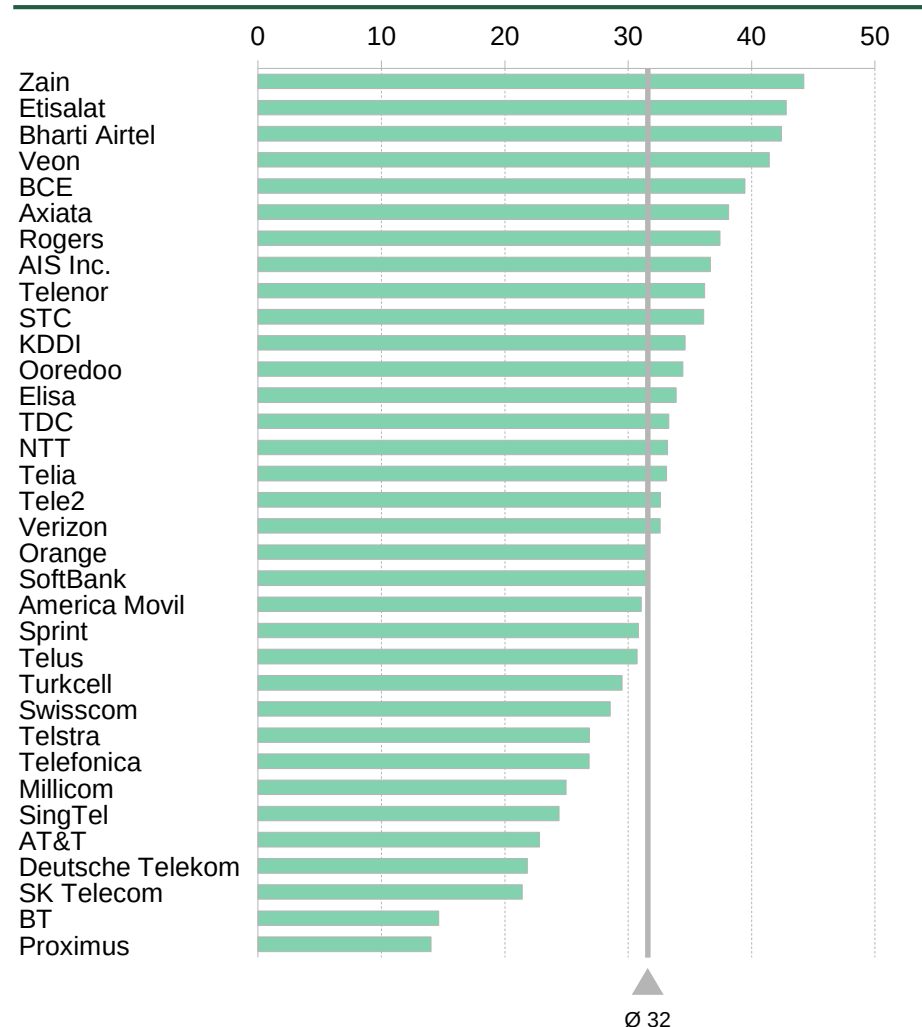
—○— EBITDA margin - - - NOPAT margin

Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

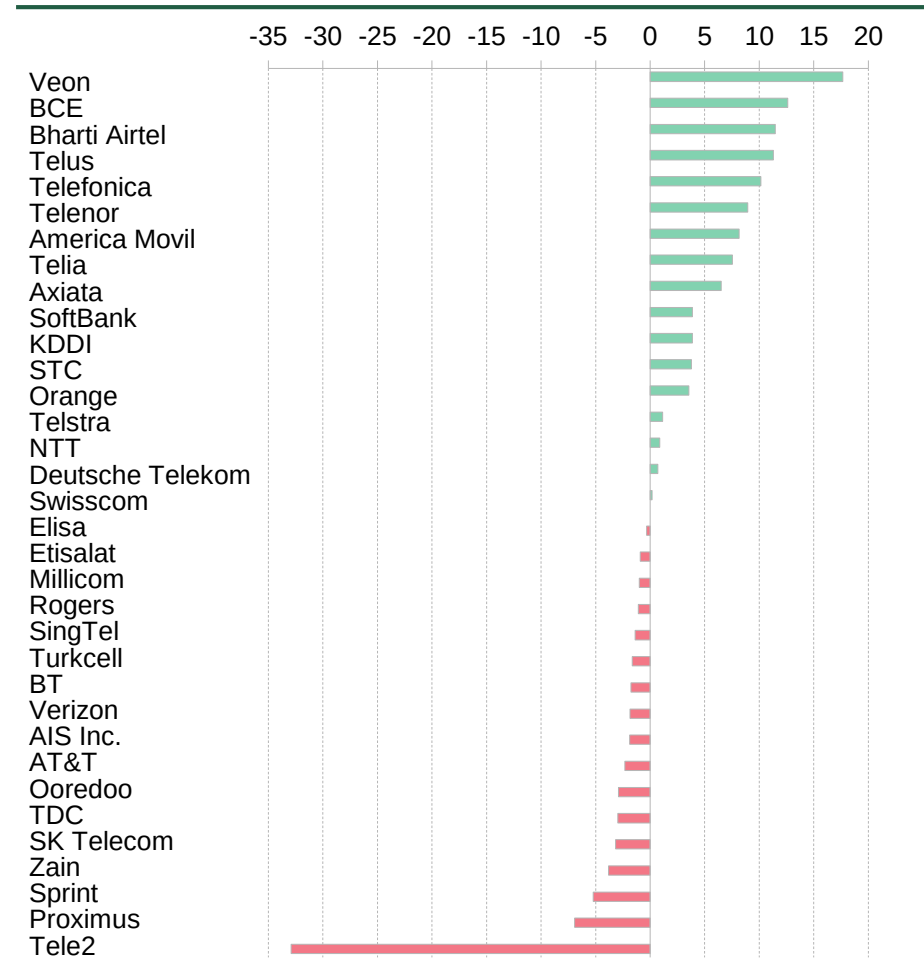


Veon has improved its EBITDA margin by 17.6 p.p. while Tele2 had a significant decline despite its advantages over its peers in Q4 '18

EBITDA margin by operator
Q4'19, %



EBITDA margin development by operator
Delta (Q4'19 vs. Q4'18), pp.



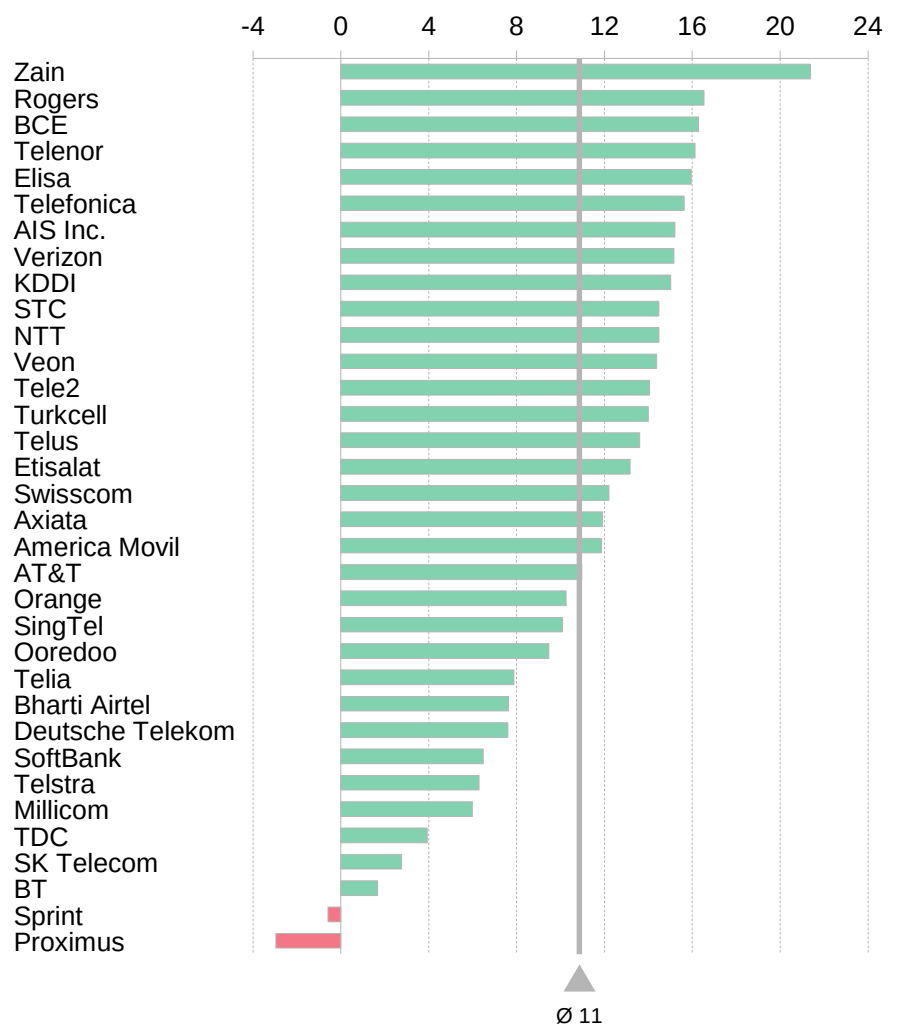
Note: The included companies differ from previous quarter. KPN excluded from EBITDA analysis due to missing company data.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

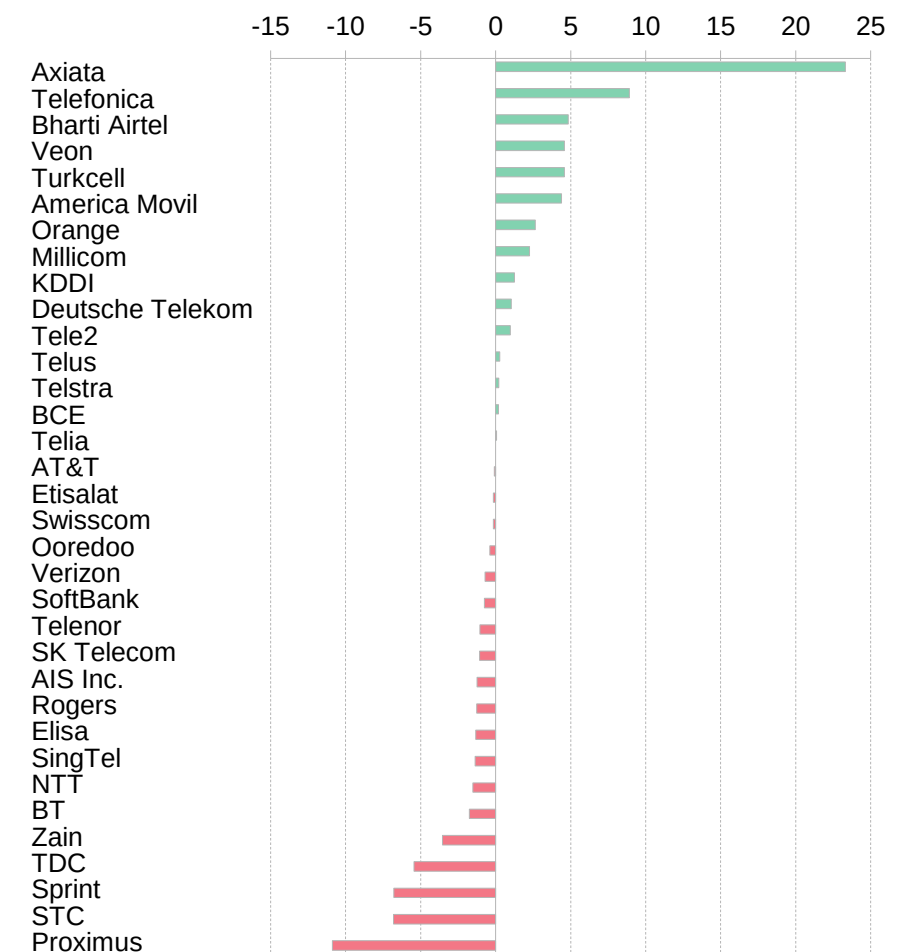


NOPAT margin deviates the most among operators ranging from -3% to 21%, of which Axiata's NOPAT was brought positive to 12% in Q4 '19

NOPAT margin by operator
Q4'19, %



NOPAT margin development by operator
Delta (Q4'19 vs. Q4'18), pp.



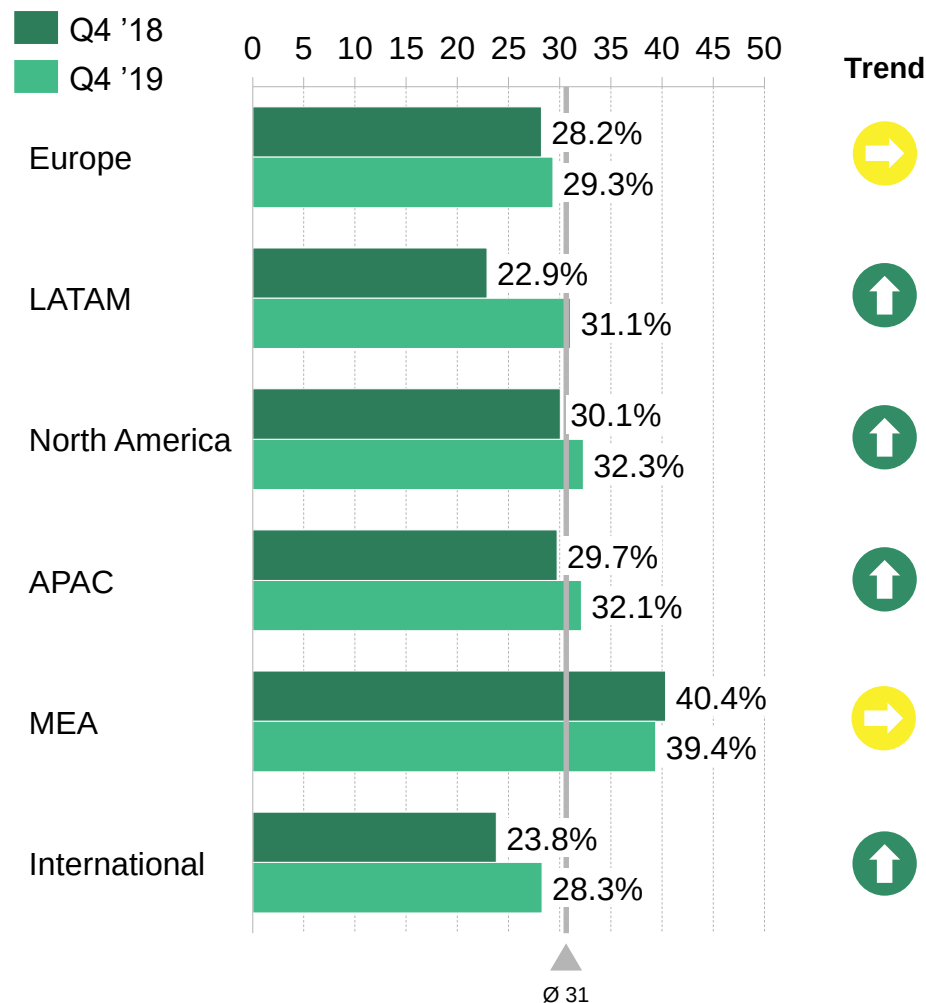
Note: The included companies differ from previous quarter.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

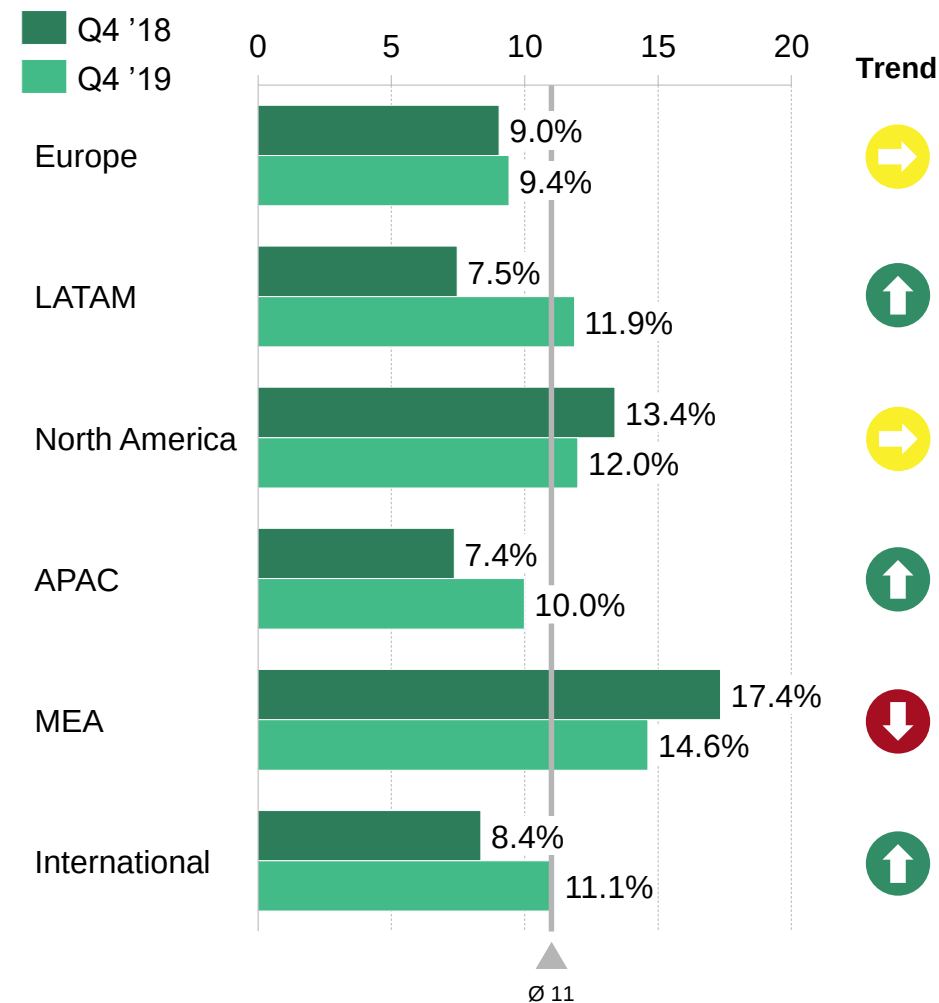


All regions but MEA region saw quarter on quarter EBITDA margin increase, and the in LATAM region operators increased margins by more than 8 pp.

Average EBITDA margin by region



Average NOPAT margin by region

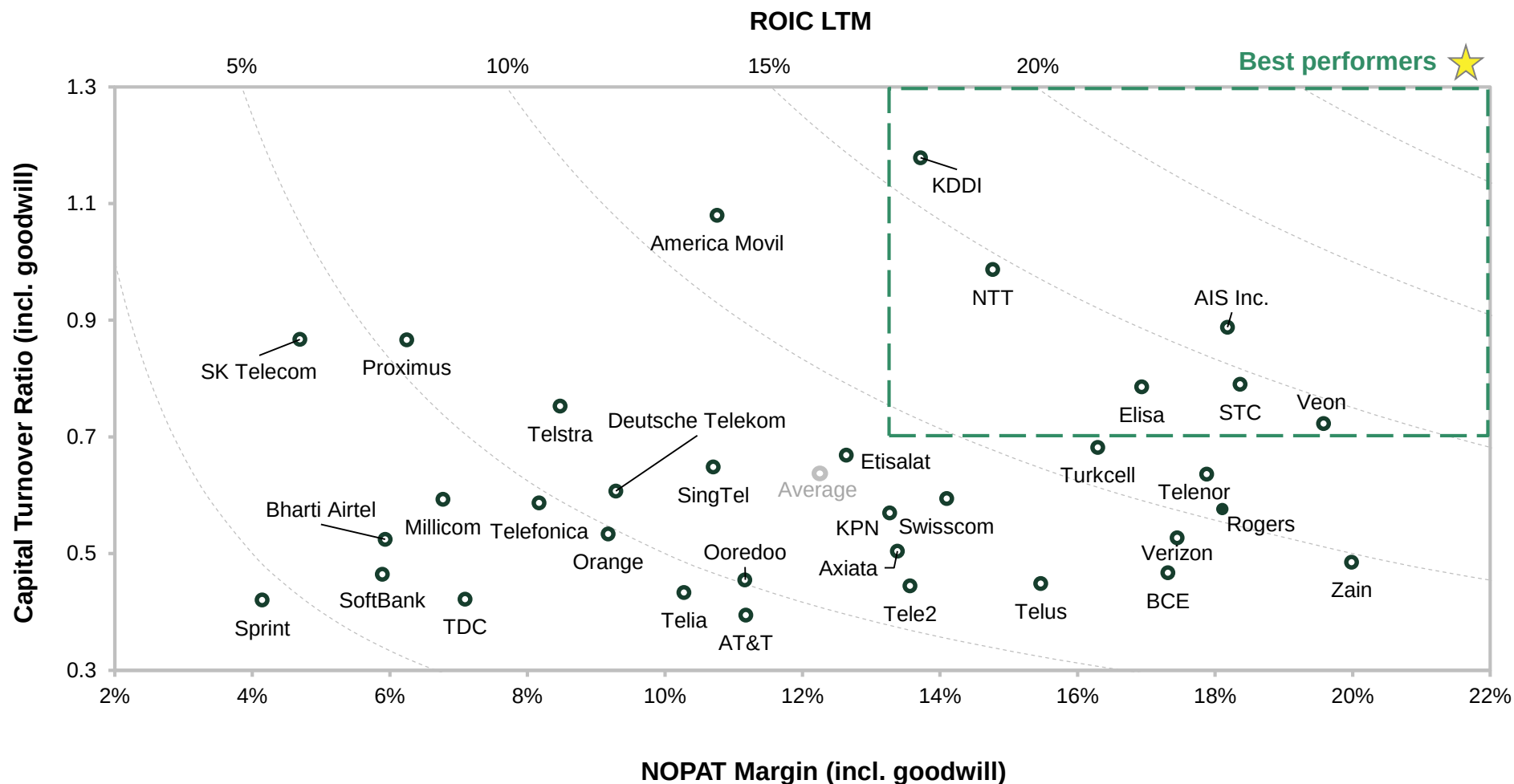


Note: The included companies differ from previous quarter.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



ROIC performances varied between ~2% and ~18% with KDDI, AIS, NTT, STC, Veon, and Elisa as best performers during the last 12 months



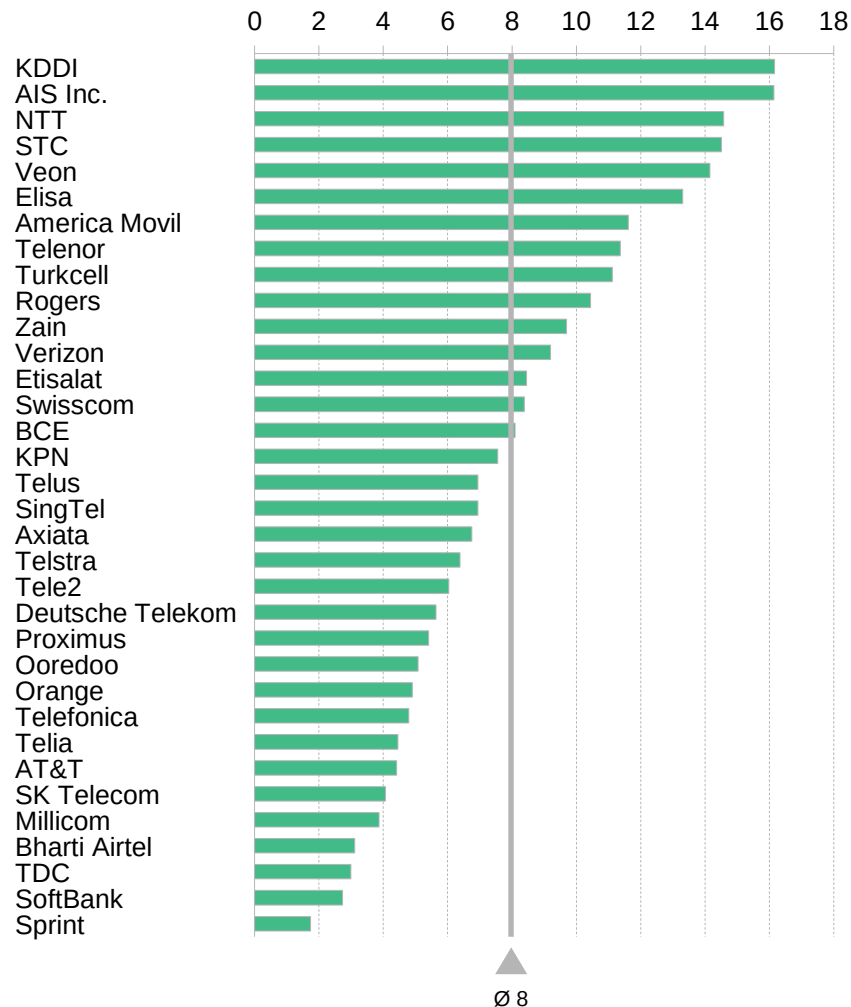
Notes: ROIC = Return on Invested Capital (actual return that the company has generated after tax). BT excluded from ROIC analysis due to missing data. The included companies differ from previous quarter.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

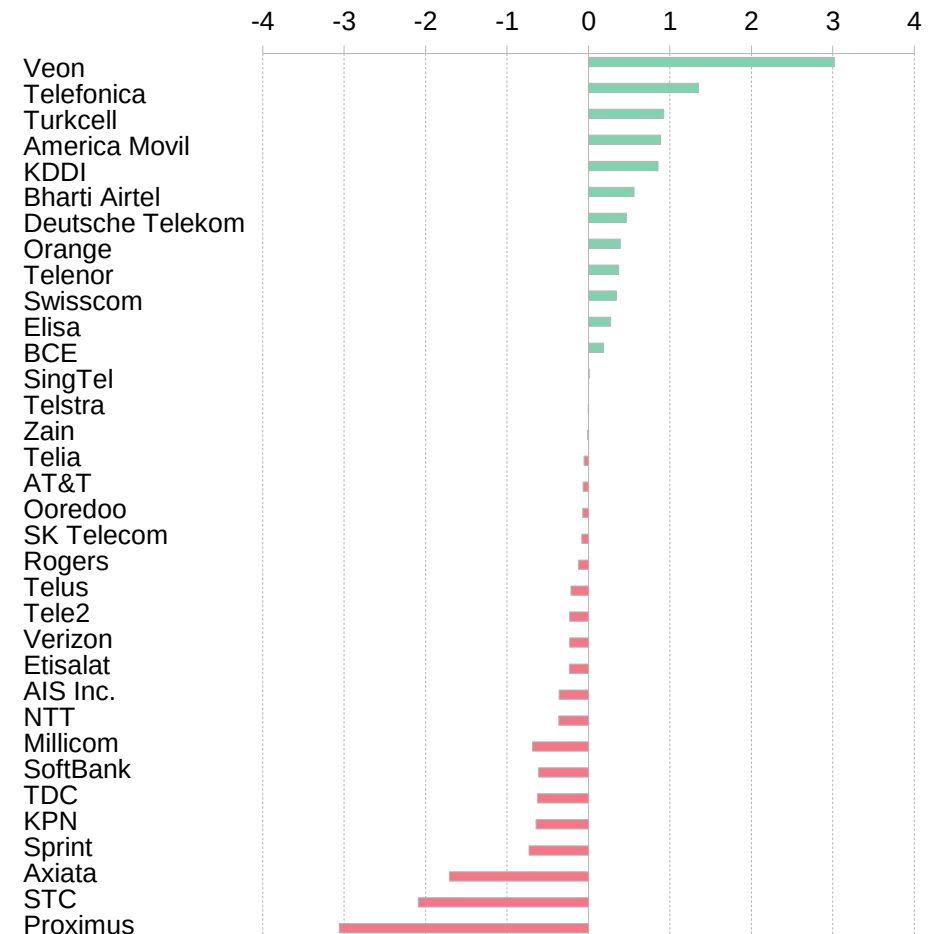


Proximus saw the largest ROIC decline of 3 pp. while Veon saw the largest increase of 3.1 pp. from LTM-1 in LTM

ROIC by operator
LTM (Q1'19-Q4'19), %



ROIC development by operator
Delta (LTM vs. LTM-1), pp.



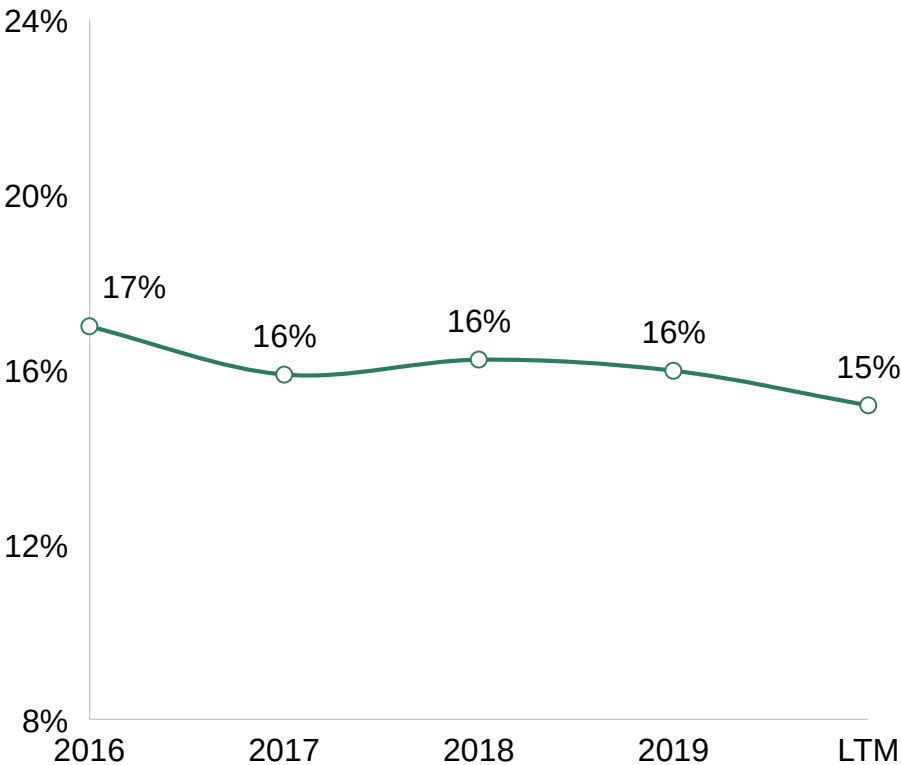
Note: The included companies differ from previous quarter. BT excluded from ROIC analysis due to missing data.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

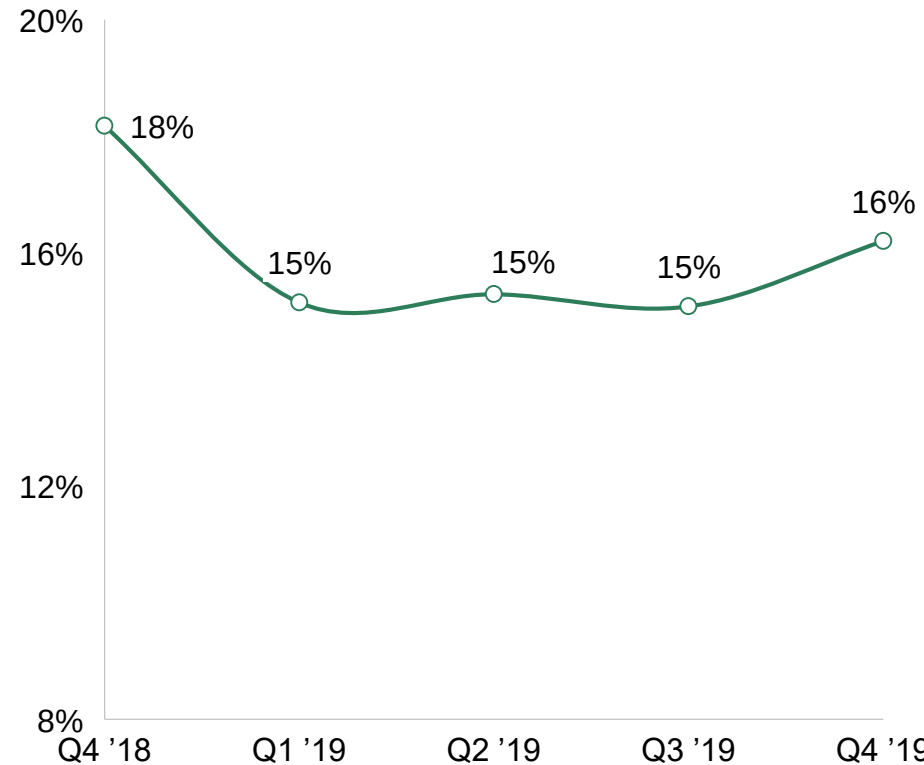


Operator’s annual CAPEX declined to 15% with a rise in Q4 ‘19 due to the large investment needed for increasing 5G coverage

Yearly CAPEX over sales development
2016 - LTM, %



Quarterly CAPEX over sales development
Q4'18 - Q4'19, %



CAPEX levels are slowly increasing due to 4G expansion and 5G preparations

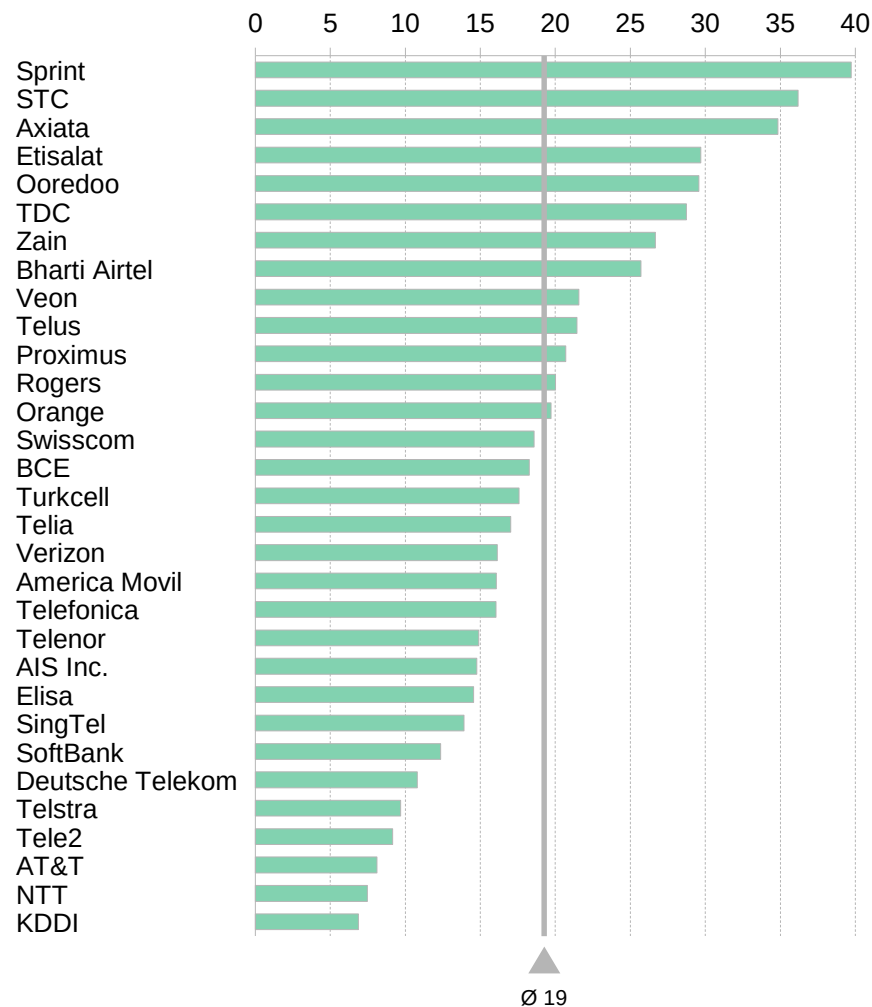
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Sprint has the largest investment in capital with CAPEX ratio of 40% in Q4'19 while TDC increased CAPEX by 14 p.p. compared to Q4'18 level

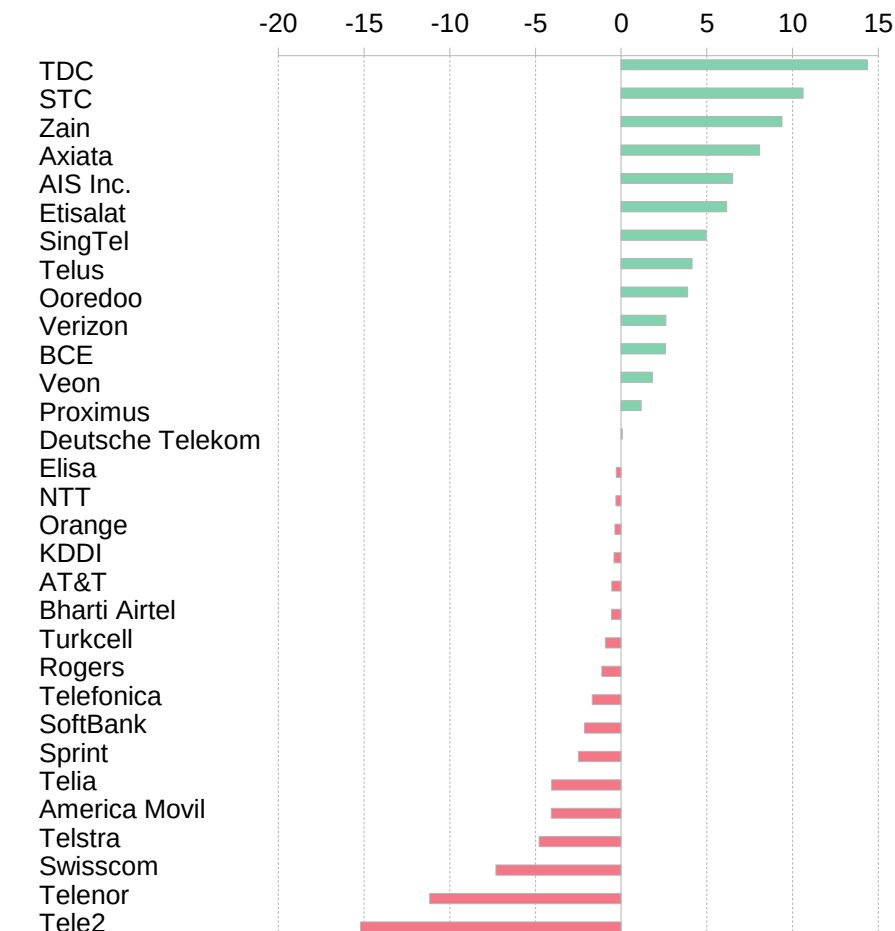
CAPEX over sales by operator

Q4'19, %



CAPEX over sales development by operator

Delta (Q4'19 vs. Q4'18), pp.



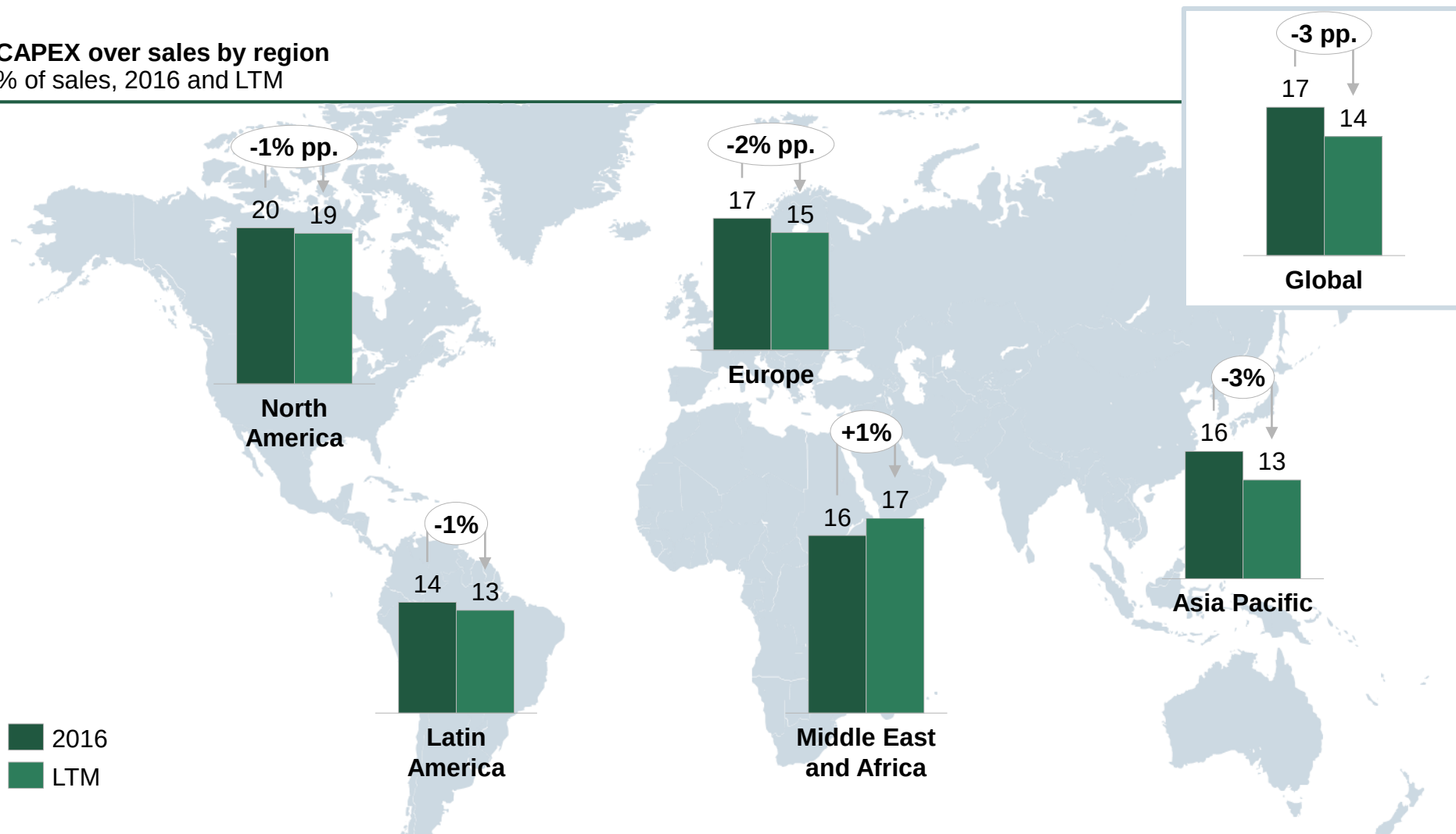
Note: The included companies differ from previous quarter. KPN, SK Telecom, Millicom and BT excluded from CAPEX analysis due to missing data.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Compared to 2016 level, CAPEX of telecom operators declined for most regions except for Middle East and Africa

CAPEX over sales by region
% of sales, 2016 and LTM



Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



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Key takeaways from the Infrastructure OEM segment

Key takeaways

Creating Shareholder Value	› Ericsson and ZTE had the largest ROIC improvement in 2019 with an increase of 9.4 pp. and 6.2 pp. respectively › Huawei still maintain the highest ROIC at 25.4% in LTM while Ericsson is catching up, the gap in ROIC is now down to 8.2 pp.	Quarter	 HUAWEI
		Year	 HUAWEI
Revenue Performance	› Nokia had significant revenue growth of 20% in Q4 '19 compared to Q3 '19 which boosted yearly revenue to 26.2 billion USD › Huawei's group revenue continue to grow at a fast pace achieving 15% growth in LTM, whereas carrier revenue in 2019 remains at same levels as 2016	Quarter	NOKIA
		Year	 HUAWEI
Margin Performance	› All companies but Nokia delivered increases in NOPAT margin in 2019 with Ericsson showing the highest increase of 4 pp. to a margin of 7.4% › Huawei and ZTE show the strongest performance in R&D over Sales, whereas Ericsson and Nokia reports top performing SG&A over Sales	Quarter	 ERICSSON
		Year	 ERICSSON
Capital Efficiency	› Huawei and ZTE witnessed significant decline in capital efficiency in 2019 but still maintained their advantage over European competitors › Huawei's capital efficiency decreased by 25% in the LTM while Ericsson improved its capital turnover ratio to 2.3 in LTM	Quarter	 ERICSSON
		Year	 HUAWEI

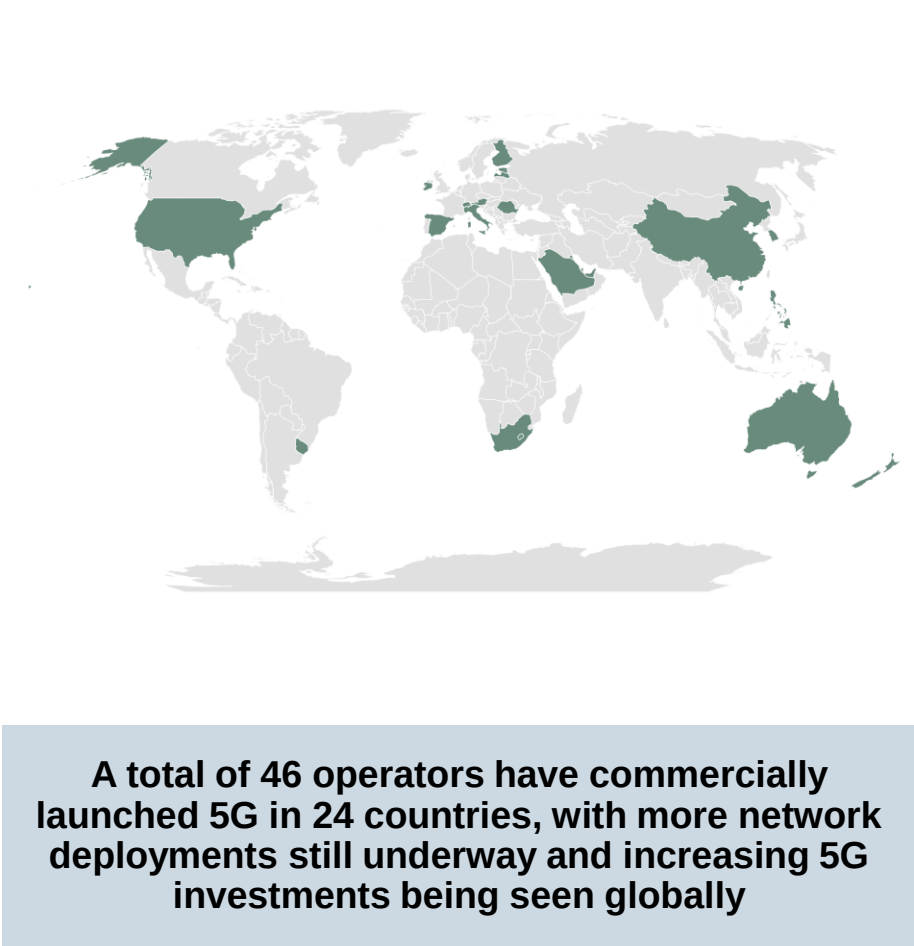


News and happenings - Infrastructure OEMs during the past months

News and happenings for infrastructure OEMs

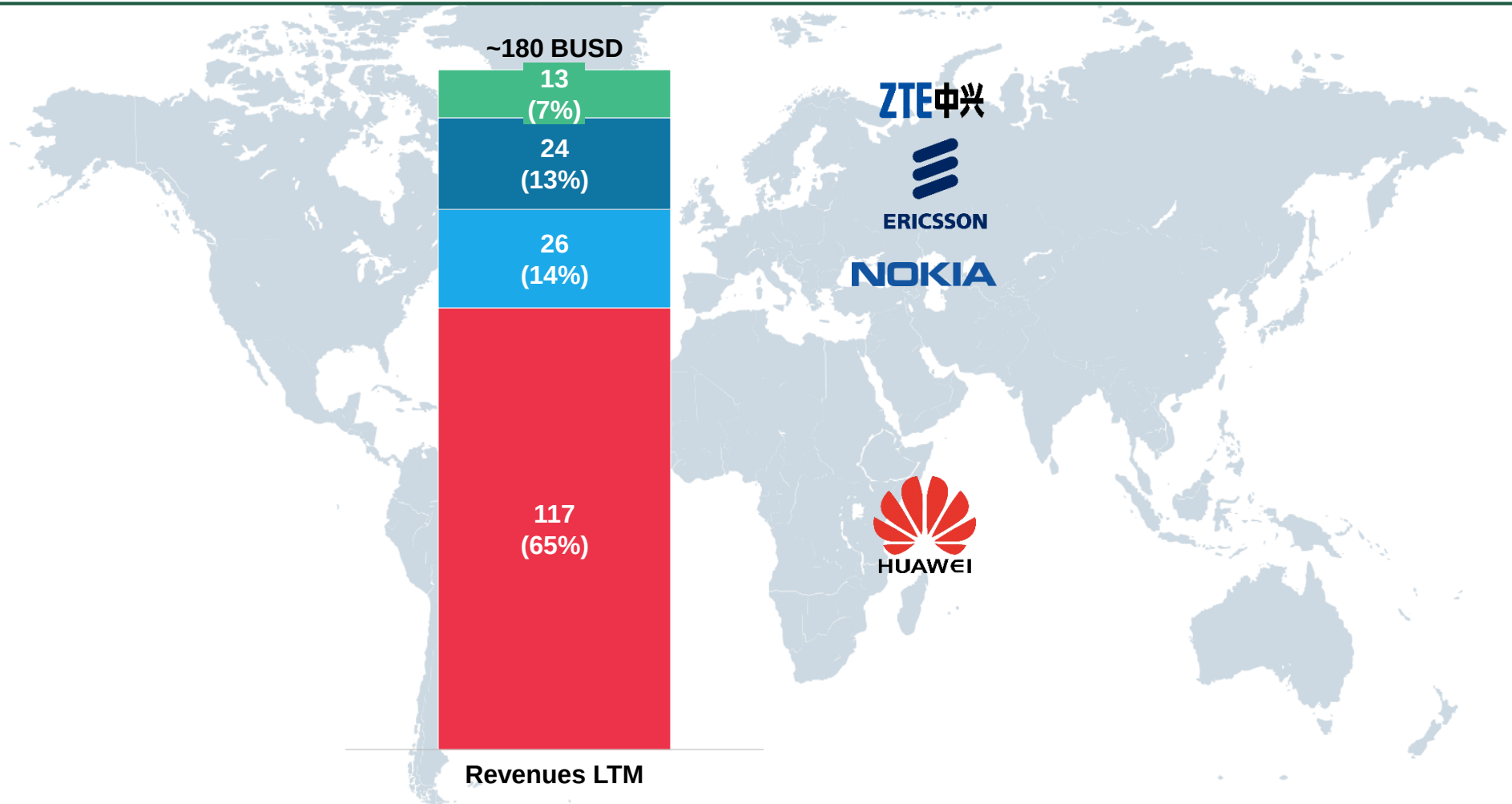
Nov-2019	US Federal Communications Commission will in November 2019 vote on an order to ban carriers from using federal subsidies to purchase equipment or services from Huawei or ZTE , due to the firms posing national security risks
Dec-2019	Ericsson publishes 5G mobility report estimating that by 2025, global 5G subscription will reach 2.6 billion with total number of IoT connections reaching 5 billion from 1.3 billion in 2019
Jan-2020	Orange officially announced Ericsson and Nokia as long-term industrial equipment partner to provide packages of equipment in its 5G network upgrade
Jan-2020	Nokia announced acquisition of Elenion Technologies. Elenion technologies is a US firm that manufactures silicon optical chipsets which can improve efficiency in 5G and data center networking
Feb-2020	European Union recommended to its member states of restriction instead of banning of use of Huawei and ZTE equipment in core national 5G networks
Feb-2020	German spy-chief published statement stating that he believes Huawei and ZTE are national intelligence threat and warned against the use of Huawei equipment in German 5G networks
Feb-2020	The UK officially announced it is allowing Huawei and ZTE equipment to be used in 5G networks following security review, however, Vodafone will continue to remove Huawei equipment from its network

Footprint of operators who have commercially launched 5G



The Q4 2019 report includes the four major infrastructure players

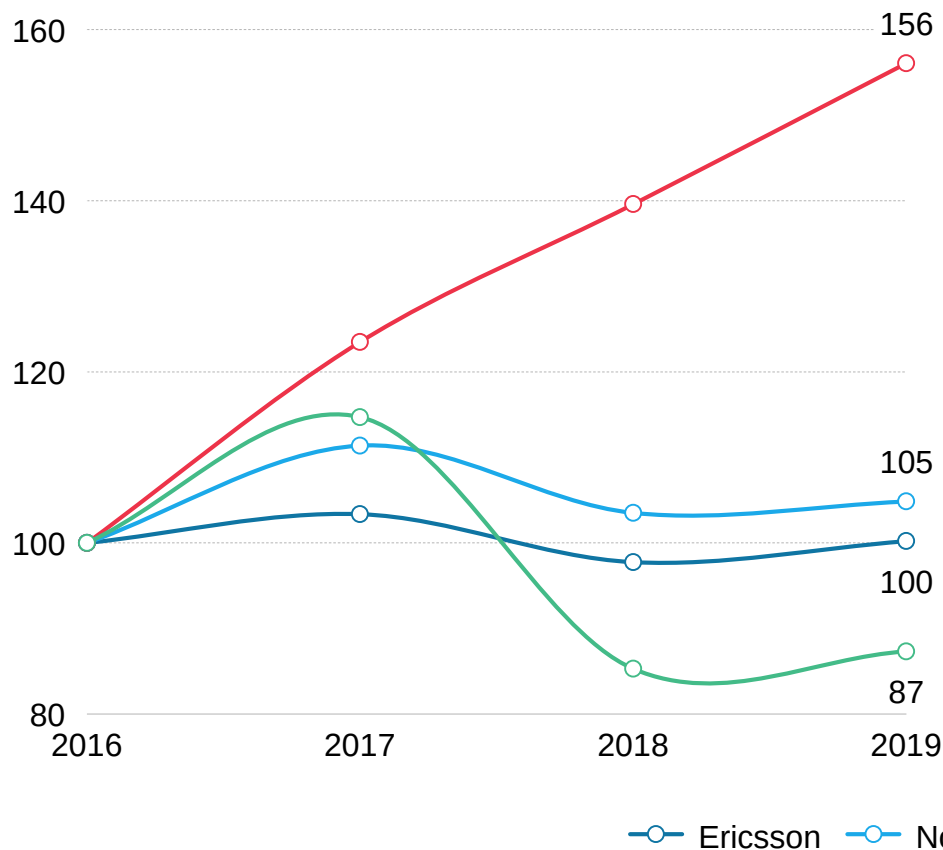
Report overview Revenue in BUSD



Ericsson and Nokia have recovered to the 2016 indexed level in fiscal year 2019, while ZTE's revenue declined for the third consecutive quarter

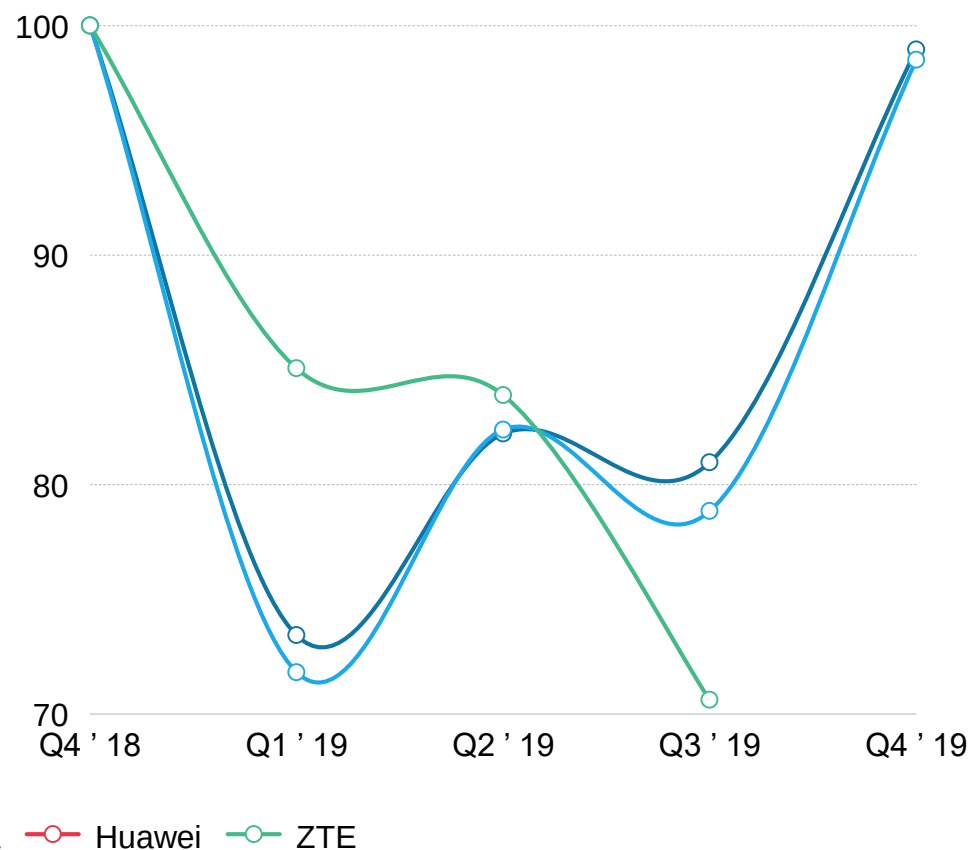
Yearly revenues

2016 to LTM (index 2016=100)



Quarterly revenues

Q4'18 to Q4'19 (index Q4'18=100)

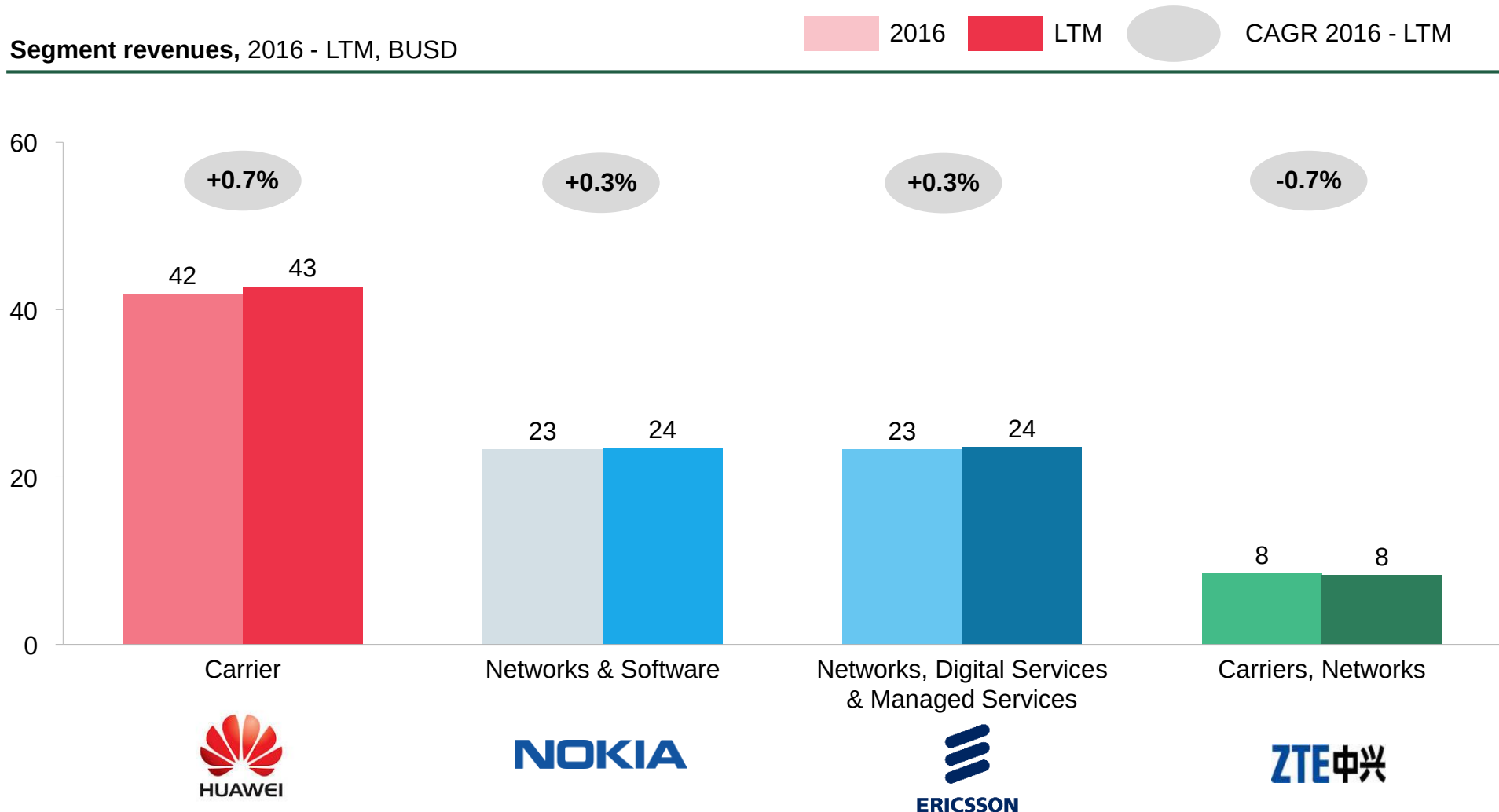


Notes: Fiscal years are used in the yearly analysis. Huawei reports annually.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



A stagnation in growth is observed within Huawei's carrier segment since 2016, but it maintained leader position in the industry



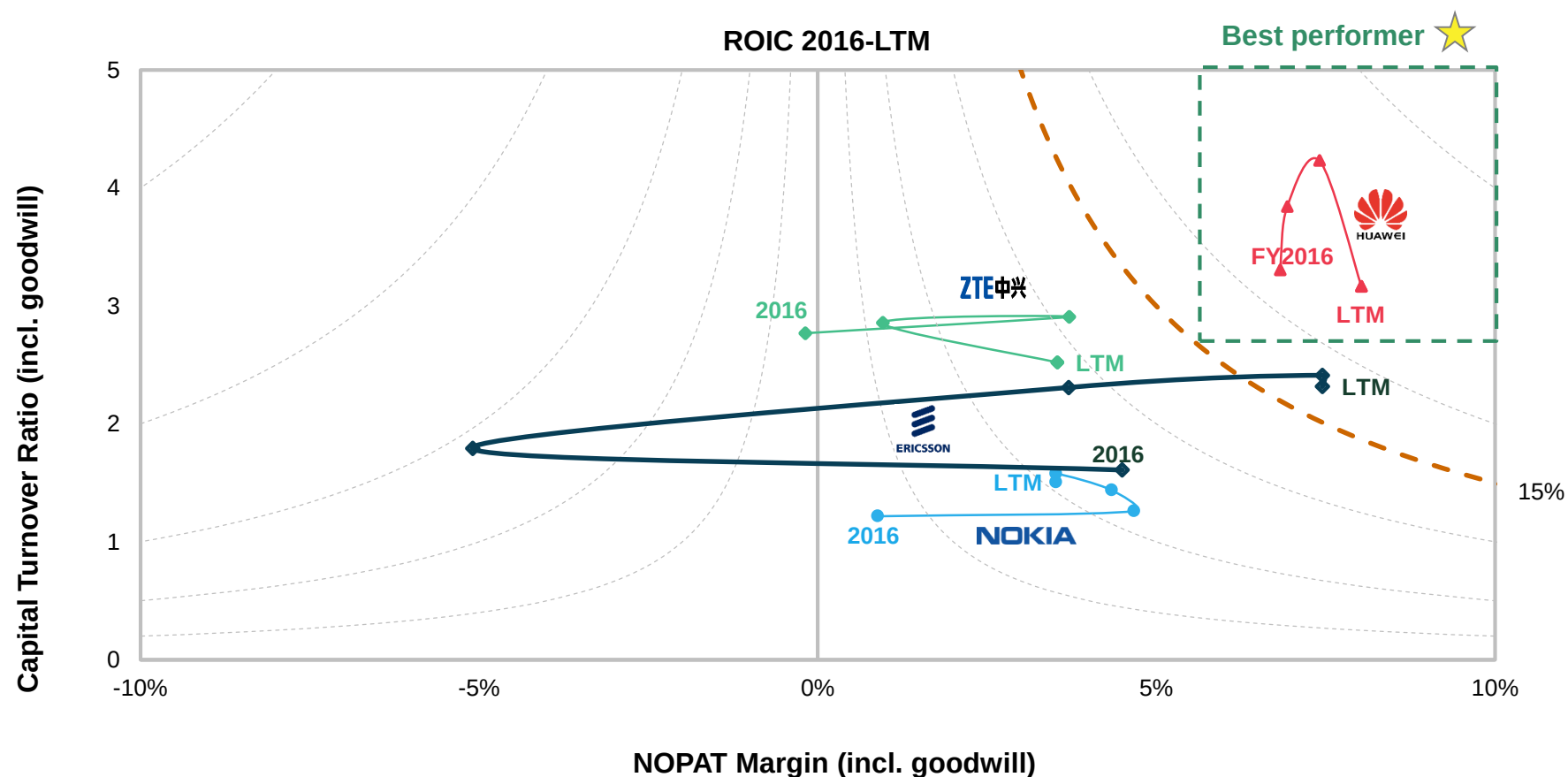
Note: CAGR 2016-2018 used for Huawei and ZTE.

Included segments per company: Huawei (Carrier), ZTE (Carrier), Ericsson (Networks, Digital Services, Managed Services), Nokia (Networks, Software).

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Huawei outperforms its peers, but the gap narrowed due to lowered CTR- Ericsson, ZTE and Nokia reported ROICs of 17%, 9% and 5% respectively



In 2019 Ericsson generated a positive Shareholder Value, for the first time since Q2 2013

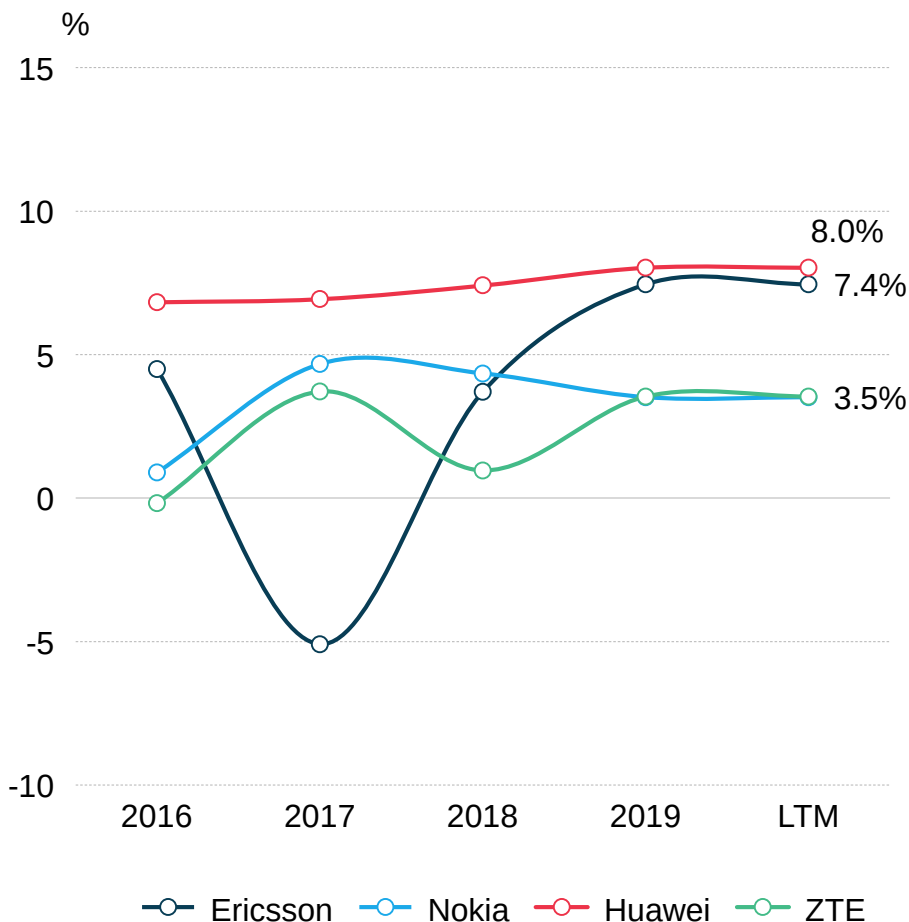
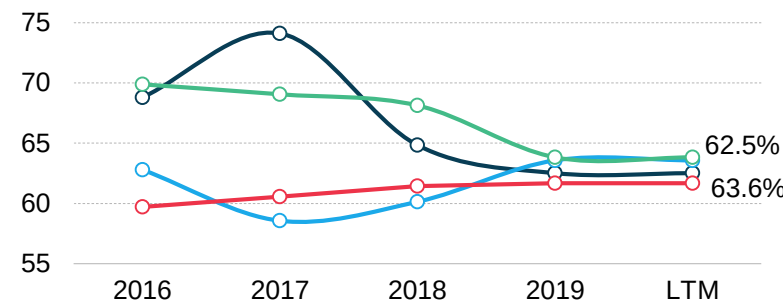
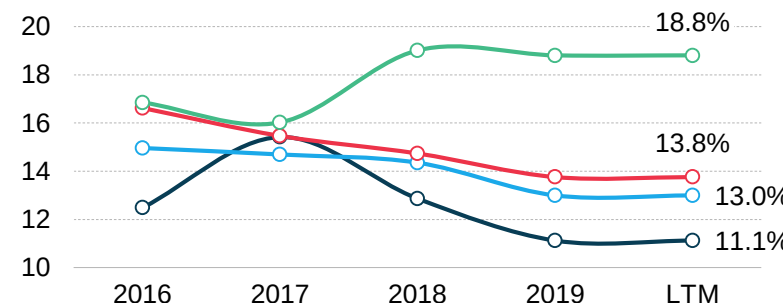
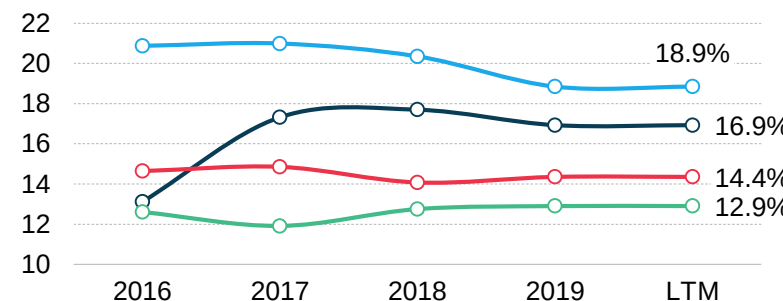
Note: Fiscal years are used in the yearly analysis. Huawei reports annually.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Ericsson's NOPAT margin is almost on par with Huawei after a strong 2019, where they have improved from -5 to +7.4% during the last two years

NOPAT margin, %

COGS
% salesSG&A
% salesR&D
% sales

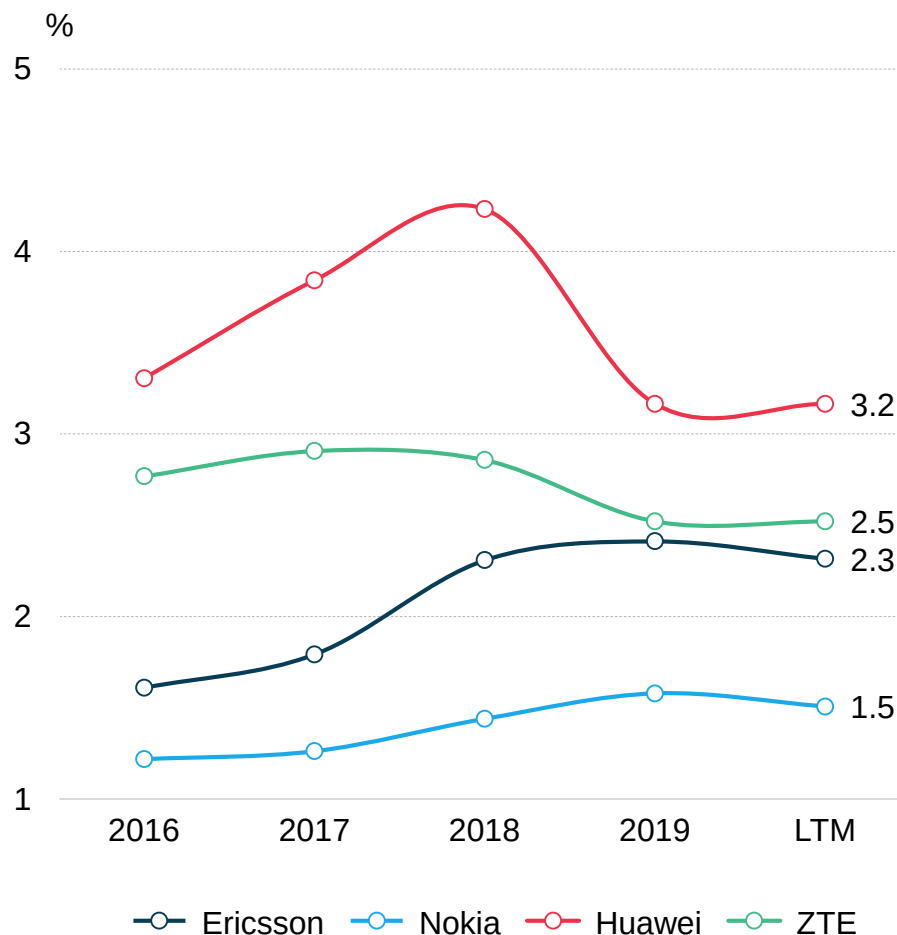
Notes: Fiscal years are used in the yearly analysis. Huawei reports annually.

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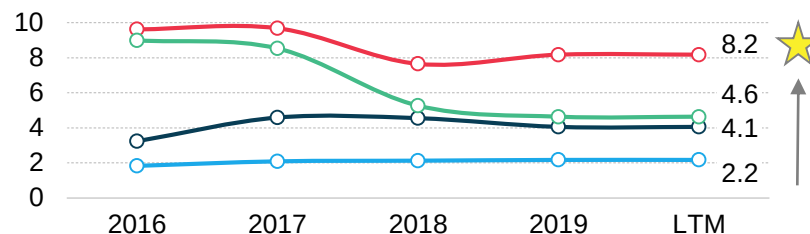


A decline in capital turnover ratio was experienced for Huawei and ZTE in 2019 due to significant increase in current assets and other intangibles

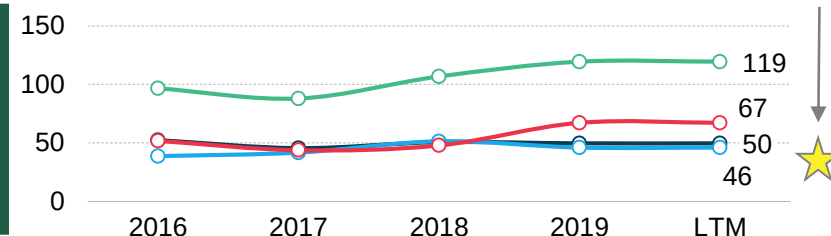
Capital turnover ratio (CTR)



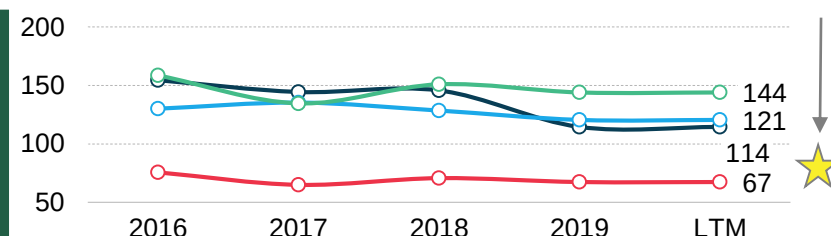
Fixed asset turnover



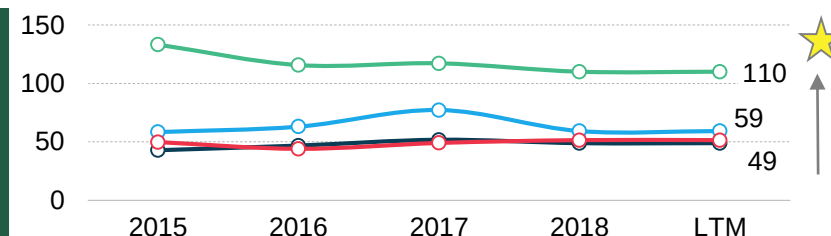
Inv. Days sales



AR Days sales



AP Days sales



Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



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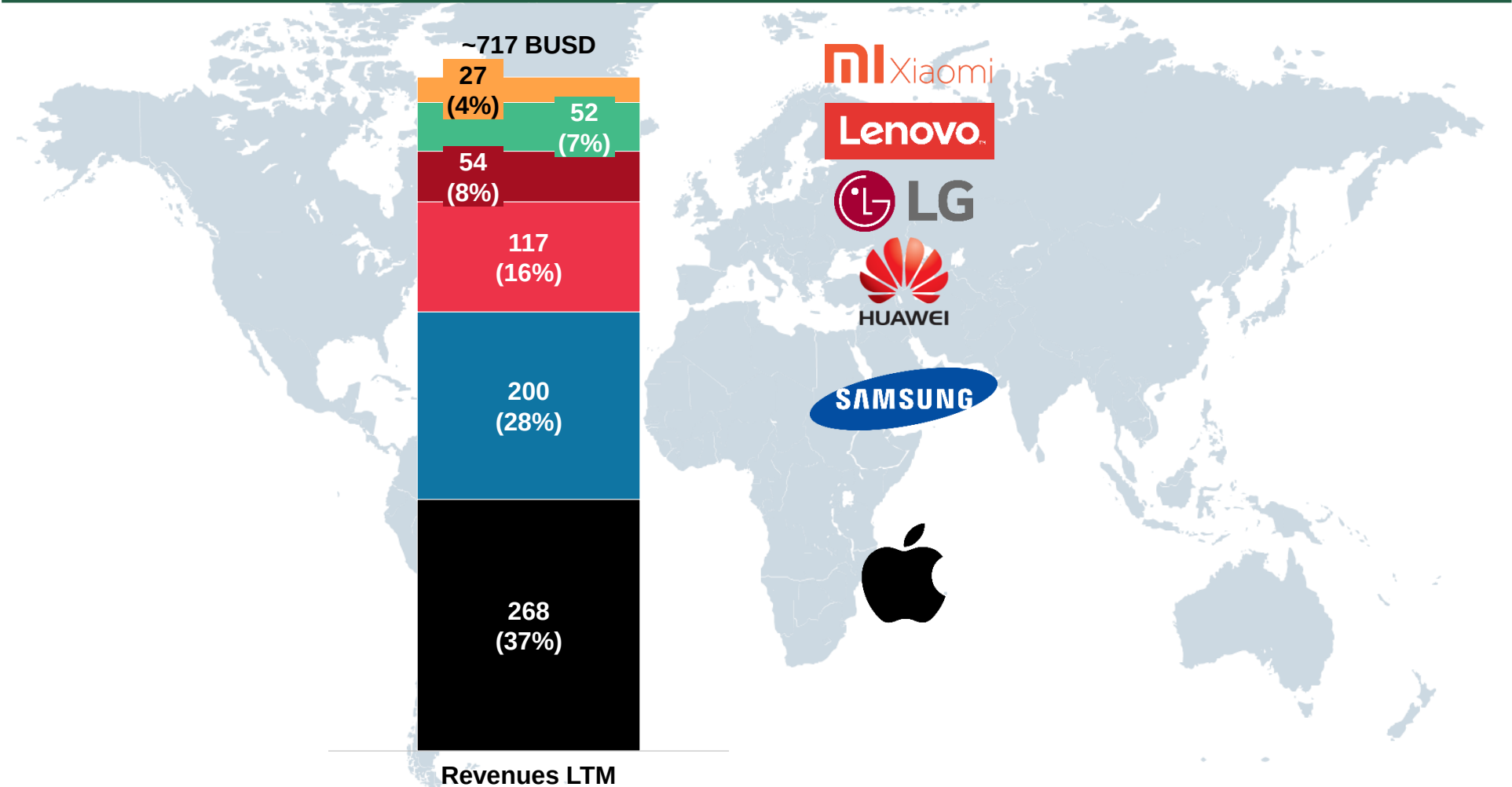
Key takeaways

Key takeaways	Top performers	
	Quarter	Year
Creating Shareholder Value › Apple saw major ROIC decline of 144 pp. because of a major increase in cash while Samsung had ROIC decline of 16 pp. in the last twelve month › Apple maintains significant ROIC advantage over its competitors at 98% in the LTM	Quarter	
	Year	
Revenue Performance › Lenovo had the largest revenue growth of 14% in LTM while Samsung saw the largest decline of 9% › Apple's revenue increased by more than 40% in Q4 '19 compared to Q3 '19 and by nearly 10% quarter over quarter due to the successful launch of iPhone 11 series	Quarter	
	Year	
Margin Performance › Apple and Samsung saw NOPAT margin decline of 1.4 pp. and 9.1 pp. respectively, in 2019 compared to 2018 › Apple continues to deliver the highest NOPAT margin among its peers despite slight decline in Q4 '19	Quarter	
	Year	
Capital Efficiency › Apple's capital efficiency increased slightly in Q4 '19, however with 50% decline on a yearly level in 2019 › Lenovo outperforms its peers in LTM in terms of capital efficiency which has been steadily improved over the past four years	Quarter	
	Year	



The Q4 2019 report includes six major device manufacturers

Report overview
Revenue in BUSD



Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Device OEMs' business segments, revenue split and descriptions

Company	Business segments and revenue share in 2019, %	Description
	 - iPhone - Mac - iPad - Wearables & Home - Services	<u>iPhone</u>: Mobile Phones <u>Services</u>: iTunes Store, iCloud, Apple Pay, other services <u>Mac</u>: Laptops & Personal Computers <u>iPad</u>: Tablets <u>Wearables & Home</u>: Apple Watch, Apple branded accessories for Apple products
	 - Device Solutions - IT and Mobile Communications - Consumer Electronics - Others	<u>Information Technology & Mobile Communications</u>: Mobile Phones, Communication systems and computers <u>Device Solutions</u>: Semiconductor Business and display panels <u>Consumer Electronics</u>: TVs, monitors, printers, air conditioners and refrigerators <u>Harman</u>: Infotainment, connected solutions for automakers, consumers and enterprises
	 - Carrier - Enterprise - Consumer - Others	<u>Carrier</u>: Building telecommunications networks and services <u>Enterprise</u>: Equipment, software and services to enterprise customers <u>Consumer</u>: Manufacturing of electronic communication services (e.g. phones) <u>Others</u>: Communication services not applicable to above descriptions
	 - Home Appliance & Air Solution - Home Entertainment - Mobile Communications - VCS - B2B	<u>Home Entertainment</u>: TV, Monitors, PCs, Security Devices, Audio/Video <u>Home Appliance & Air solution</u>: Kitchen appliances, Vacuums, air conditioners, displays <u>Mobile Communications</u>: Mobile communications, handsets <u>VCS</u>: Vehicle components and others <u>Business solutions/B2B</u>: Information displays, solar modules and others
	 - PC & Smart Device - Mobile - Data Center	<u>PC & Smart Device</u>: Commercial and Consumer Computers <u>Mobile</u>: Mobile devices, Smartphone, Tablet <u>Data Center</u>: Server Business, System X
	 - Smartphones - IoT & Lifestyle Products - Internet Services - Others	<u>Smartphones</u>: Mobile devices, Smartphone, Tablet <u>IoT & Lifestyle products</u>: Smart TVs, scooters, vacuum cleaners, cameras, etc. <u>Internet Services</u>: Preloaded apps, services and advertisements <u>Other</u>: Miscellaneous additional services and products

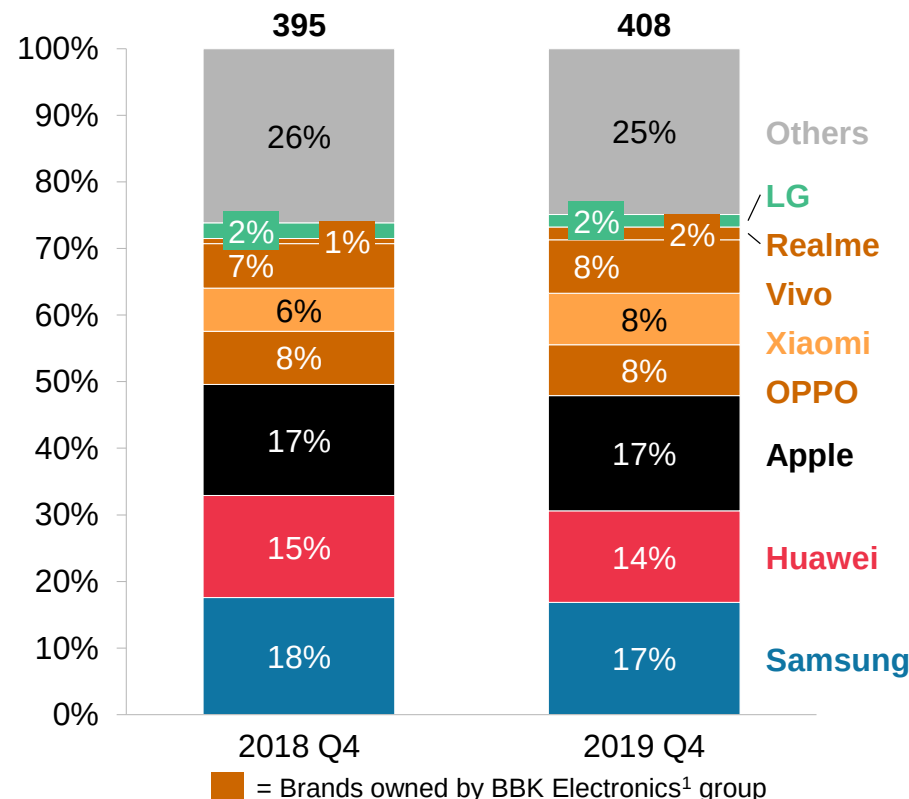


News and happenings – Device OEMs over the past months

News and happenings for Device OEMs

Nov-2019	Google acquired Fitbit for 2.1 BUSD. Fitbit is one of the top 5 wearables manufacturers in the world
Dec-2019	Apple iPhone 11 was the best-selling smartphone globally for the entire month of December causing Apple to overtake Samsung in global smartphone deliveries.
Dec-2019	IDC released its Q3 2019 smart wearables tracking data which highlighted that smart wearables sell increase by nearly 100% compared to Q3 2018 with Apple capturing 35% of total market share
Dec-2019	India smart-phone sell recovers with significant boost in Q4 sell reaching 39 million units. Xiaomi maintain large leadership in the Indian market with the delivery of 11 million units
Jan-2020	IDC released Q4 2019 tablet device tracking data showing that global tablet sale declined slightly compared to Q4 2018, Apple maintain dominance in the tablet field capturing an additional 7% market share
Feb-2020	Huawei launches Mate XS, the second iteration of its foldable smartphone. The newer generation contains major improvements in the foldable concept and greatly improves ease of use and durability

Global smartphone shipments, Million units



Global smartphone sale continued to increase since Q3 2019 with Apple shipped record number and overtook Samsung as largest device OEM in Q4 2019

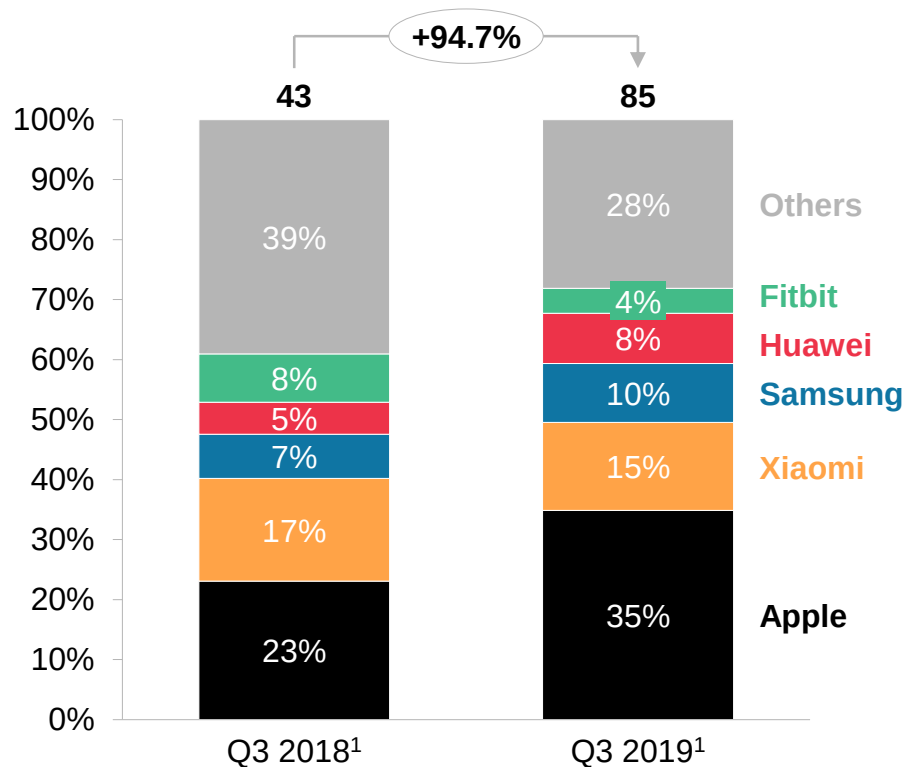
Note: 1. BBK Electronics is a Chinese multinational electronics firm that markets the smartphone brands Realme, Oppo, Vivo and OnePlus.

Source: Counterpoint Research, IDC, Capital IQ, Annual & quarterly reports, Applied Value Analysis.



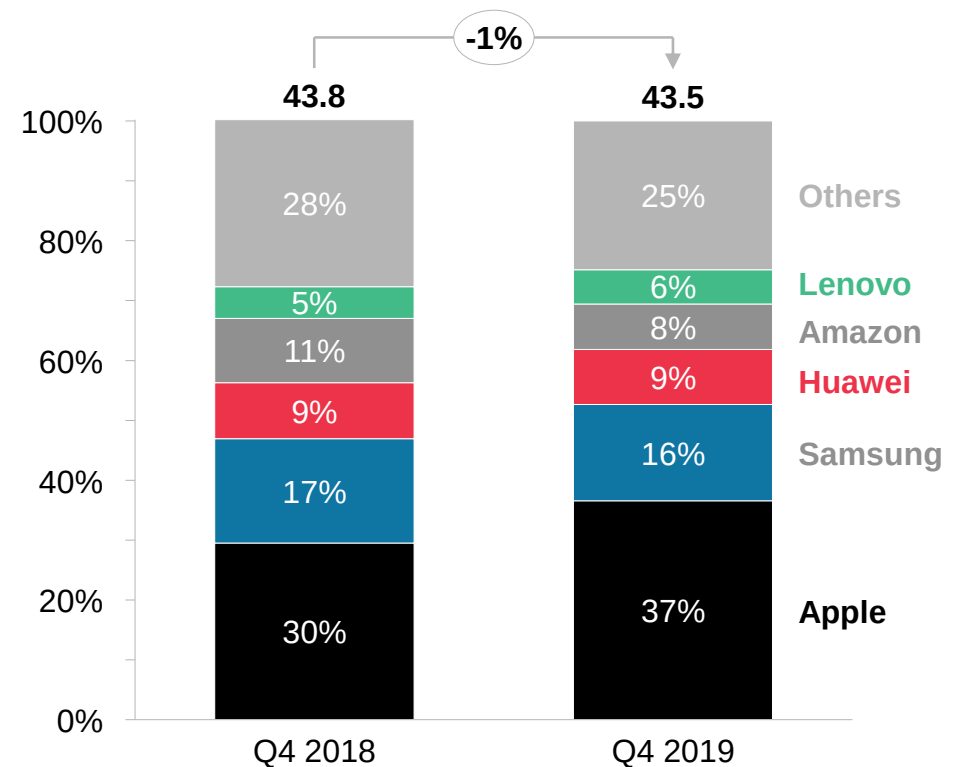
Wearables market grew by nearly 100% quarter over quarter in Q4 2019 while tablets continue to see mild decline

Global wearables shipments
Million units



The market for smart wearables nearly doubled quarter over quarter with consolidations to major brands.

Global tablet shipments
Million units



Apple continues to strength its dominance in the tablet market with a 7% increase in market share quarter on quarter.

Note: 1. Most recent wrist-worn wearables figures are from Q3 2019.

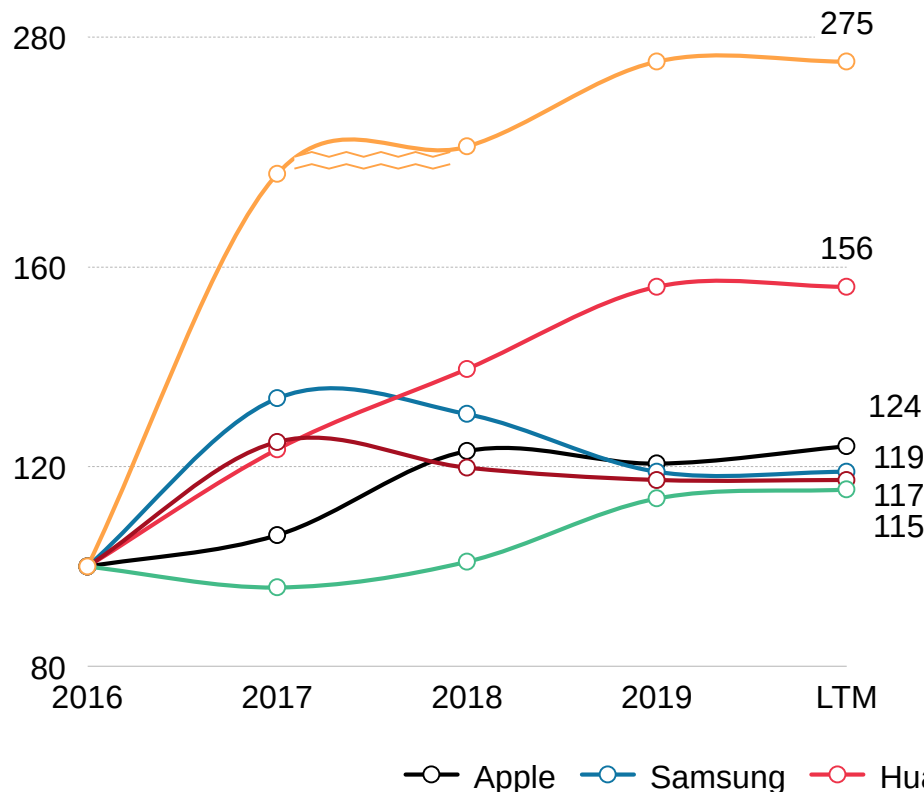
Source: IDC, Counterpoint Research and Applied Value Analysis.



Apple's revenue has seen the largest increase over the past of four years at 24%, while Lenovo has the slowest growth at 15%

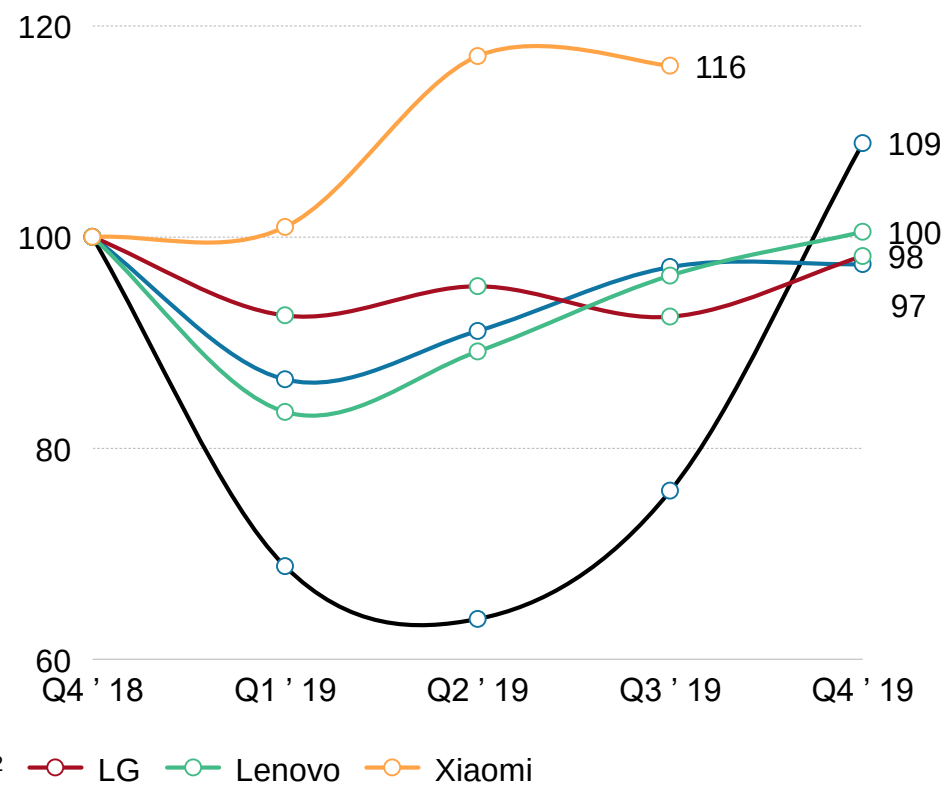
Yearly revenue development

2016 - LTM (index 2016=100)



Quarterly revenue development

Q4'18 - Q4'19 (index Q4'18=100)

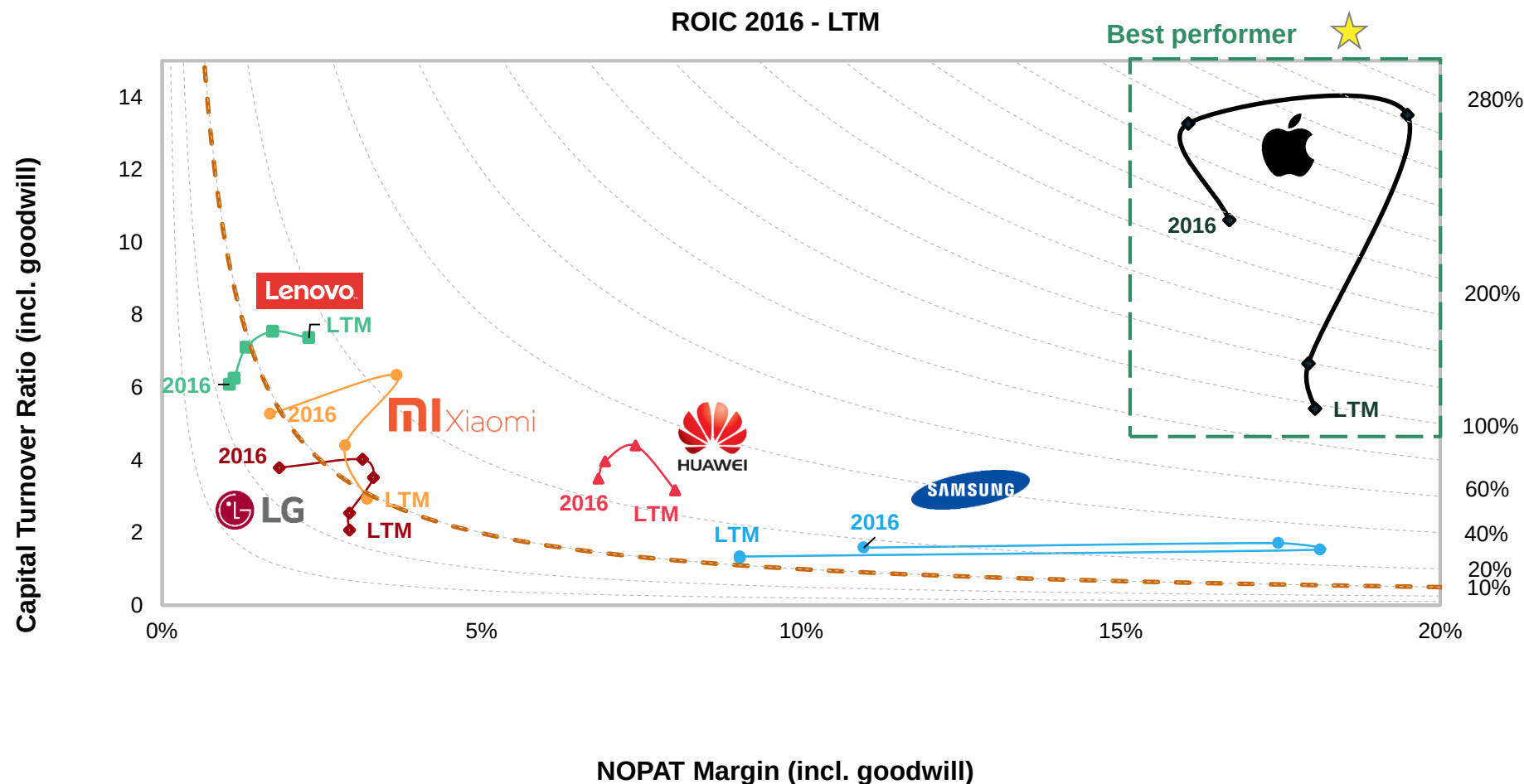


Samsung has seen revenue decline since highs achieved in 2017

Apple revenue increase significantly in Q4 2019 largely due to the successful launch of iPhone 11



Xiaomi, Lenovo and LG had positive ROIC development in LTM vs. 2016 while Apple, Huawei and Samsung experienced declines during the period



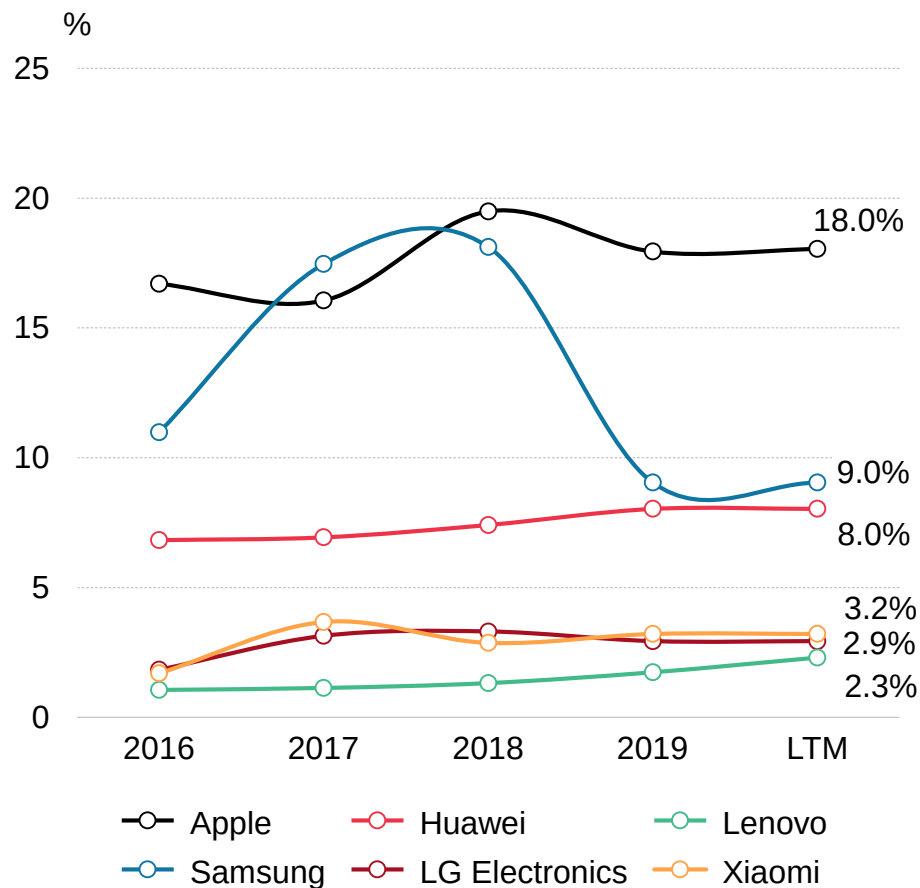
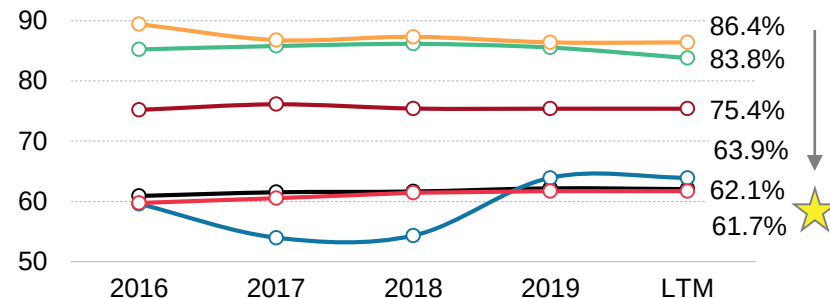
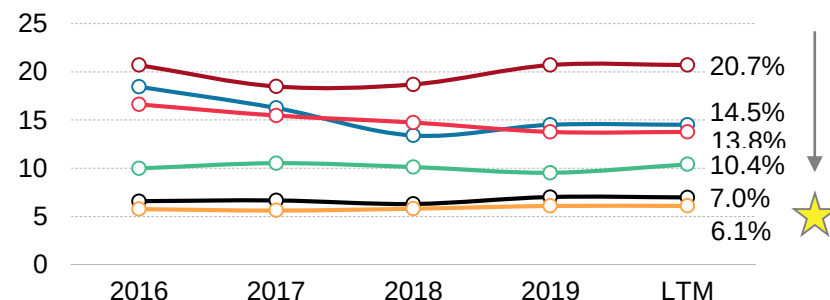
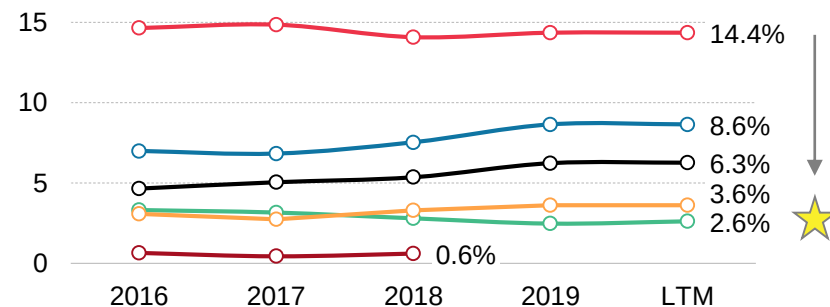
Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



Samsung saw a significant NOPAT margin decline in 2019 while Apple has the highest NOPAT margin among the large OEM manufactures

NOPAT margin, %

COGS
% salesSG&A
% salesR&D
% sales

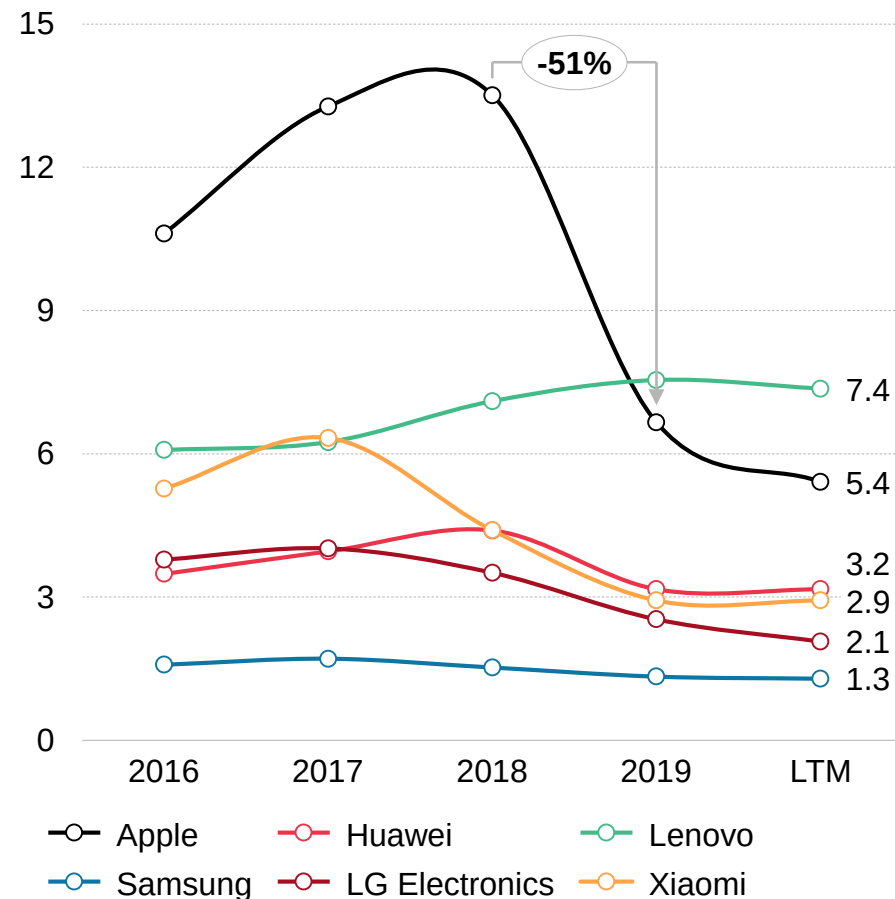
Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

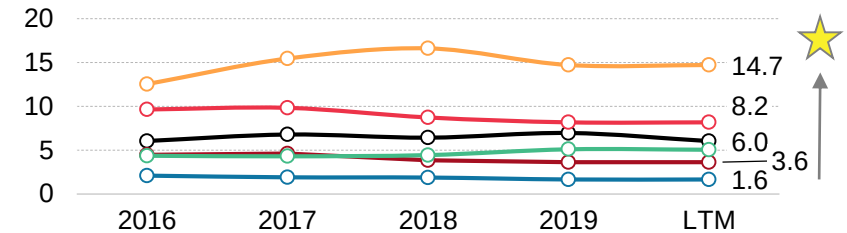


Apple saw continuous decrease in CTR of 51% in 2019, while Lenovo was the only company seeing an increase in CTR in the last four years

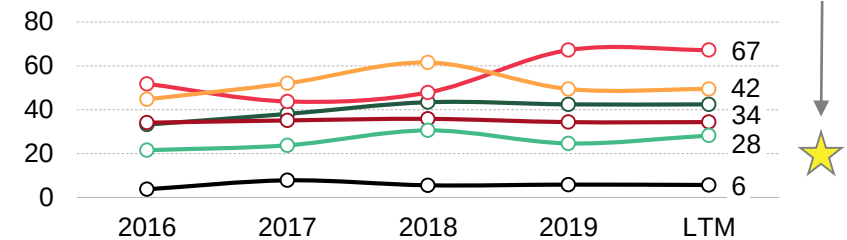
Capital turnover ratio (CTR)



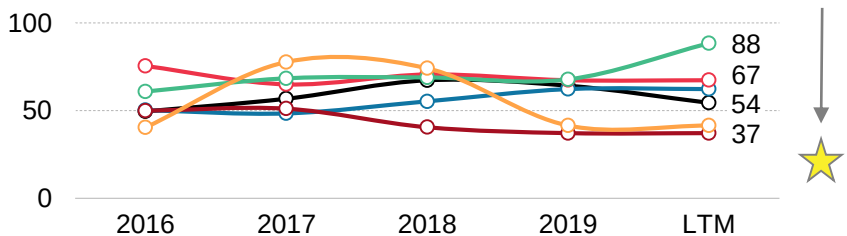
Fixed asset turnover



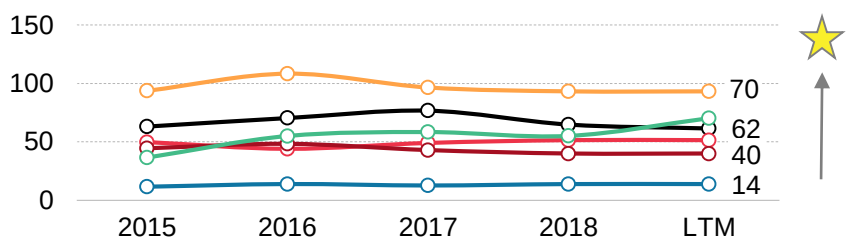
Inv. Days sales



AR Days sales



AP Days sales



Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.

Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.



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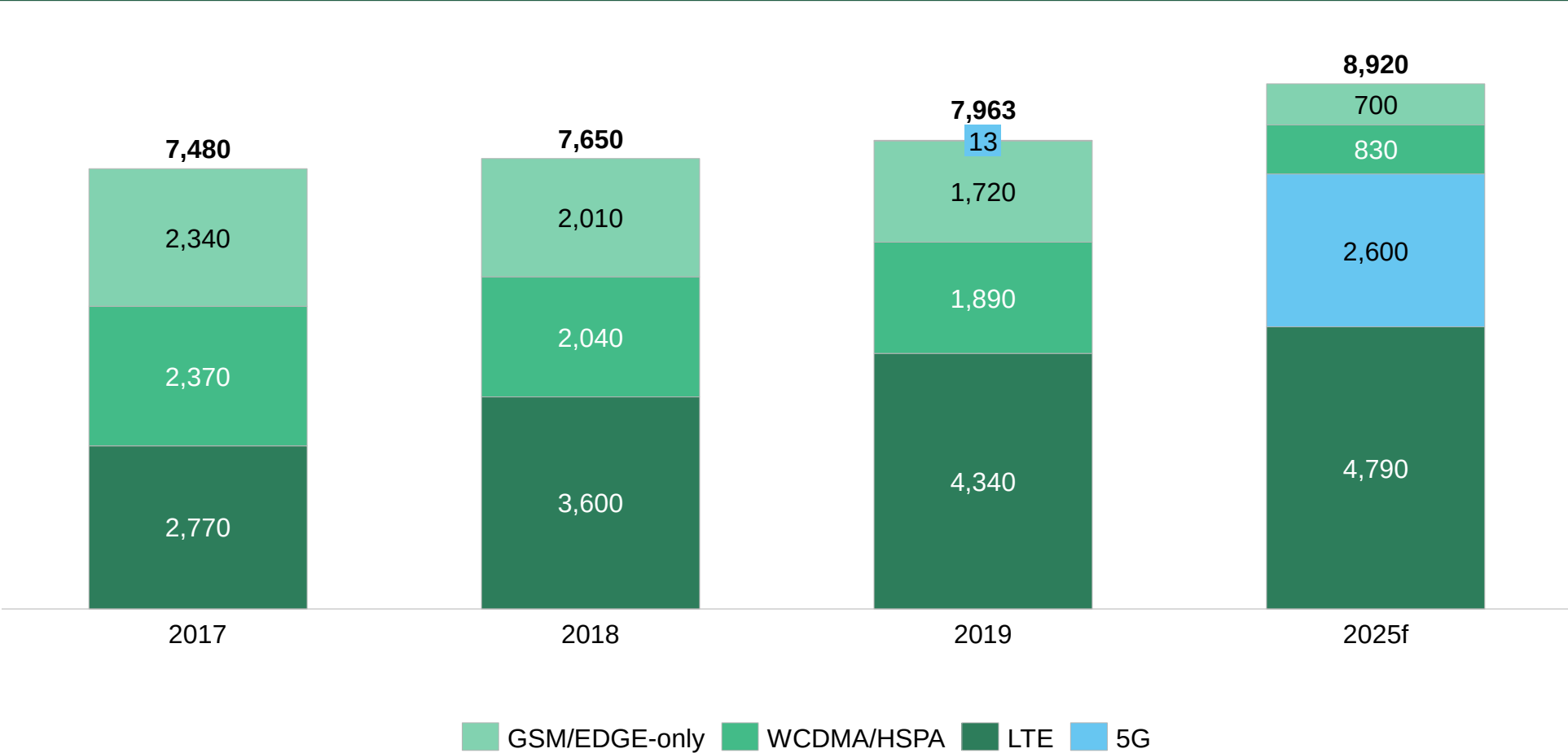
4. Current State of 5G Deployment

About Applied Value



5G is projected to ramp up quickly and reach 2.6bn users in 2025 according to Ericsson’s Mobility Report

Mobile subscription by technology
Million



Note: APAC excluding China and India
Source: Ericsson Mobility Report



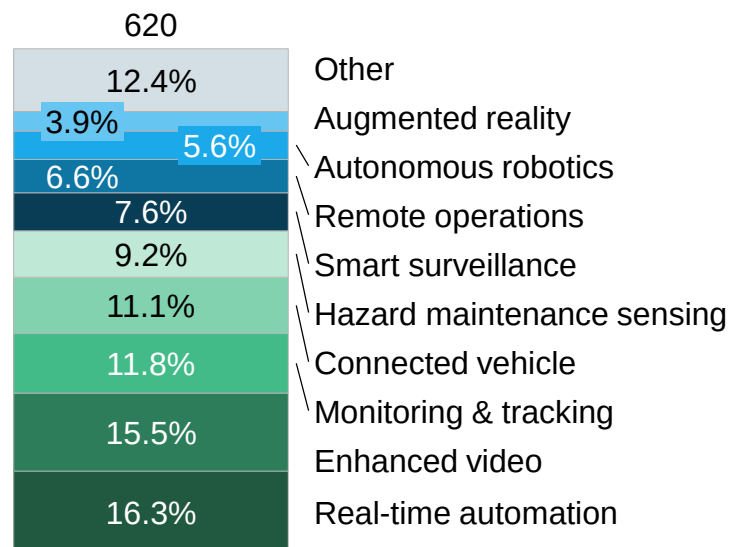
New multi-vendor strategies are being communicated together with the 5G launch and scale up plan by operators in USA, NEA and Europe

		Commercial 5G	Short-term Planning	Mid-/long-term Planning	NOKIA	ERICSSON	HUAWEI	ZTE中兴
United States	Verizon	Launched	30+ cities by 2019	>50% by 2020	✓	✓		
	AT&T	Launched	29 cities by 2019	Nationwide H1 2020				
	T-Mobile	Launched	30 cities by 2019	67% population coverage by 2021				
	Spirit	Launched	10 cities by 2019	Nationwide by 2020				
China	China Mobile	Oct 1, 2019	40 cities by October 1, 2019	460m 5G connections by 2025	✓	✓	✓	✓
	China Telecom							
	China Unicom							
Japan	NTT	2020	Been assigned 5G spectrum from the MIC for coverage obligations	90%+ population coverage by 2024	✓	✓		
	KDDI	March 2020		64% population coverage by 2024				
	Softbank	2020						
S. Korea	SK Telecom	Early April 2019	2m subscribers by 2019	7m subscribers by 2020	✓	✓		
	KT		+80% population coverage by 2019	--				
	LG Uplus		85 cities/ 90% by 2019	Target to match 4G coverage by 2022				
Europe	EE (BT)	May 2019	16 cities coverage in 2019 rollout plan	Target another ten cities in 2020			✓	
	Vodafone-UK	July 2019	21 cities coverage in 2019	--		✓		
	Vodafone-ITA	June 2019	Launched in 5 major cities in Italy	40~50 cities in 2020 and 100 in 2021	✓			
	Orange	Plan in 2020	17 cities across Spain, France, Romania, Belgium, Poland, Luxembourg		✓	✓		
	Elisa	Limited Launch	Deliver 5G service and phones in June	--	✓	✓	✓	
	Deutsche Telekom	July 2019	5G deals on hold pending Huawei ban	99% population coverage by 2025	✓	✓		



Businesses are seeing the most-value across nine concrete use cases areas for example Real-Time Monitoring, Automation, AR/VR and Operations

Forecasted value of 5G use case
Billion USD



Impact of market structure on telecom operators
5G Costs and Benefits

Market Structure	5G Cost & Revenue benefits distribution	ARPU Growth
Stable 3-player	- Expanded revenues from new segments 20-40% of cost benefits reinvested 20-40% passed on to customers 30-50% of digitalization gains flowing through to margins	
Stable 4-player	- Revenue gains offset by price pressure from 5G's massive capacity increase 25-35% of cost gains trickling down to margins 20% of cost gains reinvested 40-60% passed on to customers	
Challenged 4/5-player	- Massive 5G capacity increase eroding revenues - More than 100% of digitalization cost cuts passed on to customers	

- › From enterprise and public use point of view, the biggest opportunity identified within various 5G use cases was real-time automation, followed by enhanced video services and eight other use-case clusters ranging from simple monitoring and tracking to connected vehicles, smart surveillance and augmented reality

- › In markets with four mobile network operators, the revenue benefits of digital transformation cost cuts and the massively increased capacity of 5G are likely to be passed on to consumers
- › The extent to which operators will succeed heavily depends on how 5G spectrum will be regulated: niche operators, enterprise cloud suppliers and ICT integrators will compete with telecom companies for Private 5G networks business with lower margins



New 5G use cases are causing tendencies of consolidation in the Telco/High-Tech ecosystem – Applied Value expect M&A activity to continue

	Date	Parties Involved	Transaction	Business Scope	Impact on 5G Deployment	Geographic Presence
①	April 2019		\$26.5 billion merger	Wireless network carriers	Combination of the two carriers' wireless networks and airwave spectrum will accelerate the planned nationwide 5G network without raising prices	
②	July 2019		\$1 billion	Smartphone modem chip business	Apple acquired Intel's modem business accompanied with a large portfolio of wireless patent for self-development of 5G modem without reliance on Qualcomm	
③	Aug. 2019		\$50 million cash	Mobile network engineering services	Combination of TTS' field-proven services at leading operators with the Amdocs Open 5G portfolio aims to accelerate and simplify operator's 5G networks with comprehensive network rollout solutions	
④	Nov. 2019		\$324m cash plus 32.5 m shares of Ribbon stock	Cloud communication & End-to-end packet-optical transport and SDN/NFV solutions	Expansion of Ribbon's product portfolio to include data applications and optical networking, positioned to serve 5G market	
⑤	Jan. 2020		n/a	Telecom equipment & End-to-end network service	Samsung's collaboration with major U.S. network operators to fulfill 5G network expansion	
⑥	Feb. 2020		n/a	Telecom infrastructure & Silicon photonic technology	Efficiency improvement in 5G and data center networking and integration into Nokia's product portfolio	



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About Applied Value



Applied Value is a management consulting & investment firm founded on the principles of lean growth and entrepreneurship

1997

Background as an internal change agent in the **Kinnevik Group**...



K I N N E V I K

...today, a hands-on consultancy supporting clients **across industries**

2019

Industries of Expertise

- Telecom & Media
- Chemicals & Process
- Industrials & Engineering
- Consumer Goods
- Automotive



Lean Growth Principles



Investments



Management Consulting



Social Responsibility

Selected portfolio companies



APPLIED VALUE



HAND IN HAND



ROI driven



Fact-based



Practical over theoretical



Hands-On



Global perspectives



Applied Value challenges and supports repeat global clients across industries from three offices

Selected ICT Clients







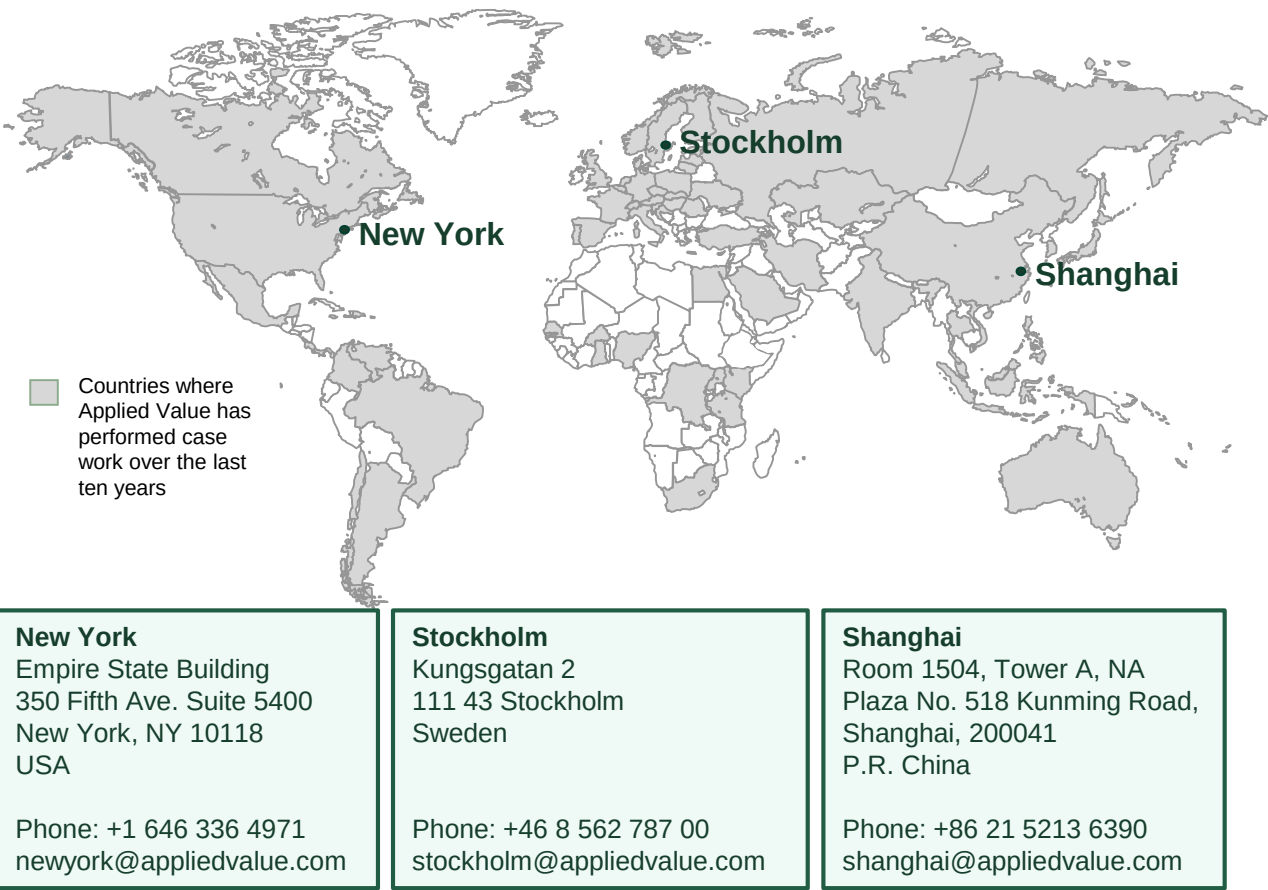








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