Financial performance and trends in the Telecom industry

Applied Value Q2 2020

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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+ 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 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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Executive summary

Key takeaways per segment

Operators

1. Revenue started to recover from the impact of COVID-19. Despite this, a 2.3% negative Year-on-Year (YoY) development was recorded for Q2'20.
2. ROIC performances saw little YoY deviation
3. CAPEX stayed low in Q2'20 but is expected to increase with the 5G coverage expansion

Infrastructure OEMs

1. Revenue of major infrastructure vendors has begun to recover from the impact of COVID-19. Despite the sanctions imposed, Huawei's carrier segment achieved 8.9% revenue growth YoY in H1 '20
2. Ericsson outperformed its peers with 19.8% ROIC in the LTM.
3. Meanwhile bans have caused slow inventory turnover for Huawei, resulting in a substantial drop in CTR and ROIC

Device OEMs

1. Global smartphone shipments fell by 16% YoY in Q2'20, of which OPPO and Samsung endured over 25% of decline
2. Wearables market grew by 29.7% YoY in Q2'20. A surge in hearable demand, caused by remote work needs, accounted for 68% of the total growth, and the growth was comparable between OEMs

Roundup of telecommunication forecasts

Globally, over 75 commercial 5G networks were live by the start of May 2020. User-linked 5G connections will grow to over 200 million by year-end and to 2.8 billion in 2025. 5G momentum will begin to build from 2021, **overtake 4G revenue in 2024**, and in **2025 5G will account for 53 percent of service revenue**.

Source: Strategy Analytics

US wireless network operators are expected to collectively spend **$35 billon on CAPEX in 2021**, and that figure will **increase by 6% to amount to $37 billion in 2022**. Spending will focus on nationwide 5G network construction, and factors including spectrum purchase can add further momentum to operators' CAPEX.

Source: Deutsche Bank Research

Faced with tighter margins over the past five years, telcos are actively incorporating software as part of value offerings to clients. In 2019, **$50 billion** of CAPEX were allocated to software, **accounting for 16.8% of all telco CAPEX**, previously only 11.7% in 2015. This growth is expected to continue with telcos' efforts to diversify revenue streams.

Source: MTNC

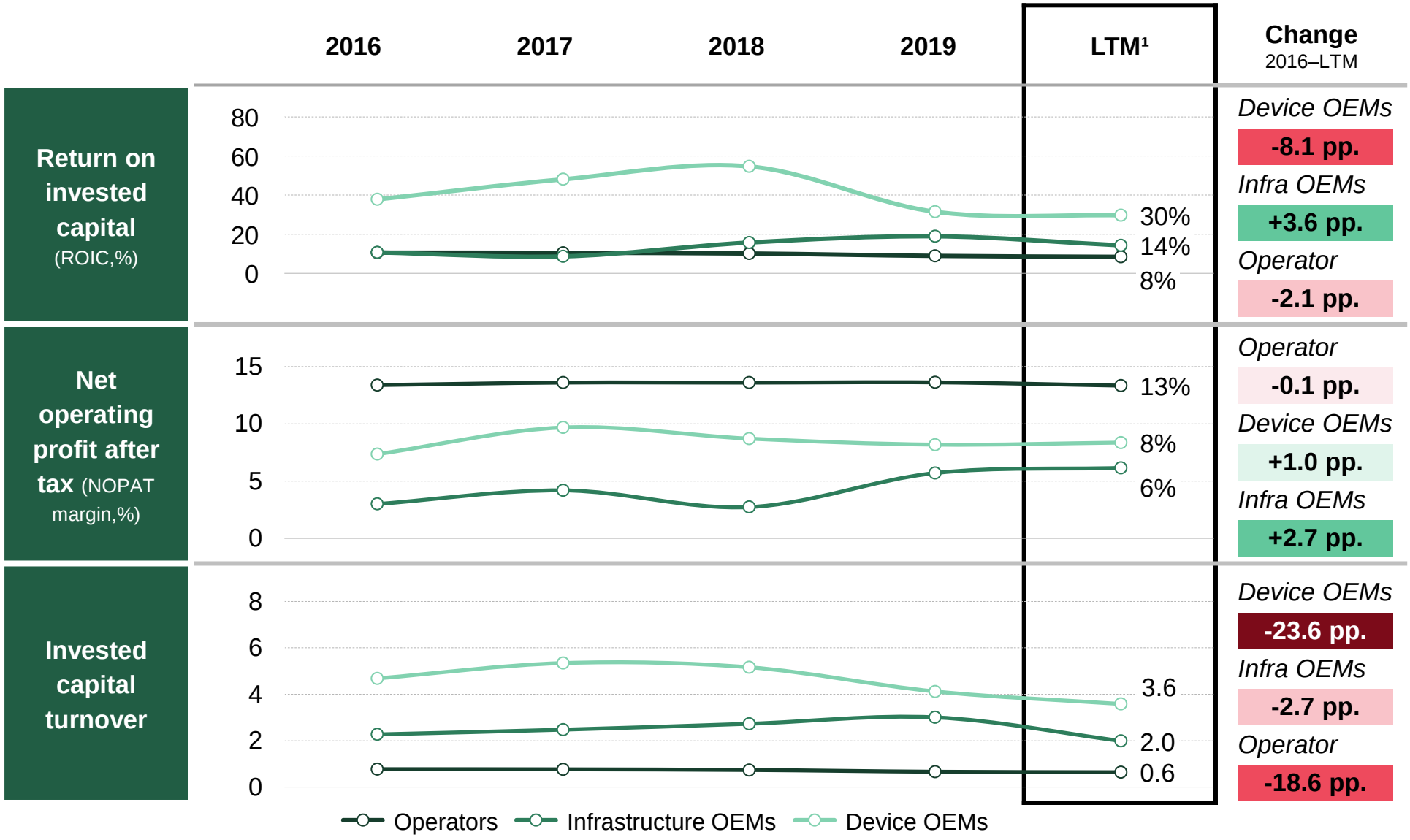
The worldwide smartphone market is forecast to **decline 11.9% year over year** in 2020 with shipments totaling 1.2 billion units. Global smartphone shipments are not expected to return to growth until the first quarter of 2021.

Source: IDC

Despite the impact of COVID-19, the **global wearables market is expected to grow at CAGR of 9.4%,** reaching 526.8 million units by the end of 2024. Hearables and watches will continue to grow at CAGR of 10.3% and 11.4% respectively by **integrating more health and fitness features.**

Source: IDC

Financial overview (1/2): Yearly performance



Note: 1. LTM refers to Q3 2019 – Q2 2020 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	Q2 ’20	Q1 ‘20	Q4 '19	Q3 '19
Sales YoY (% change)	**Operators**	-2.5 pp.	-3.8 pp.	2.1 pp.	-1.7 pp.
	Infrastructure OEMs	13.8 pp.	-3.8 pp.	4.8 pp.	29.6 pp.
	Device OEMs	-15.7 pp.	-1.7 pp.	4.9 pp.	14.1 pp.
Net operating profit after tax (NOPAT) YoY (pp. change)	**Operators**	-0.5 pp.	0.0 pp.	0.8 pp.	-0.1 pp.
	Infrastructure OEMs[1]	1.0 pp.	1.8 pp.	-0.4 pp.	4.2 pp.
	Device OEMs[2]	-0.8 pp.	0.2 pp.	-1.2 pp.	-0.1 pp.
EBITDA YoY (pp. change)	**Operators**	0.0 pp.	0.5 pp.	1.9 pp.	0.4 pp.
	Infrastructure OEMs[1]	0.8 pp.	1.8 pp.	-0.6 pp.	6.7 pp.
	Device OEMs[2]	-1.0 pp.	0.4 pp.	-1.4 pp.	0.5 pp.

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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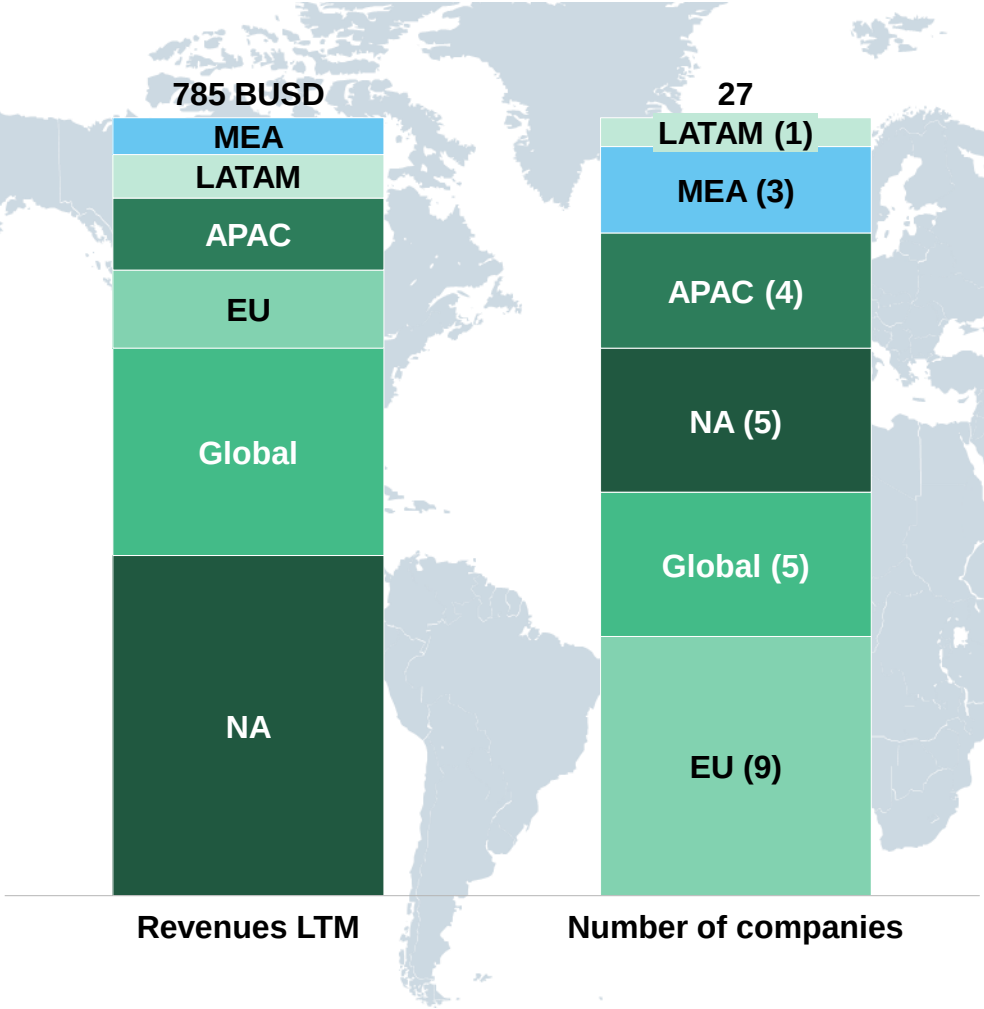
The Q2 ‘20 report covers 27 of the largest operators globally, accounting for 785 billion USD in revenues

Report overview
Revenue in BUSD, and company breakdown

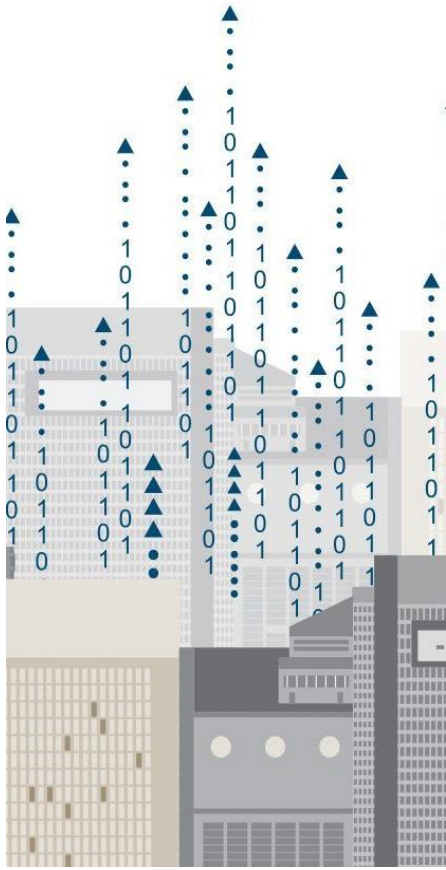


Note: The included companies differ from previous quarter. Global operator refers to those with transregional business establishments.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Key takeaways from the operator segment

Key takeaways

Creating Shareholder Value	1. ROIC performances varied between 4% and 19% over the last 12 months 2. Around half of the operators analyzed decreased their ROIC in LTM – Veon had the largest decline of 1.4 p.p. 3. Telkom Indonesia had the largest ROIC improvement of 1.5 p.p.
Revenue Performance	1. Revenue generated from EU, NA and APAC operators leveled with the previous quarter 2. Revenue from LATAM operators is starting to bounce back while Global operators experienced a considerable Quarter-on-Quarter (QoQ) revenue increase
Margin Performance	1. EBITDA margins remained relatively stable YoY for operators of all regions. MEA, NA and Global operators saw small contraction in NOPAT margins 2. Telkom Indonesia is the most profitable operator of Q2'20, with 50.4% EBITDA margin and 25.7% NOPAT margin. 3. Tele2 margin performance improved the most, by 9 p.p. NOPAT and 4 p.p. EBITDA
Capital Expenditure	1. CAPEX continued to be low compared to previous years, however, expansion in 5G coverage is creating a path for expenditure to increase 2. Telkom Indonesia had the highest CAPEX ratio of 31.2% in Q2'20 and largest increase in CAPEX YoY of 5 p.p.

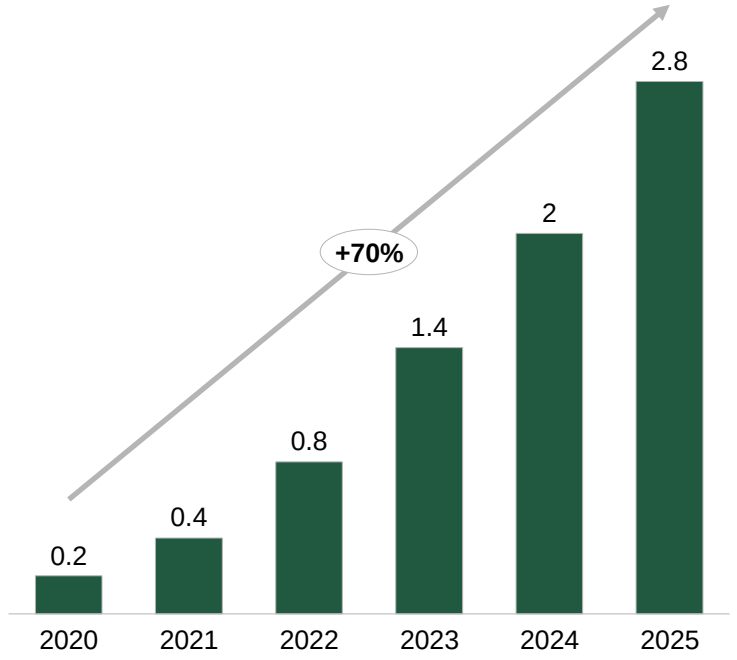


5G network construction started to build momentum after COVID-19 disruption

News and happenings for operators

Jul-2020	After choosing Ericsson as its primary RAN vendor in May 2019, **SoftBank** offers **Ericsson** the contract to supply its cloud-native 5G core, enabling the mobile operator to launch standalone 5G services in Japan.
Jul-2020	**Deutsche Telekom**, **Telefonica** and **Vodafone** finalized a trial on automated settlement of roaming discount agreements, aiming to form a frictionless inter-carrier transaction ecosystem.
Jul-2020	**Bharti Airtel** and **Vodafone Idea** lost 5.26M and 4.51M subscribers in India Q2 '20 respectively due to COVID-19 lockdown. Meanwhile **Reliance Jio** added 1.57M subscribers, becoming India's largest operator four years into existence.
Jul-2020	Following Facebook, **Google** invested $5.4B in **Reliance Jio** for 7.73% stake. Google and Jio also announced co-development of low-cost entry-level smartphones that would support Google Play and standard 5G.
Jul-2020	**SK Telecom** permanently shut down 2G mobile service. The empty bandwidth, previously occupied by the 2G network, will be used for 5G network services.
Aug-2020	**T-Mobile** switched on standalone 5G network, allowing maximum usage of the 600MHz 5G spectrum, which will expand its coverage by 30 percent.

5G user subscription forecast
Unit: billion

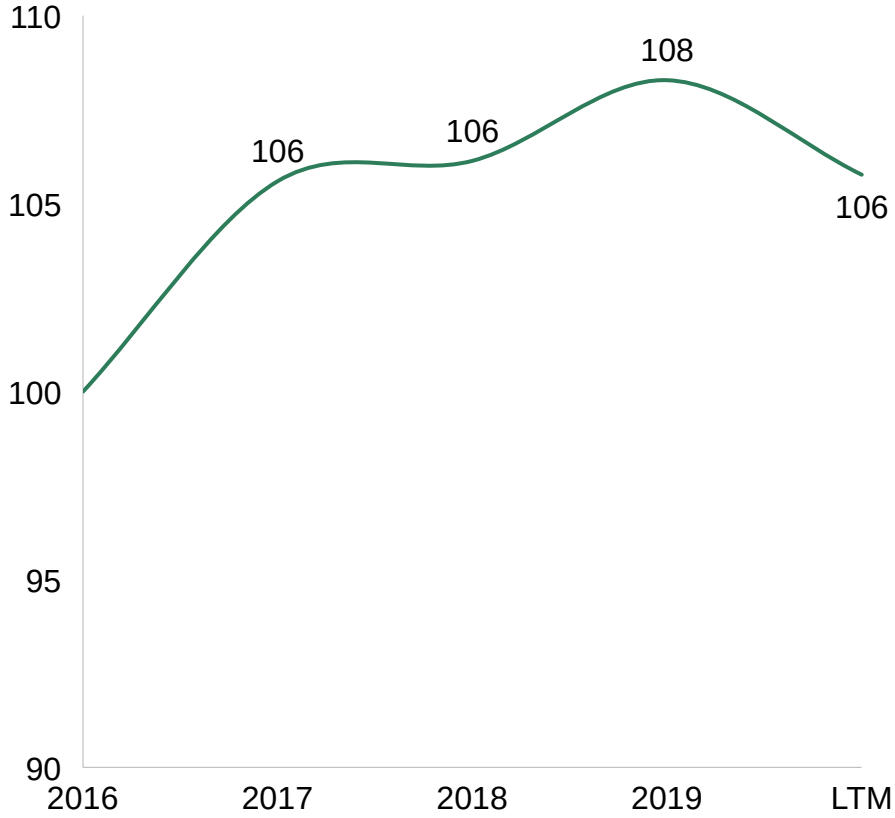


Despite the unexpected disruption from COVID-19, end-user adoption of 5G projections remained optimistic.

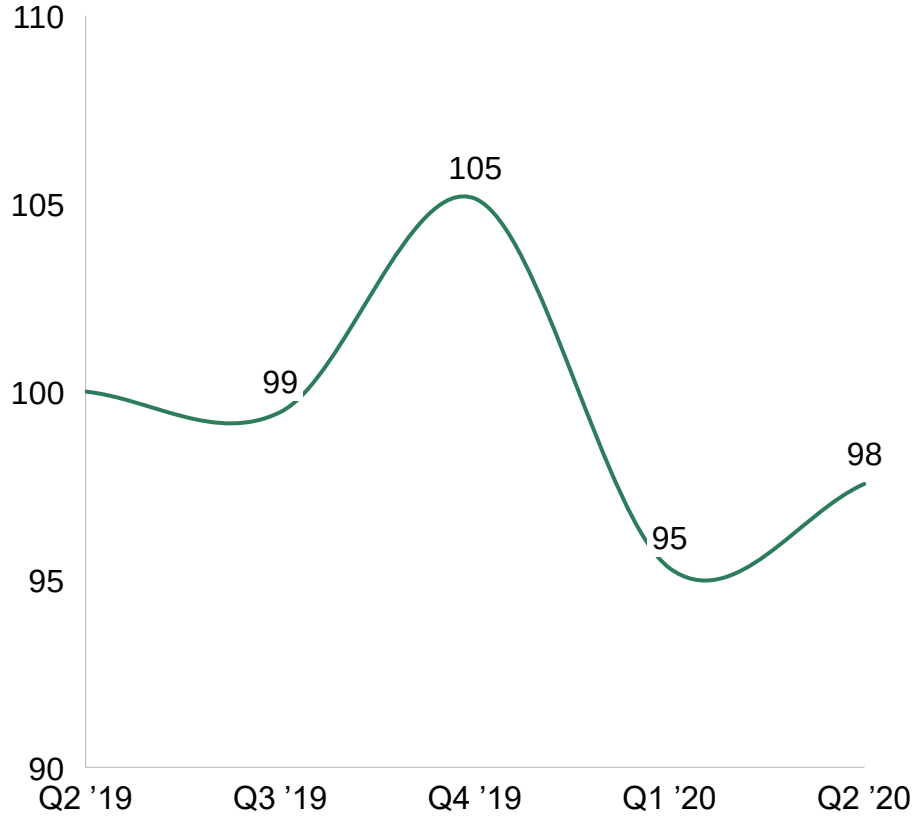
Source: Press & News, Cisco, Ericsson, Applied Value Analysis.

Operator revenue increased 2.7% between Q1’20 and Q2’20, signaling recovery from impact of the pandemic

Indexed Yearly revenues
2016 - LTM (index 2016=100)



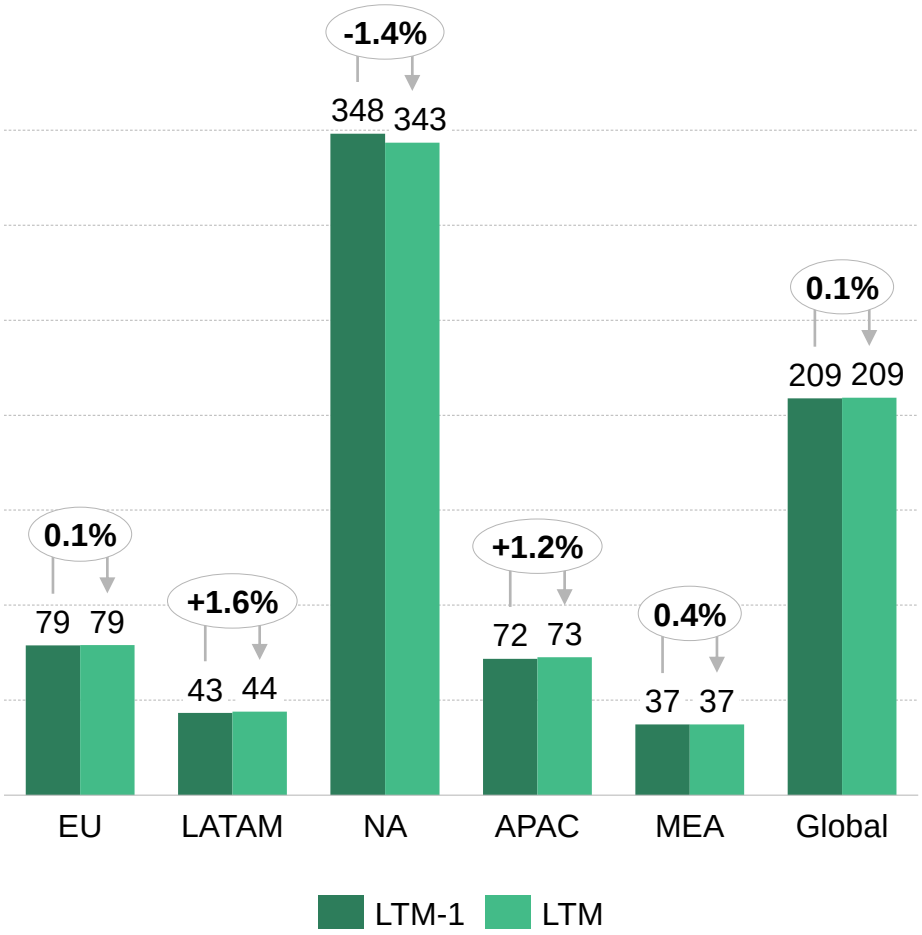
Indexed Quarterly revenues
Q2’19 – Q2’20 (index Q2’19=100)



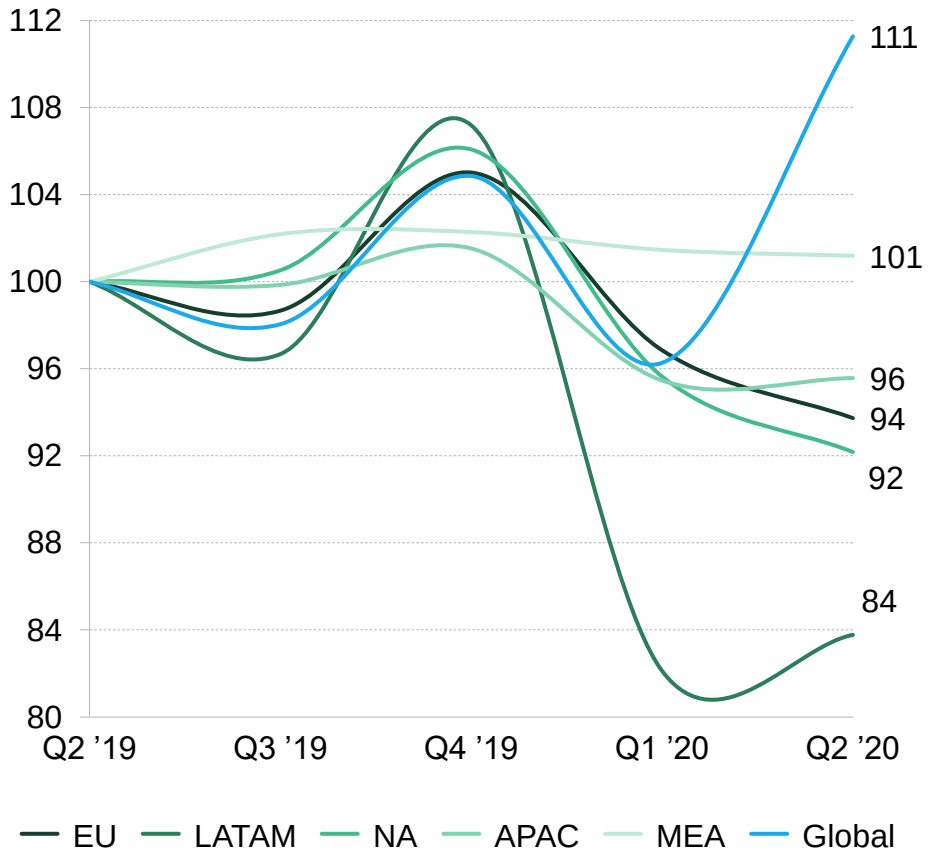
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Revenue from LATAM operators began to bounce back while North America and Europe continued to fall QoQ

Yearly revenues by region
LTM-1 (Q3'18 – Q2'19), to LTM (Q3'19 – Q2'20), BUSD



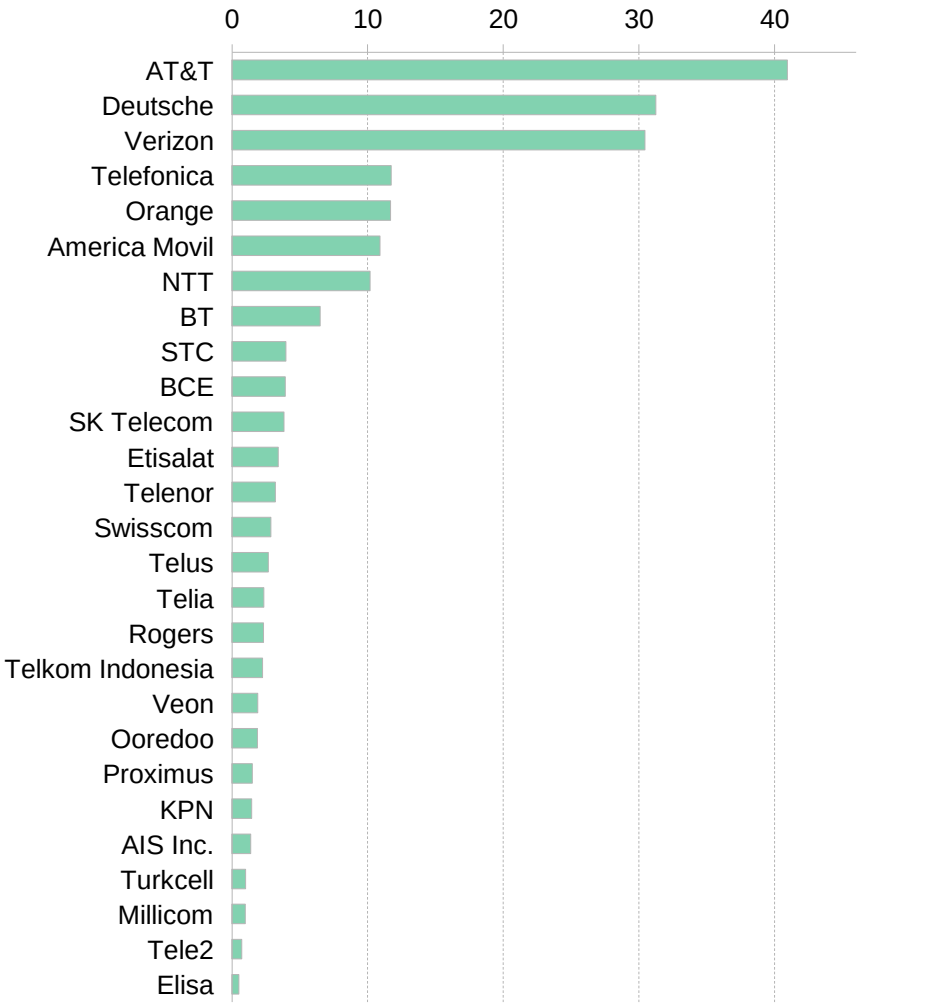
Indexed Quarterly revenues by region
Q2'19 to Q2'20 (index Q2'19=100)



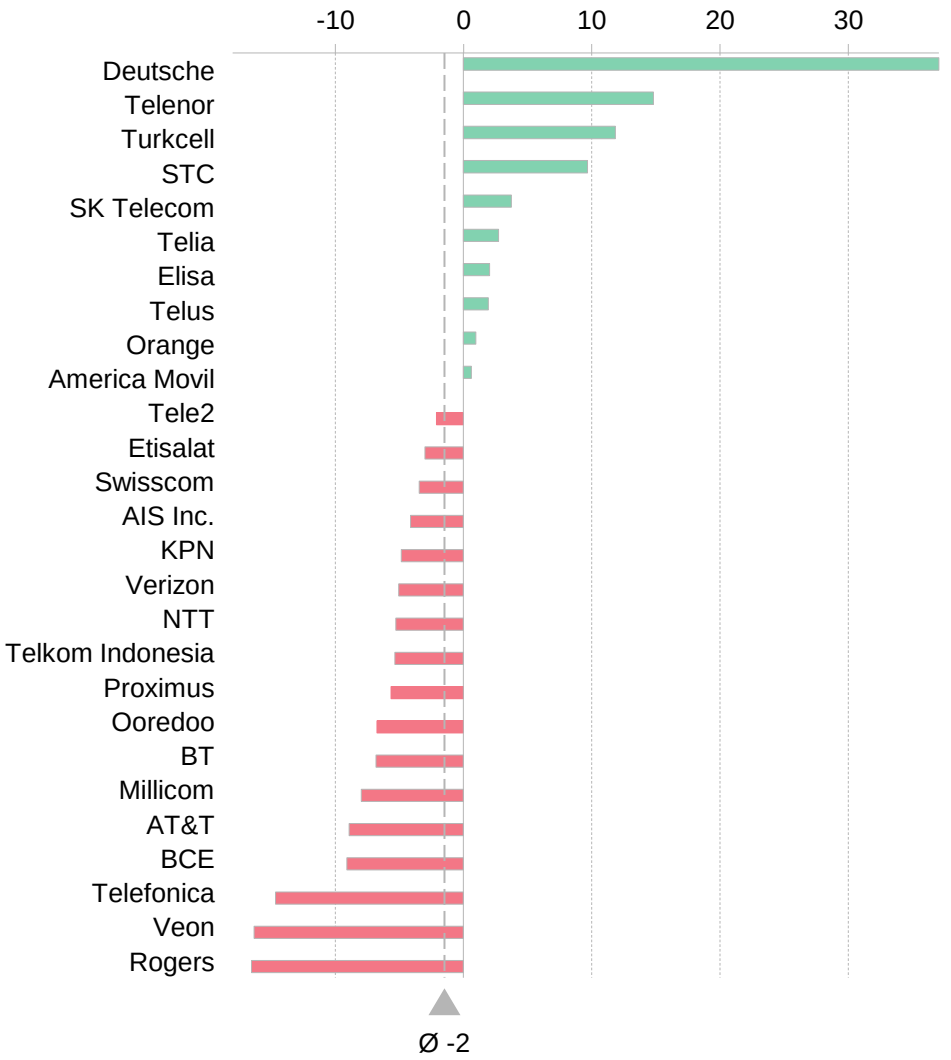
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Most operators experienced negative YoY revenue development; Deutsche Telekom grew 37% with inclusion of Sprint acquisition

Revenue by operator
Q2'20, BUSD



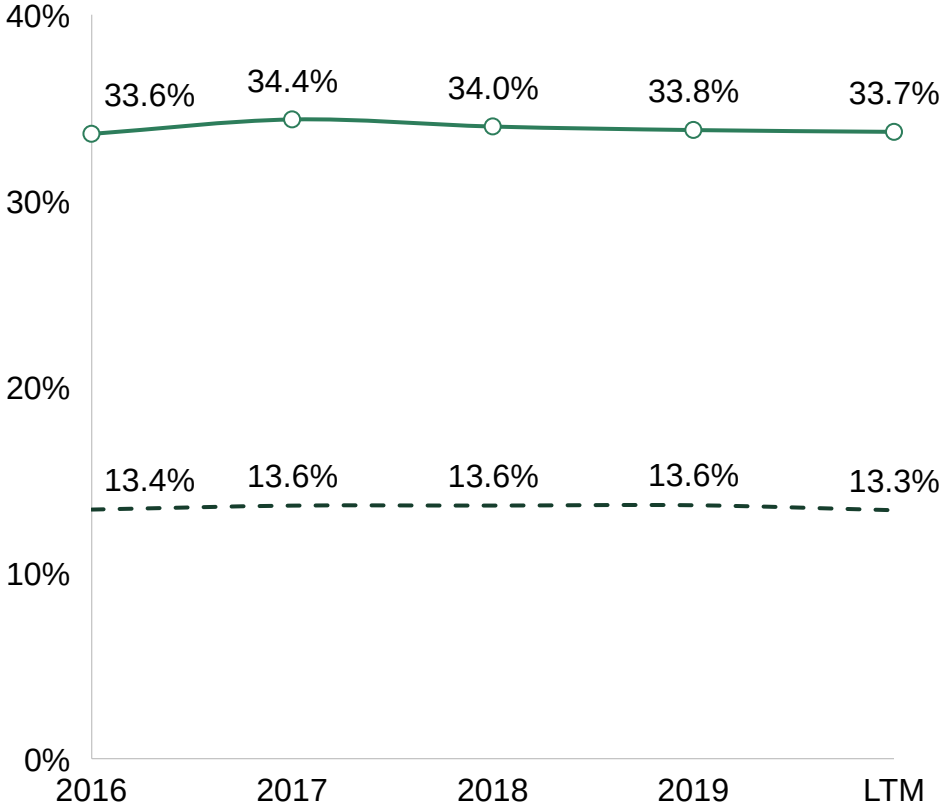
Revenue development by operator
Delta (Q2'20 vs. Q2'19), %



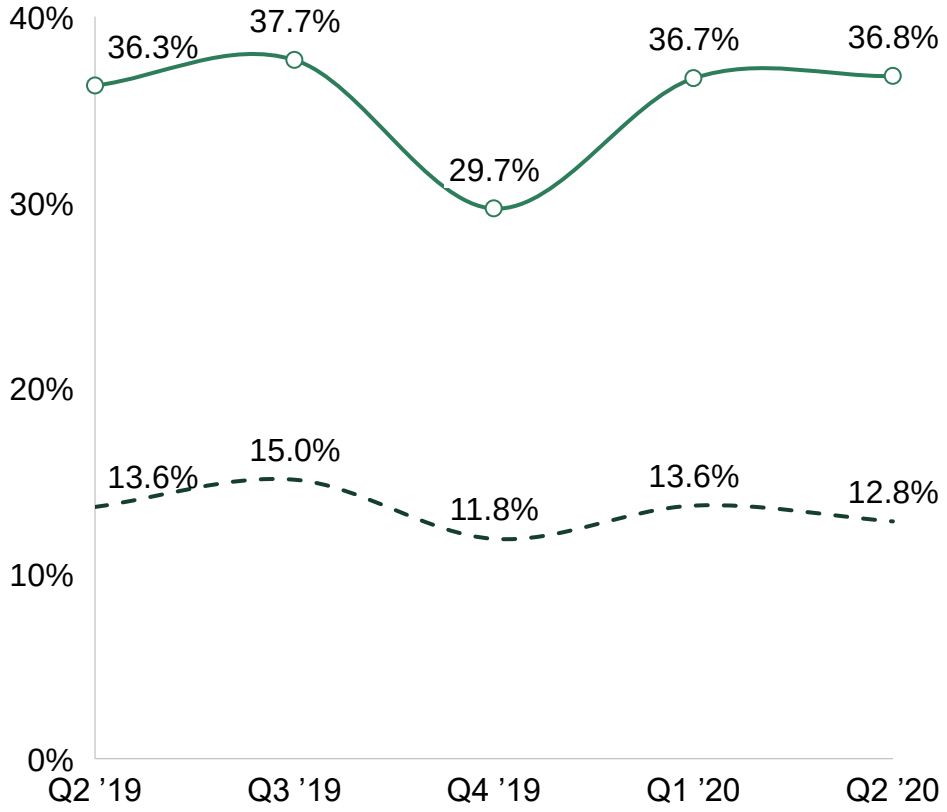
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Minor YoY developments for EBITDA and NOPAT margins were observed for Q2'20, and profitability has been stable from 2016 to LTM

Yearly profitability development
2016 - LTM, %



Quarterly profitability development
Q2'19 – Q2'20, %

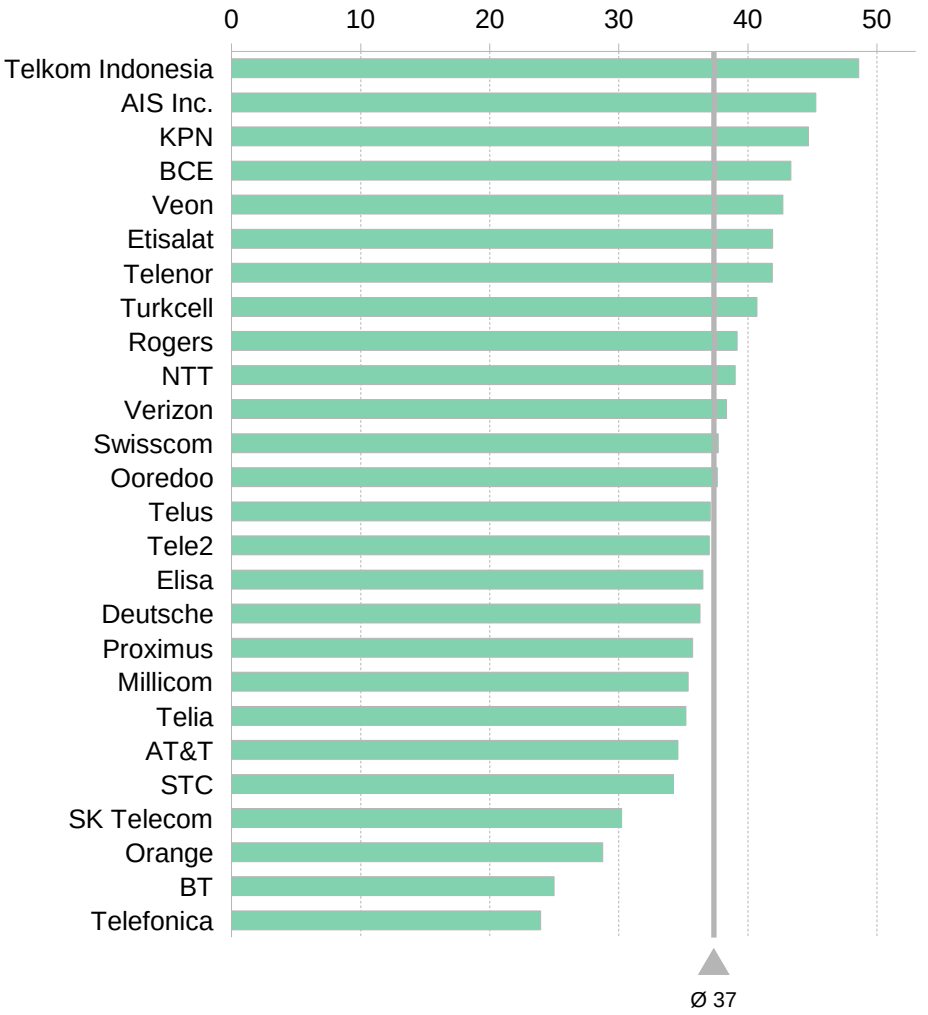


EBITDA margin — NOPAT margin

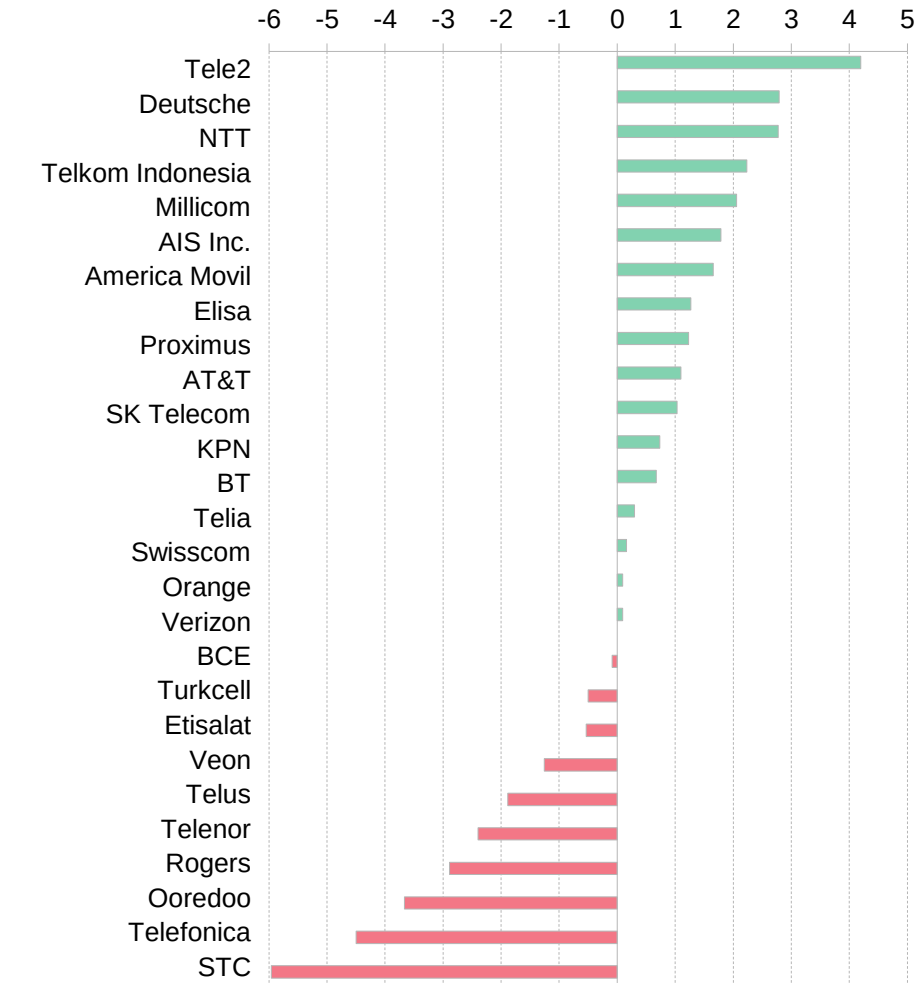
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Tele2 improved its EBITDA margin by 4.2 p.p. while STC had the largest decline of ~6% YoY in Q2'20

EBITDA margin by operator
Q2'20, %



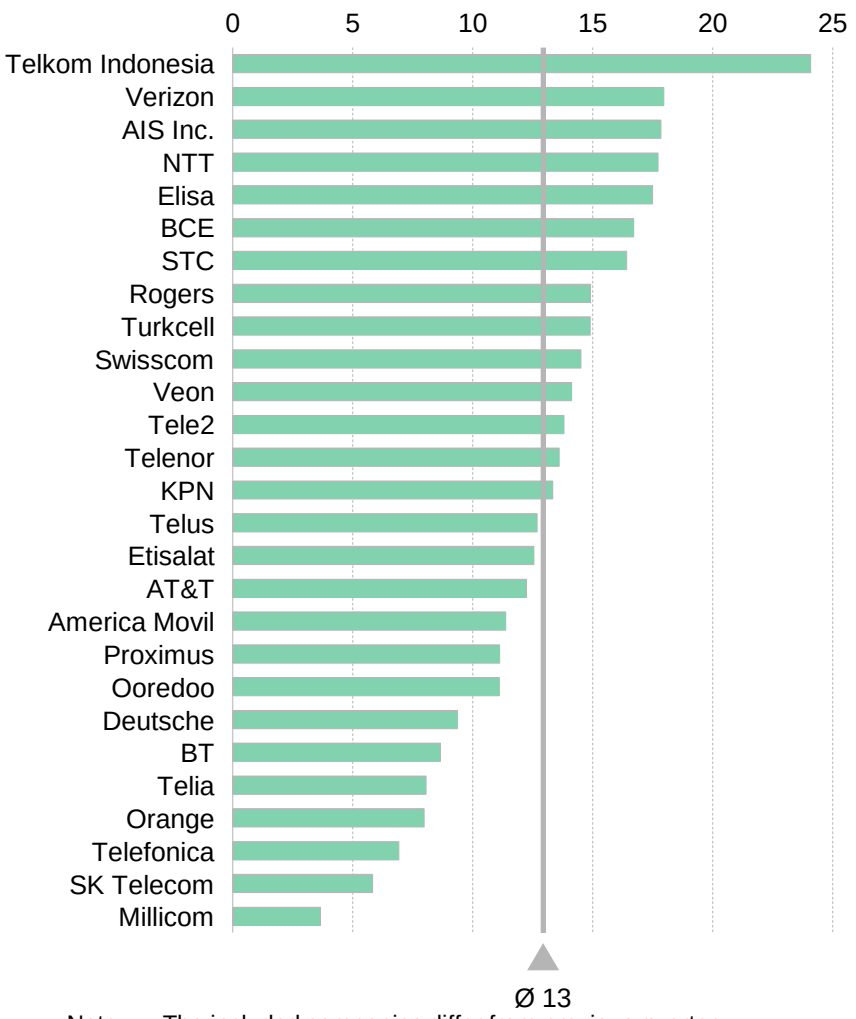
EBITDA margin development by operator
Delta (Q2'20 vs. Q2'19), p.p.



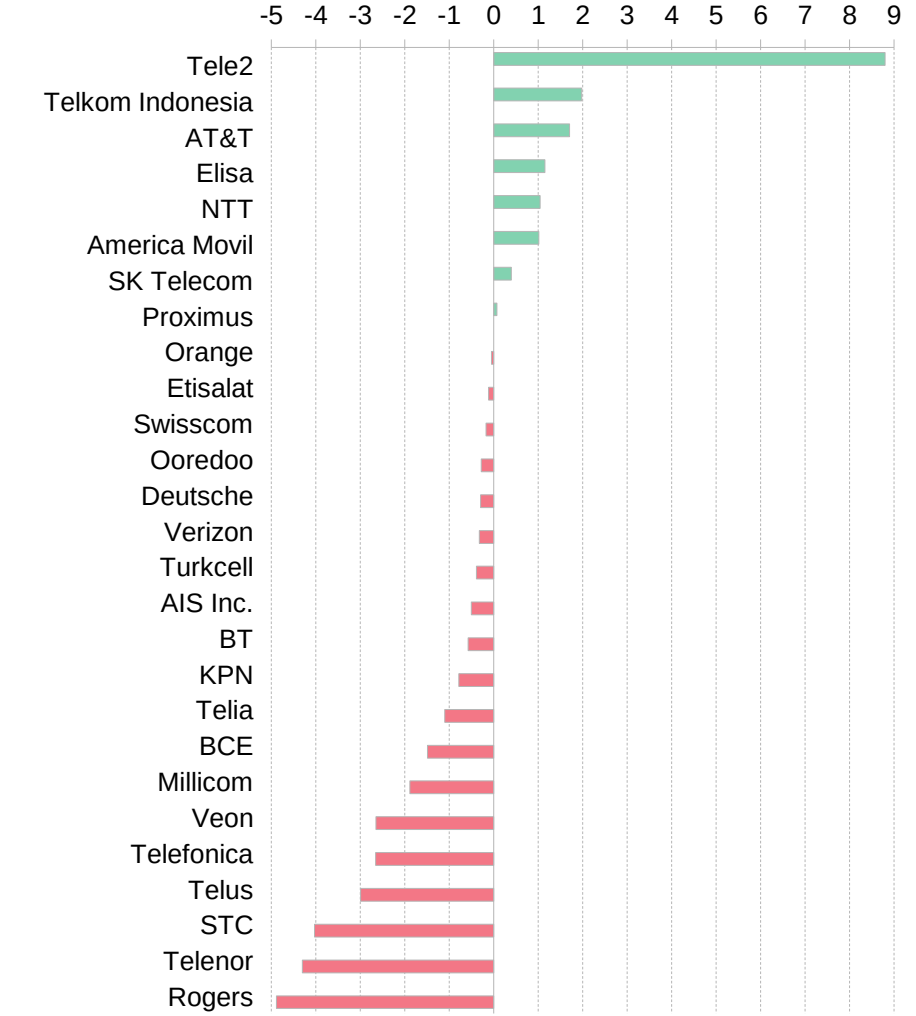
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Average NOPAT margin of the operators was 13% in Q2'20 - Tele2's margin had the highest growth of 9 p.p. YoY

NOPAT margin by operator
Q2'20, %



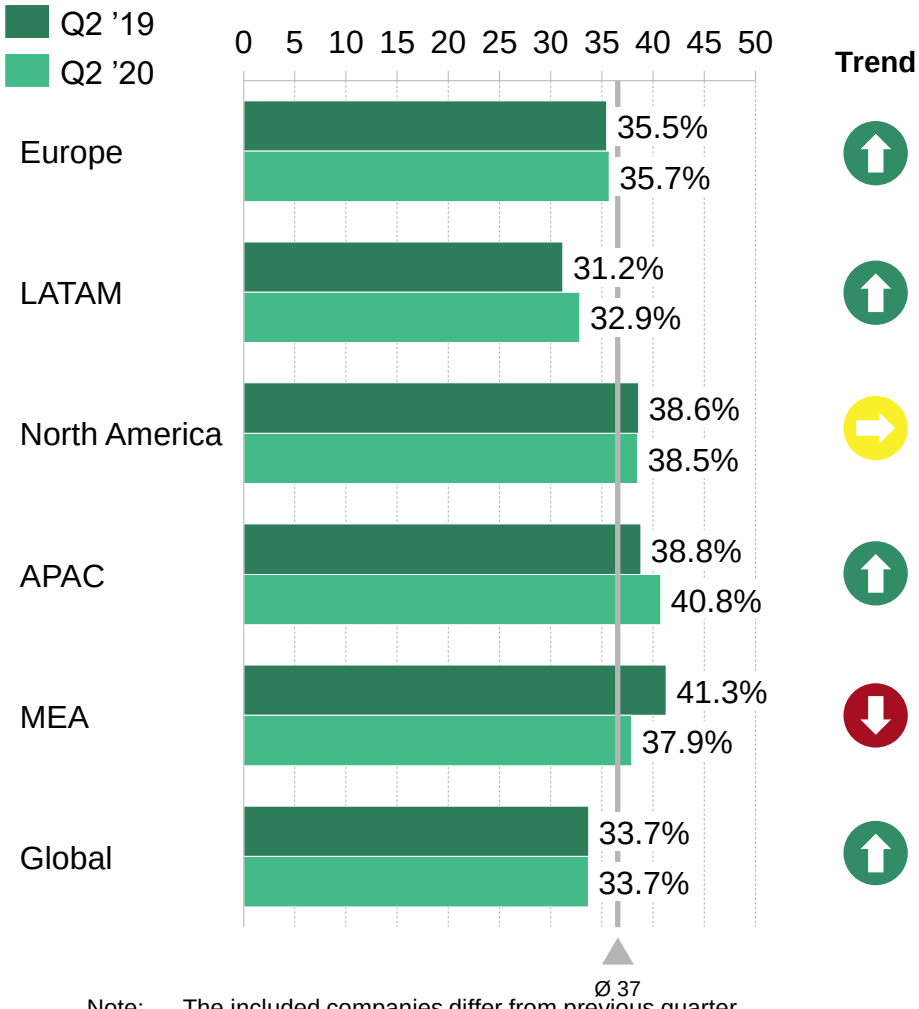
NOPAT margin development by operator
Delta (Q2'20 vs. Q2'19), p.p.



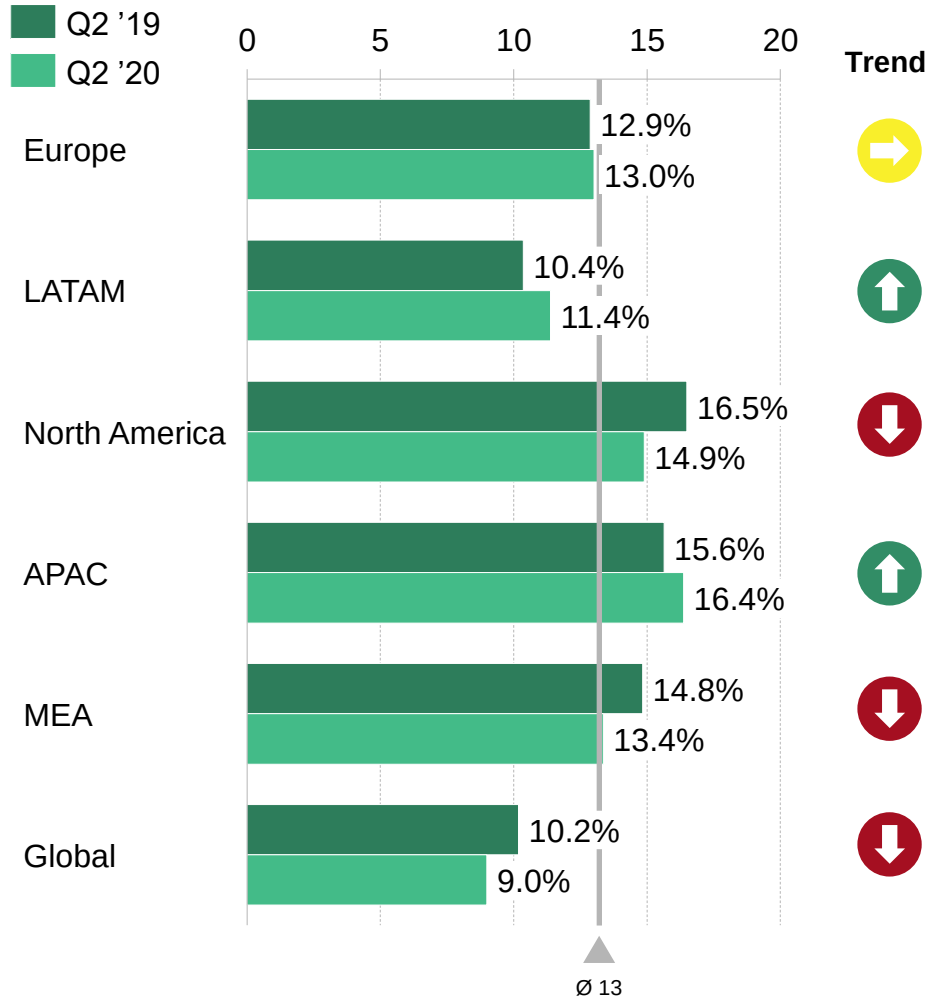
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

North America, Middle East & Africa and Global operators all experienced small declines in NOPAT

Average EBITDA margin by region

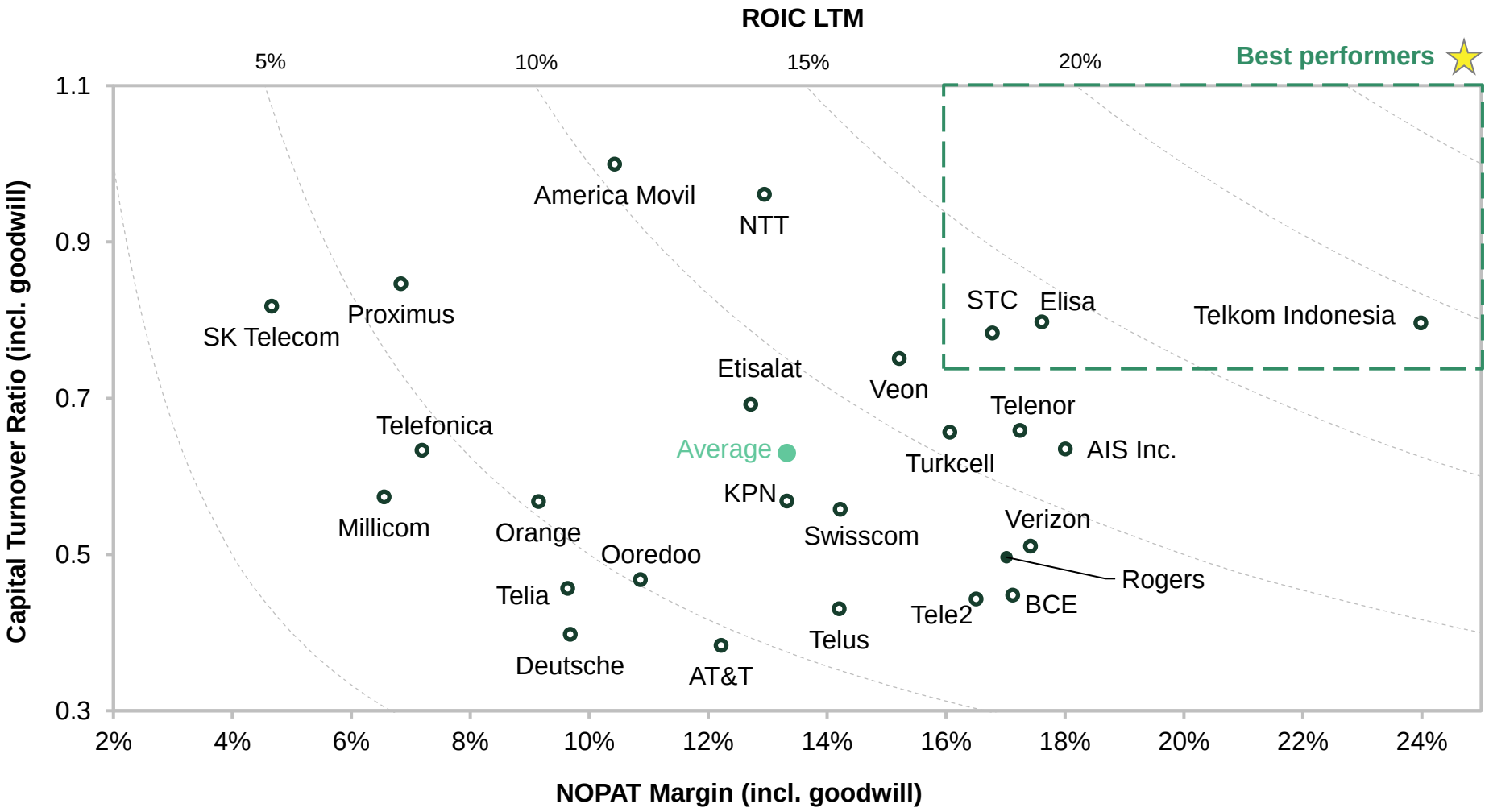


Average NOPAT margin by region



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

ROIC performances varied between 4% and 19% for operators with STC, Elisa, and Telkom Indonesia performing the best during last 12 months

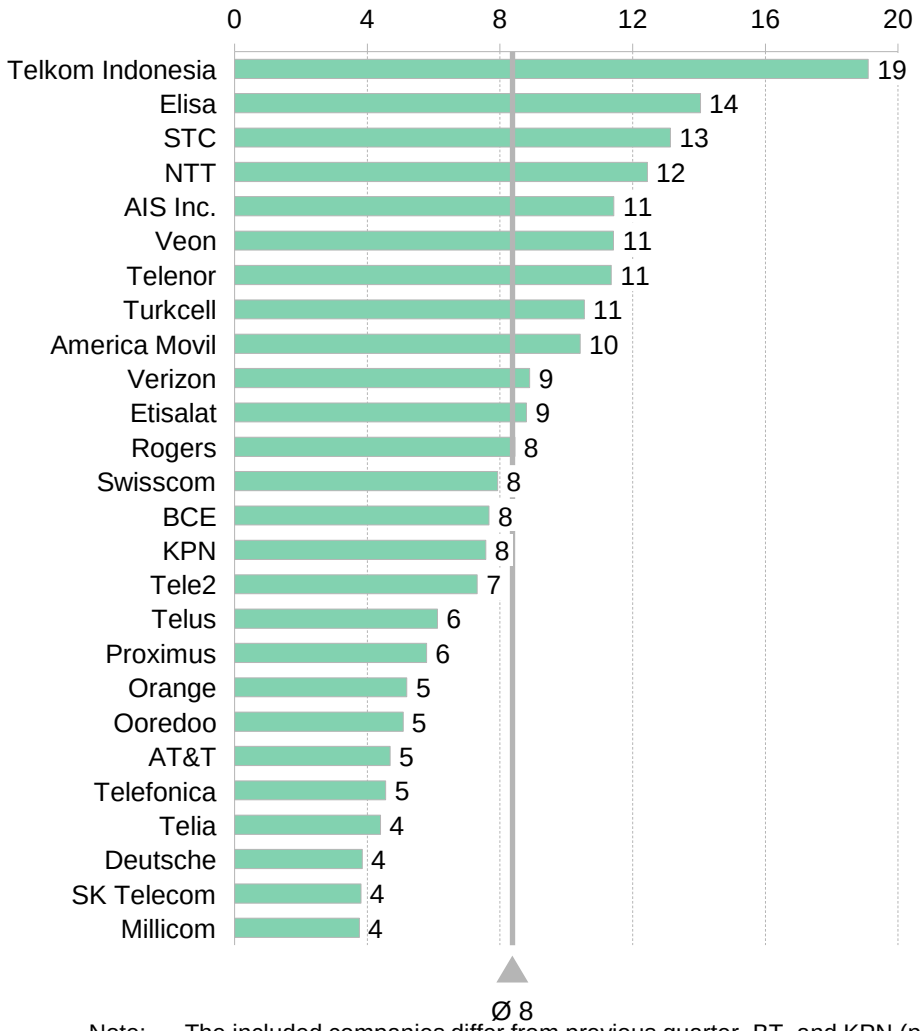


Notes: ROIC = Return on Invested Capital (actual return that the company has generated after tax). BT excluded from ROIC analysis due to missing data. The included companies differ from previous quarter.

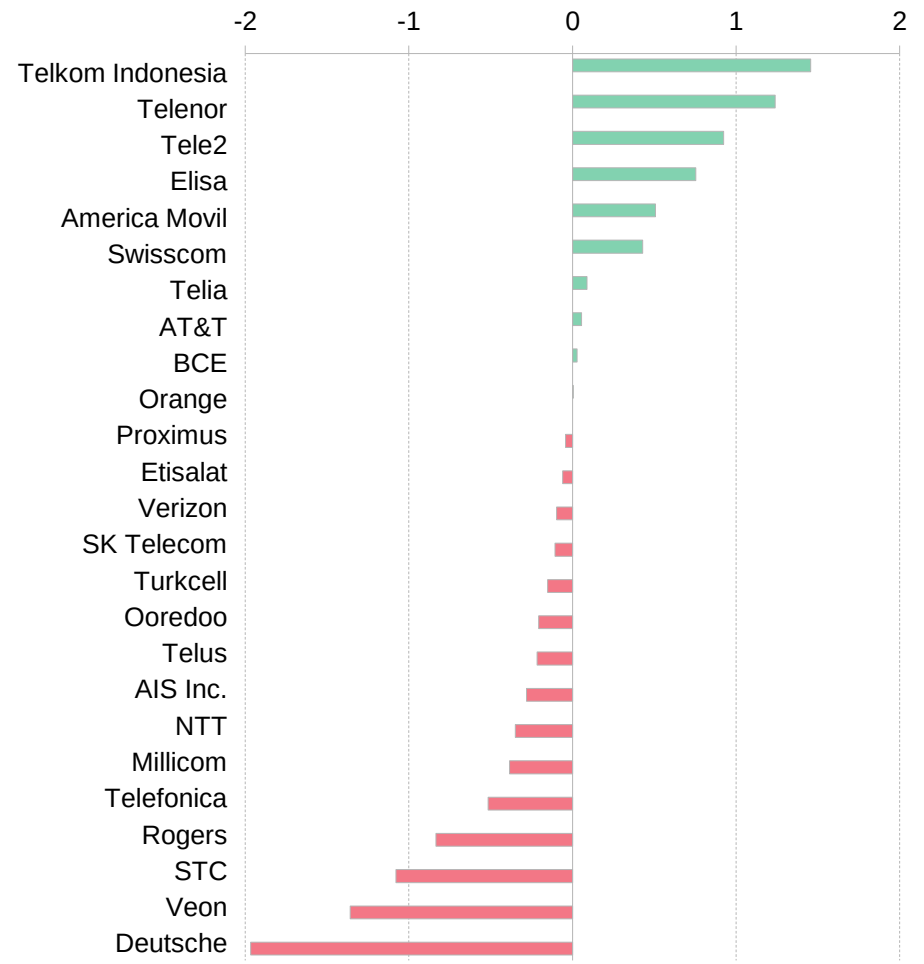
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

ROIC of operators averaged at 8% in the LTM, and Deutsche Telekom had the largest ROIC decline of 2 p.p. due to acquisition of Sprint

ROIC by operator
LTM (Q3' 19 – Q2' 20), %



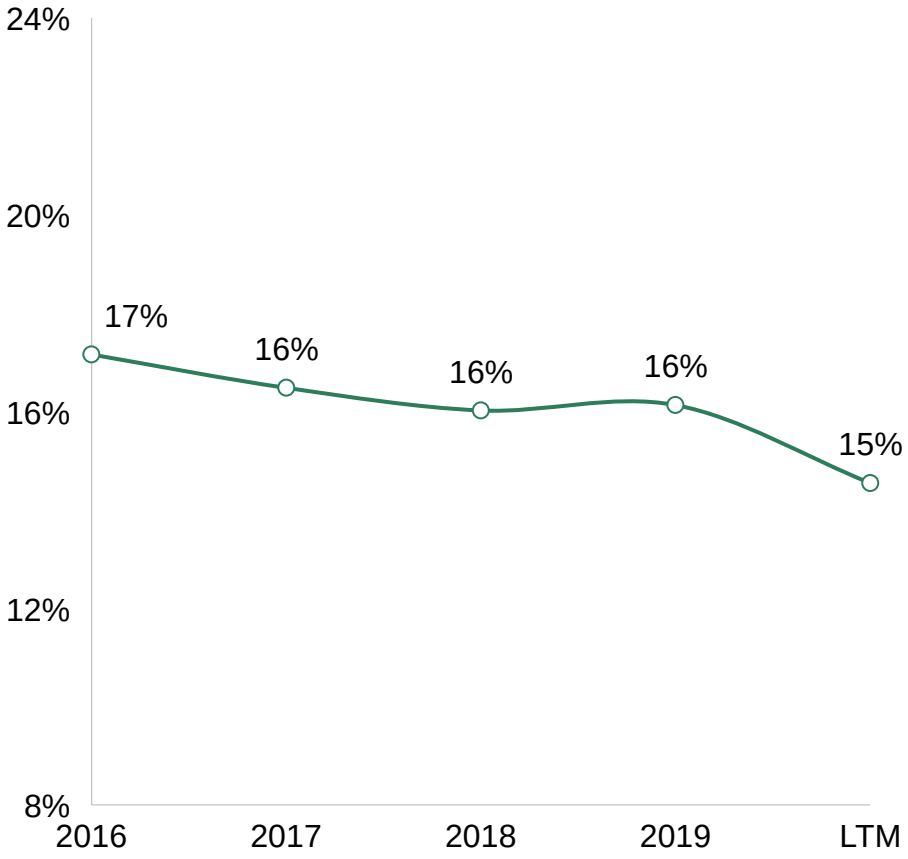
ROIC development by operator
Delta (LTM vs. LTM-1), p.p.



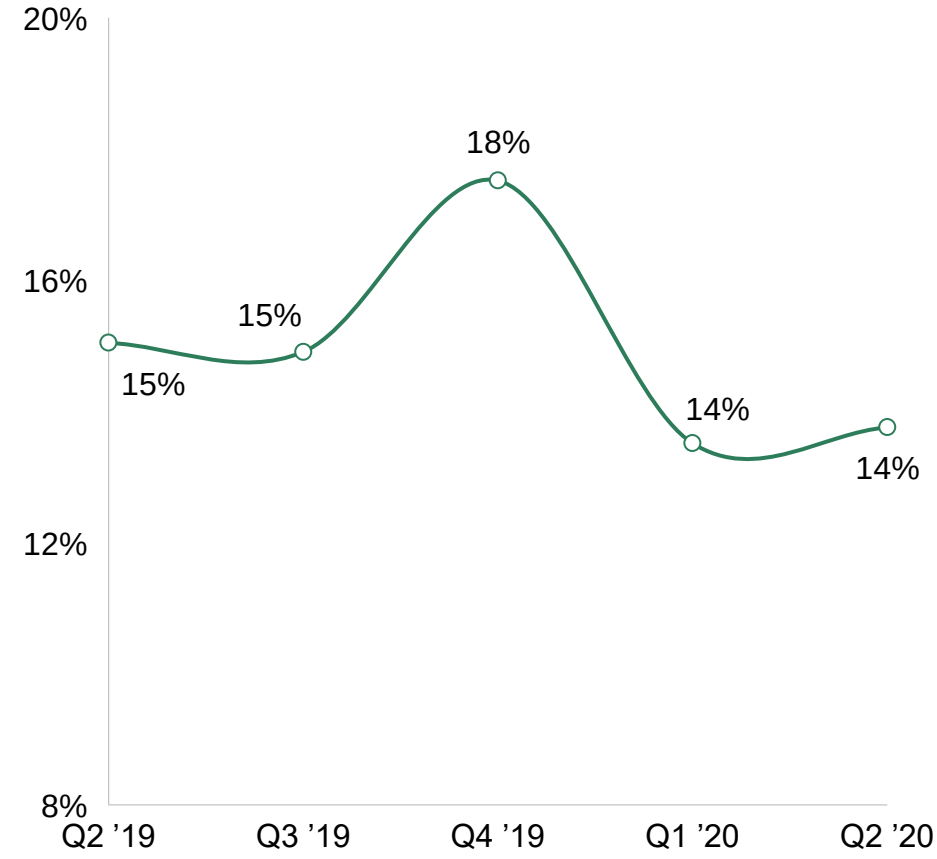
Note: The included companies differ from previous quarter. BT and KPN (partially) excluded from ROIC analysis due to missing data.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

CAPEX of operators leveled with the previous quarter due to the persisting impact of COVID-19

Yearly CAPEX over sales development
2016 - LTM, %



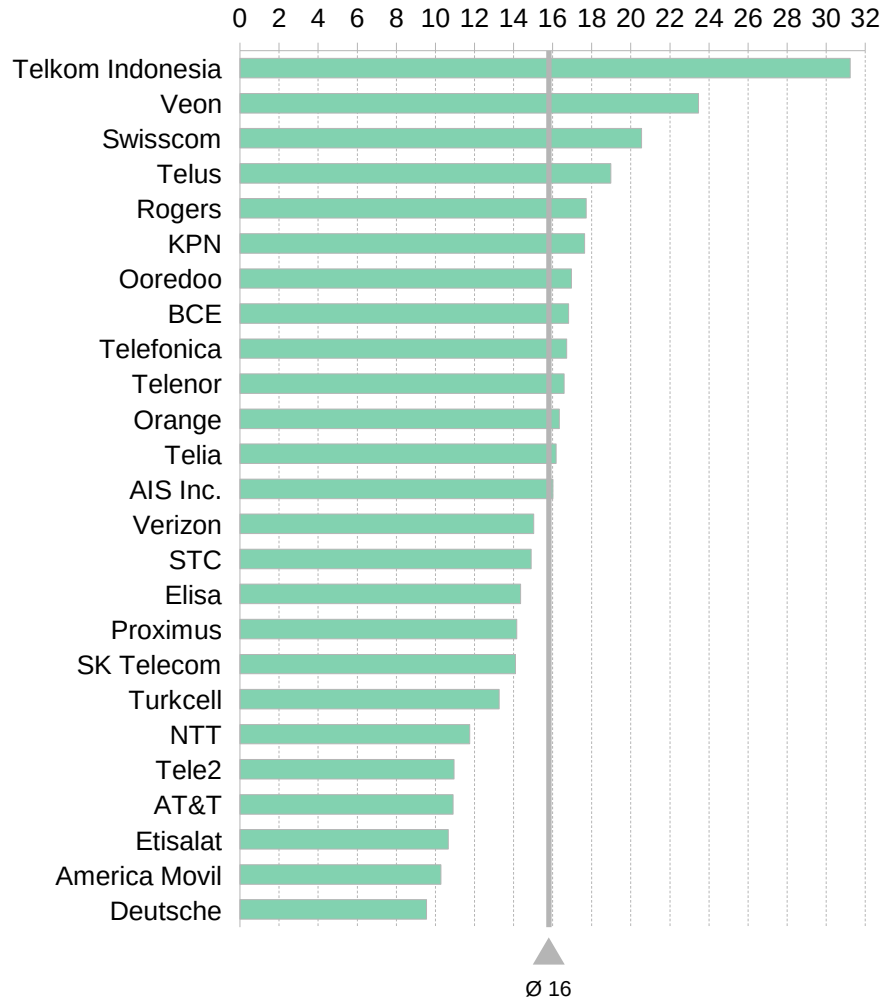
Quarterly CAPEX over sales development
Q2'19 – Q2'20, %



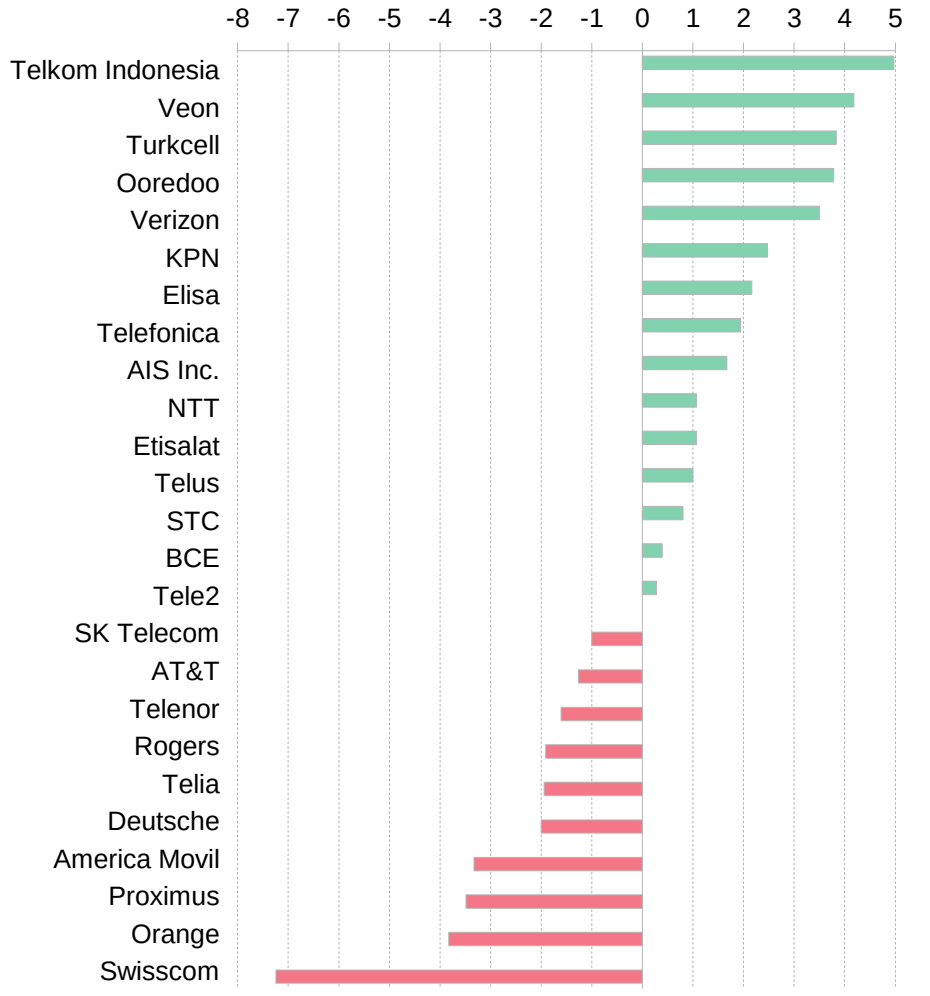
Note: The included companies differ from previous quarter.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

The average CAPEX ratio was 16% in Q2'20 – Telekom Indonesia had the highest ratio of 31.2% and the largest increase in CAPEX YoY of 5 p.p.

CAPEX over sales by operator
Q2'20, %



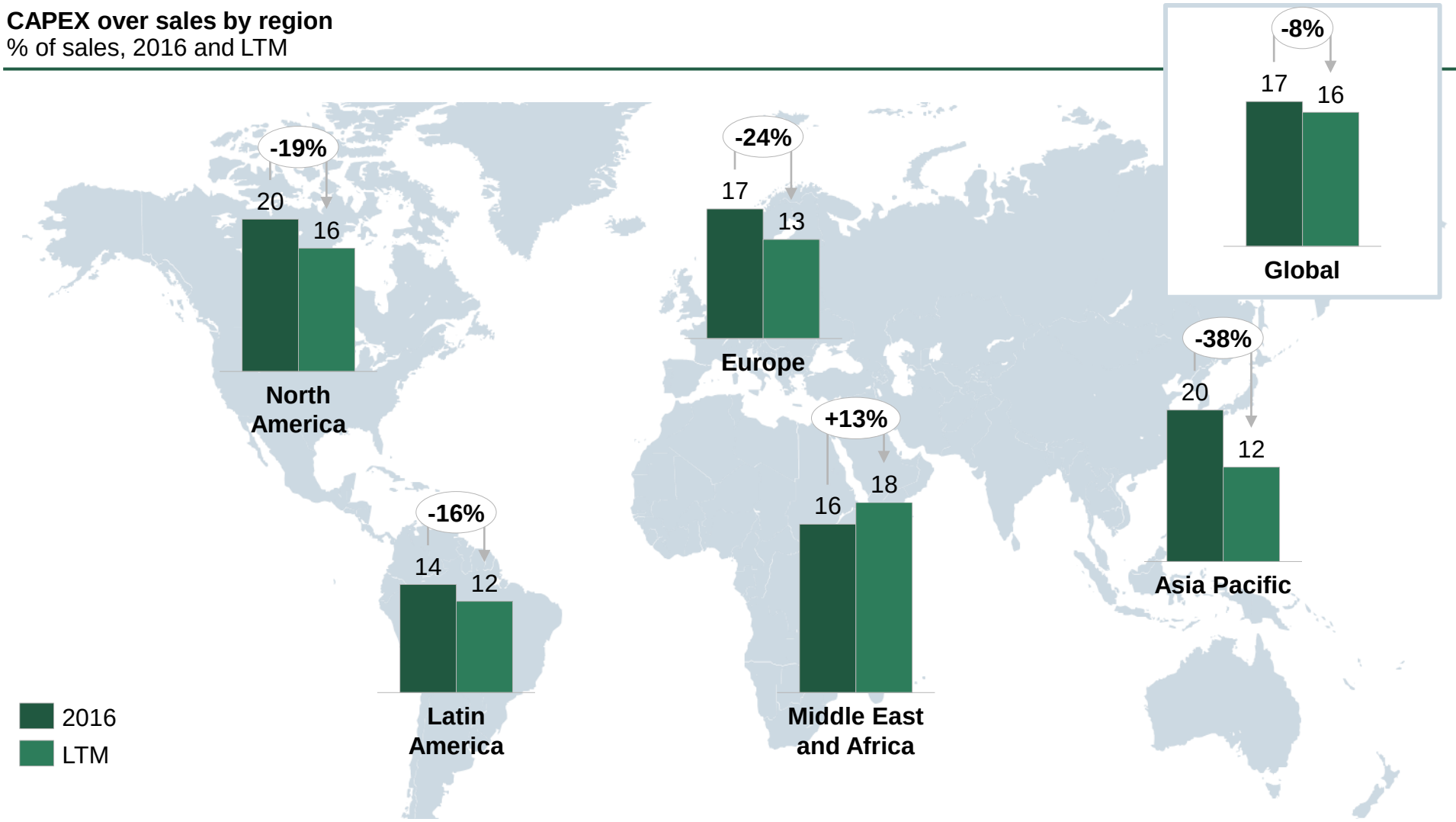
CAPEX over sales development by operator
Delta (Q2'20 vs. Q2'19), p.p.



Note: The included companies differ from previous quarter. BTand Millicom are excluded from CAPEX analysis due to missing data.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

CAPEX of telecom operators declined for all regions except the Middle East and Africa in the last twelve months when compared to 2016

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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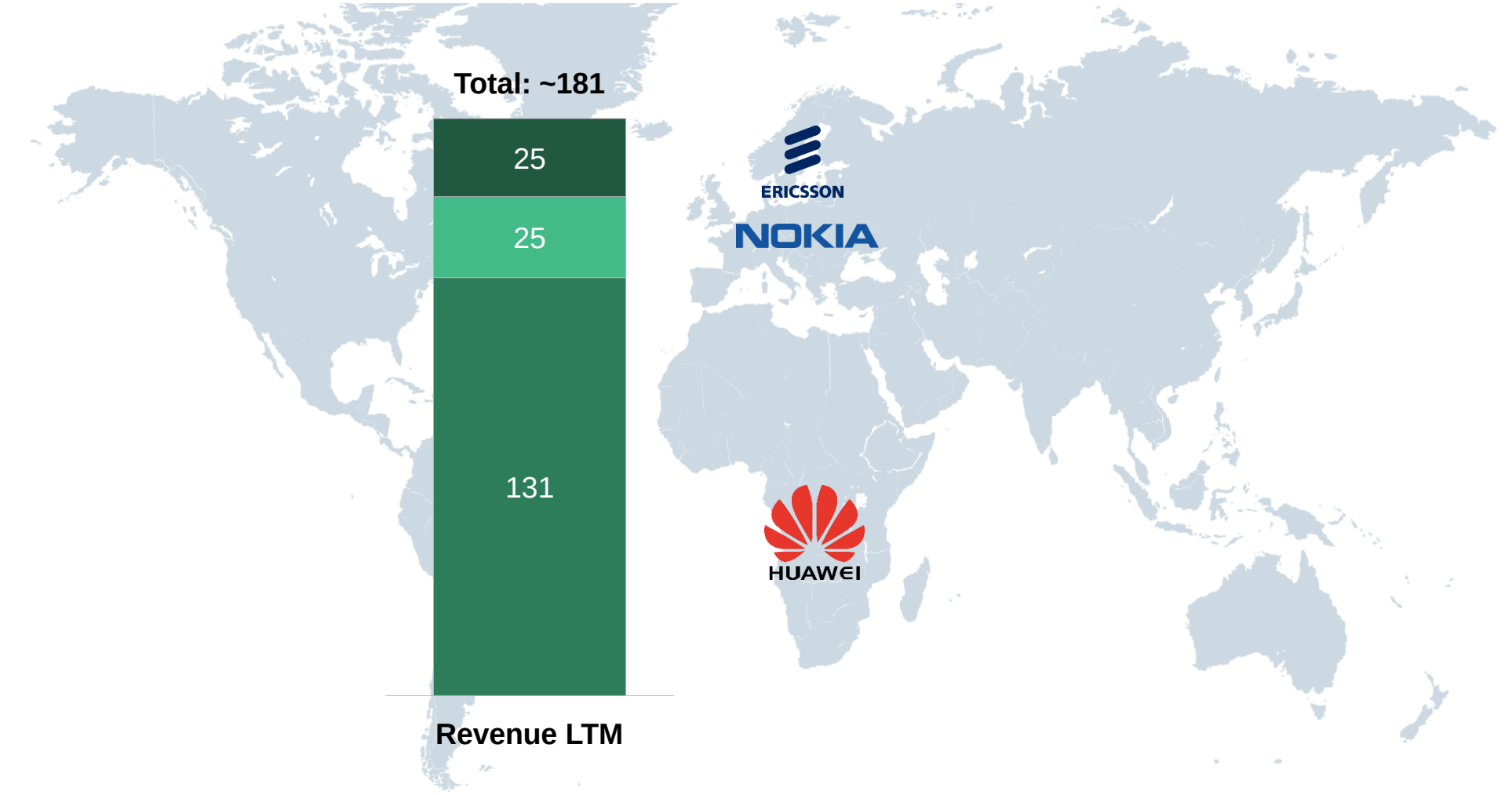
The Q1 2020 report includes the three major infrastructure players

Report overview
Revenue in BUSD



Note: Revenue based on group revenue
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Key takeaways from the Infrastructure OEM segment

Key takeaways

Creating Shareholder Value	1. Ericsson's ROIC, highest among peers, reached 19.8% in Q2'20 2. A 17 p.p. decline in Huawei's ROIC was recorded for the LTM, the significant fall was the direct result of trade bans imposed
Revenue Performance	1. Revenue of all major players started to recover in Q2'20, however, Nokia still endured a 12% YoY decrease 2. As best performer, Huawei's revenues from the carrier segment experienced a 9% YoY increase
Margin Performance	1. Nokia increased its EBITDA margin in Q2'20 to 12% from 6% in Q1'20 2. Ericsson continues to be the most profitable, outperforming the others in terms of both EBITDA and NOPAT margins
Capital Efficiency	1. Nokia chronically suffered low fixed asset turnover rate, which has been at least 50% lower than its peers 2. Huawei displayed significant decline in capital turnover rate in LTM, mainly attributable to approx. 40-day increase in DSI

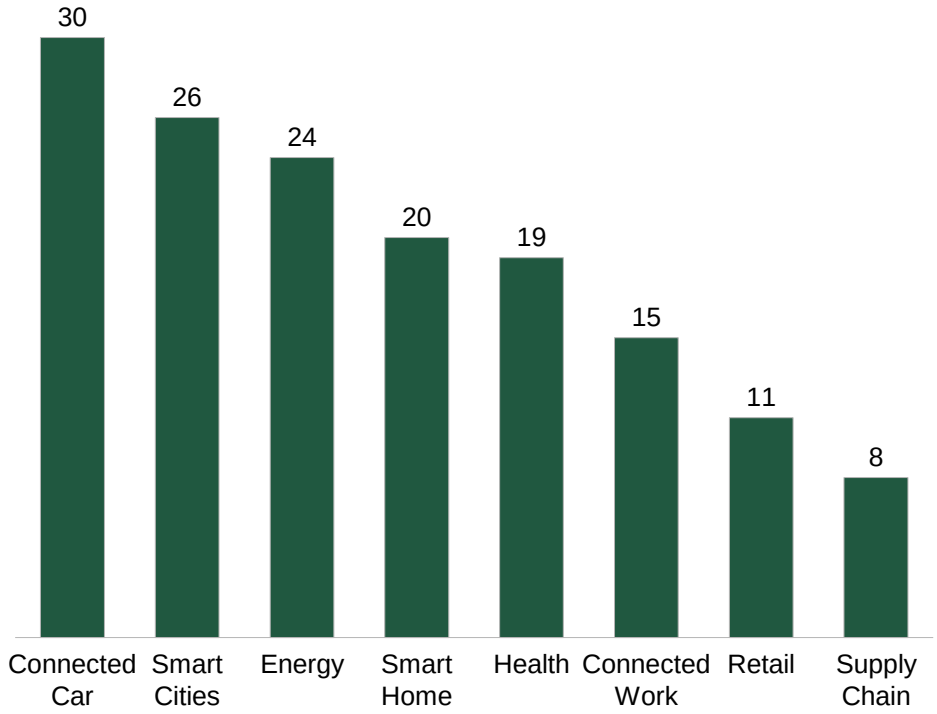
Note: Comprehensive Huawei LTM data missing.

Events across the Infrastructure OEMs sector from the last 3 months

News and happenings for infrastructure OEMs

Jun-2020	**Deutsche Telekom** and **BCE** selected **Ericsson** 5G RAN to support nationwide mobile and fixed wireless access deployment. **Telefonica Deutschland** will build its 5G core mobile network using **Ericsson** equipment.
Jun-2020	**Nokia** won a $450 million contract to become **Taiwan Mobile's** sole 5G network supplier. Meanwhile in Singapore, **Starhub** and **M1** announced **Nokia** as the supplier for its main 5G infrastructure.
Jul-2020	**Huawei** is cutting 50% of its India revenue target for 2020 and is laying off more than half of its local staff. The downsizing is a direct response towards rising tension between India and China, as well as Indian government's alleged ban on the use of Chinese network gears.
Jul-2020	UK banned mobile network providers from purchasing new **Huawei** 5G equipment, existing Huawei network components are to be removed by 2027.
Jul-2020	True, with 30% of Thailand's mobile market, will adopt **ZTE**'s 5G RAN products and services.
Aug-2020	Swiss mobile network operator and 5G pioneer, **Sunrise**, has deployed **Nokia's** cloud-native converged charging software to help it speed up the monetization of its 5G network.

CAGR of M2M connection growth by vertical (2018 – 2023)
Unit: percent

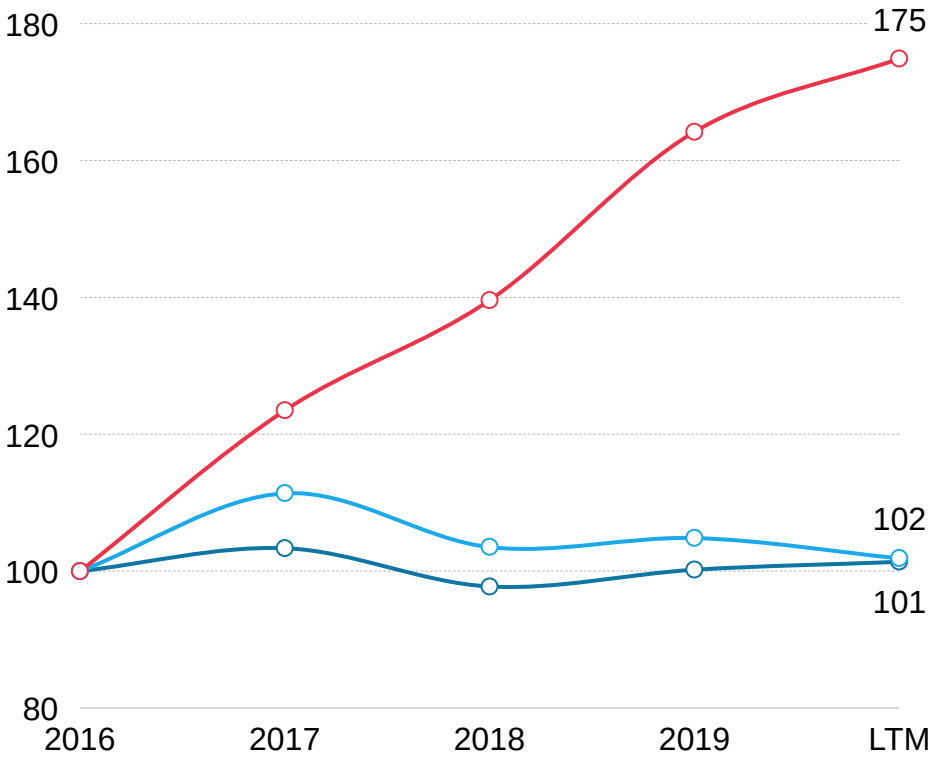


Smart home connections will account for around 50% of M2M connections in 2023. Deployment of video applications on M2M will accelerate traffic growth dramatically.

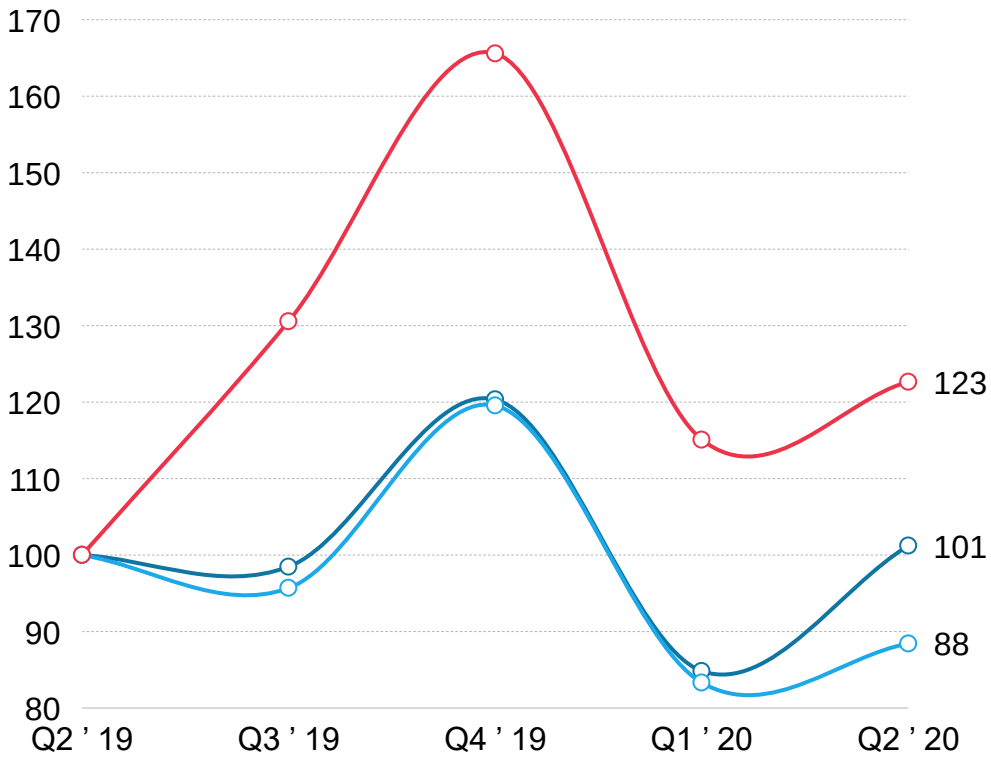
Source: Press & News, Statista, Cisco, Applied Value Analysis

The revenue of major infrastructure players has begun to recover from the impacts of COVID-19

Indexed Yearly revenues
2016 to LTM (index 2016=100)



Indexed Quarterly revenues
Q2'19 – Q2'20 (index Q2'19=100)

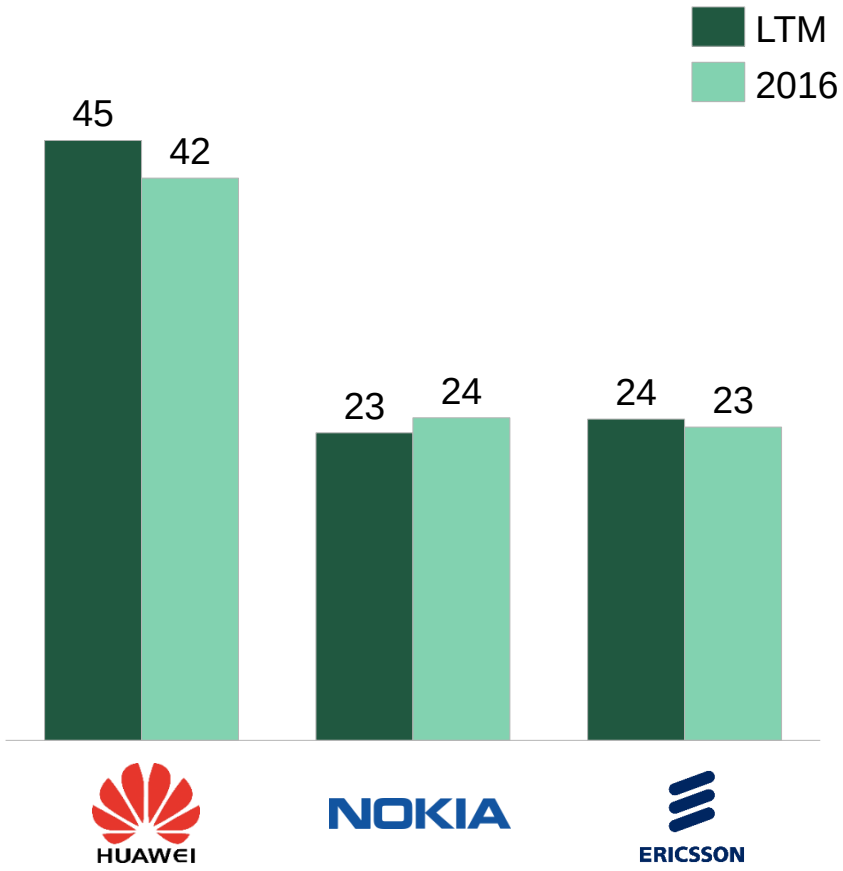


Ericsson Nokia Huawei

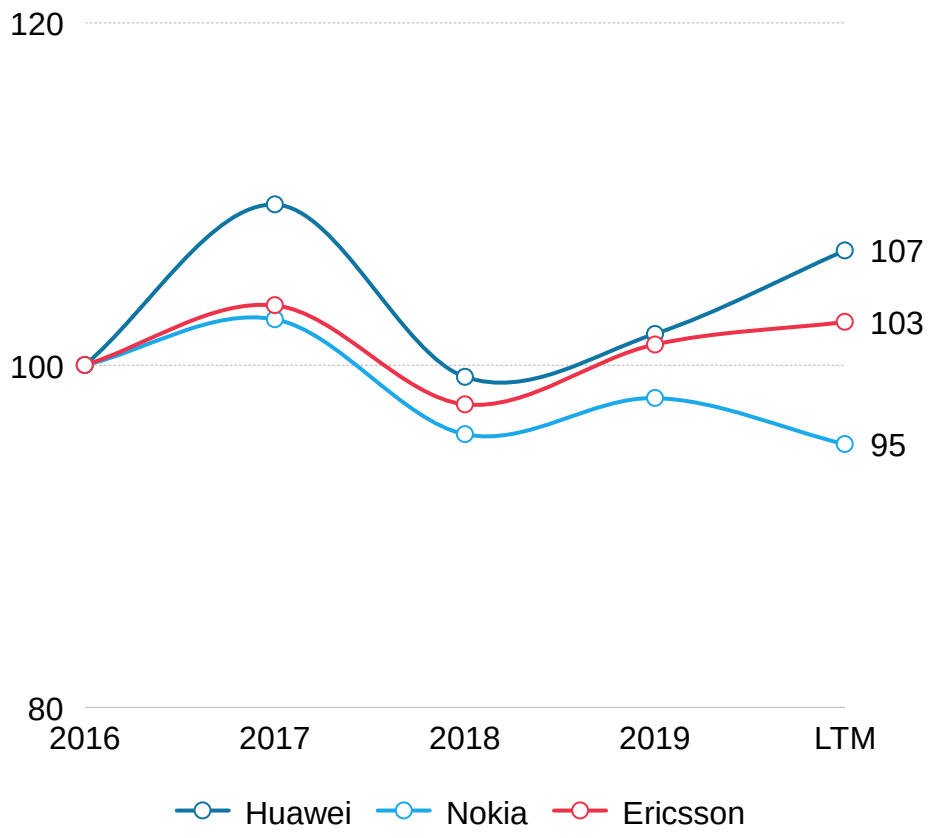
Notes: Fiscal years are used in the yearly analysis. Huawei reports annually.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Given bans from multiple countries, Huawei maintains the market leader position, and growth is stagnated throughout the segment

Segment revenues
2016 - LTM, BUSD

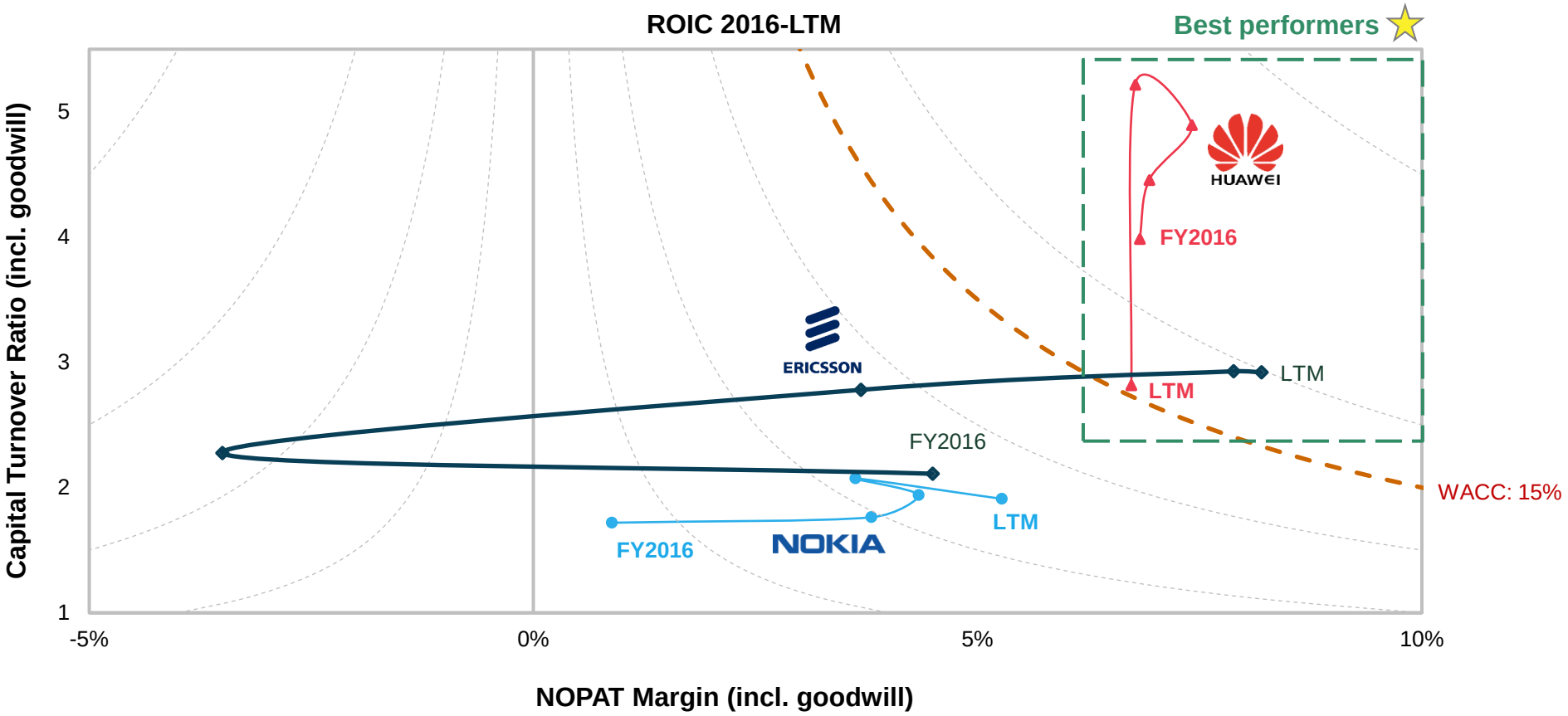


Indexed yearly segment revenues
2016 – LTM (index 2016=100)



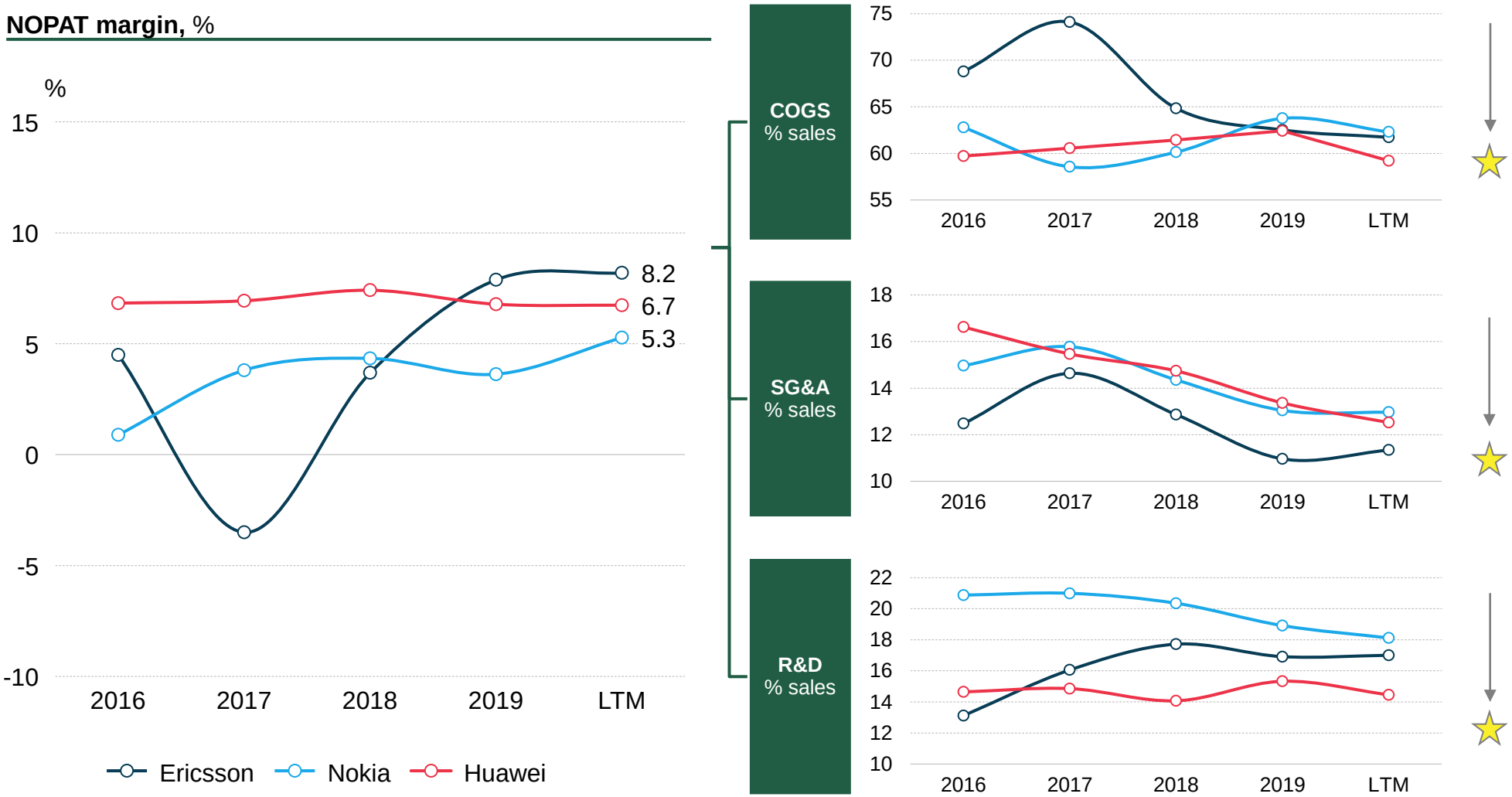
Note: Included segments per company: Huawei (Carrier), Ericsson (Networks, Digital Services, Managed Services), Nokia (Networks, Software).
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Ericsson had the highest ROIC in LTM at 19.8% among the peer group, while Huawei experienced sharp decline of 17.2 p.p.



Note: Fiscal years are used in the yearly analysis. Huawei reports annually.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

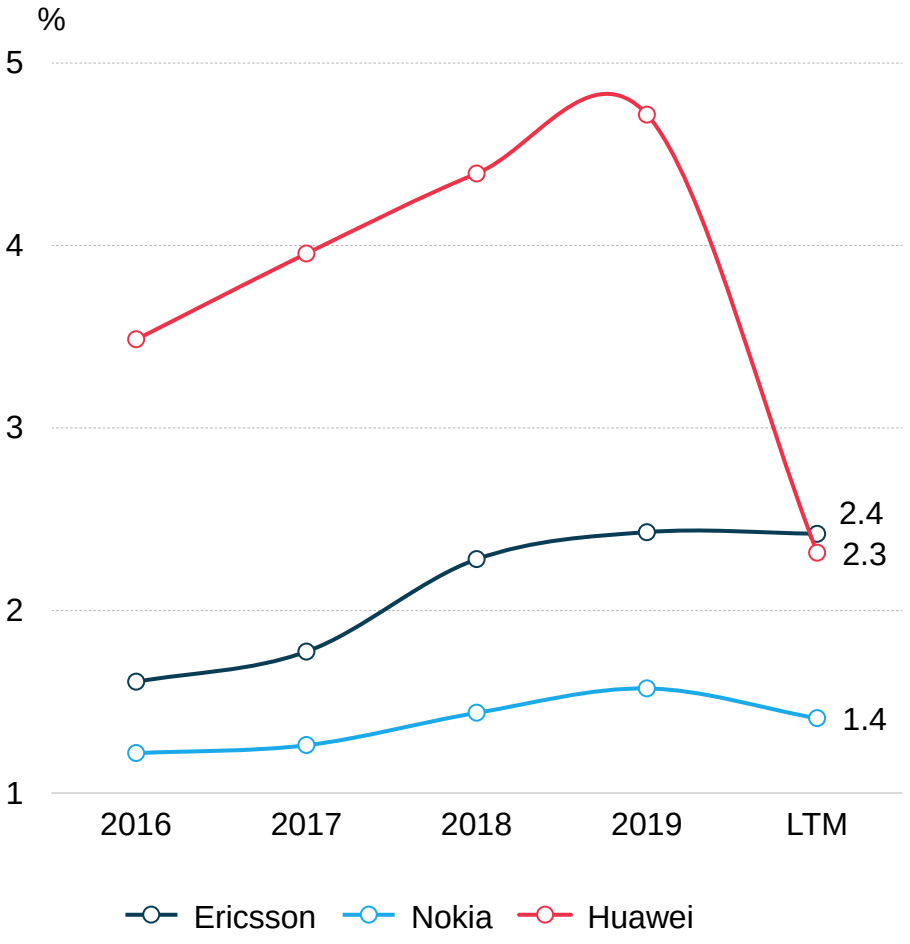
By reducing its COGS and SG&A ratio, Ericsson managed to achieve the highest cost efficiency among its peers

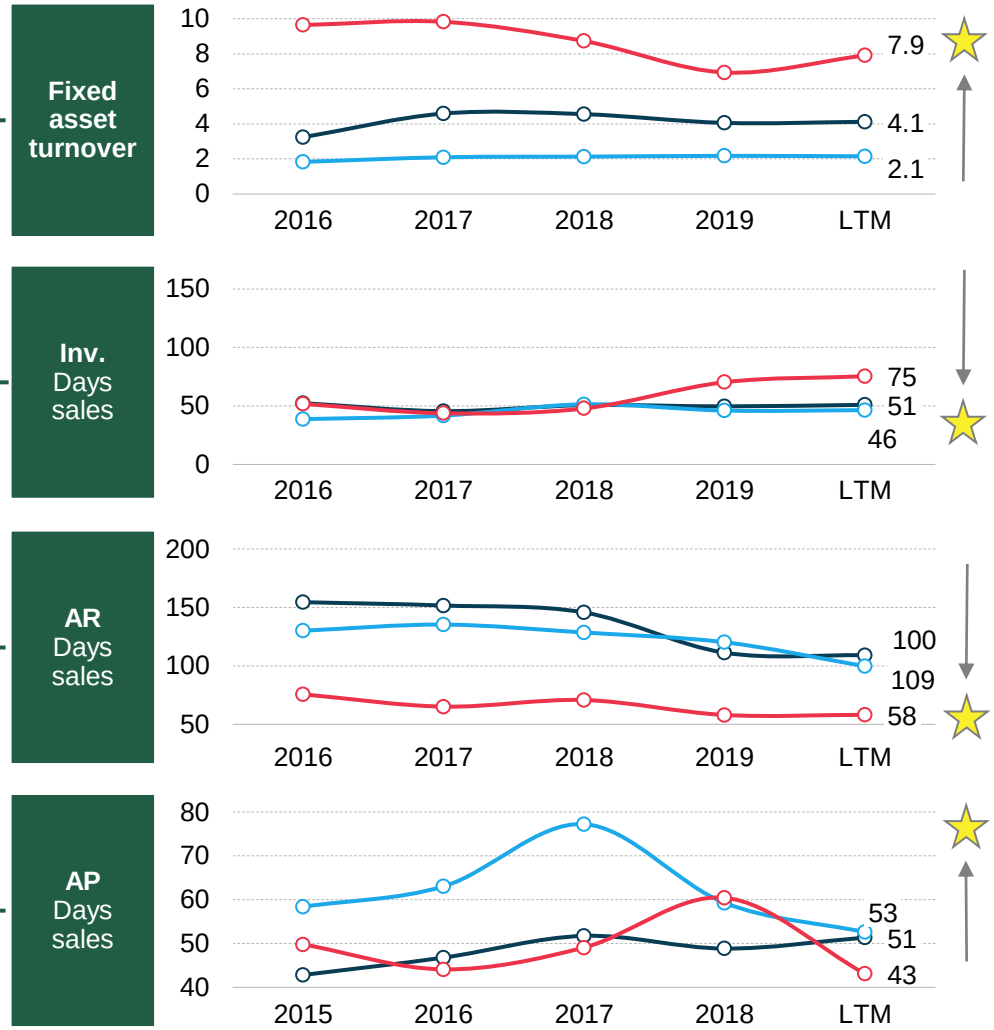


Notes: Fiscal years are used in the yearly analysis. Huawei reports annually.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Ericsson outperforms its peers with a small CTR advantage, and DSO of Huawei is around 50% lower than the other major players

Capital turnover ratio (CTR)



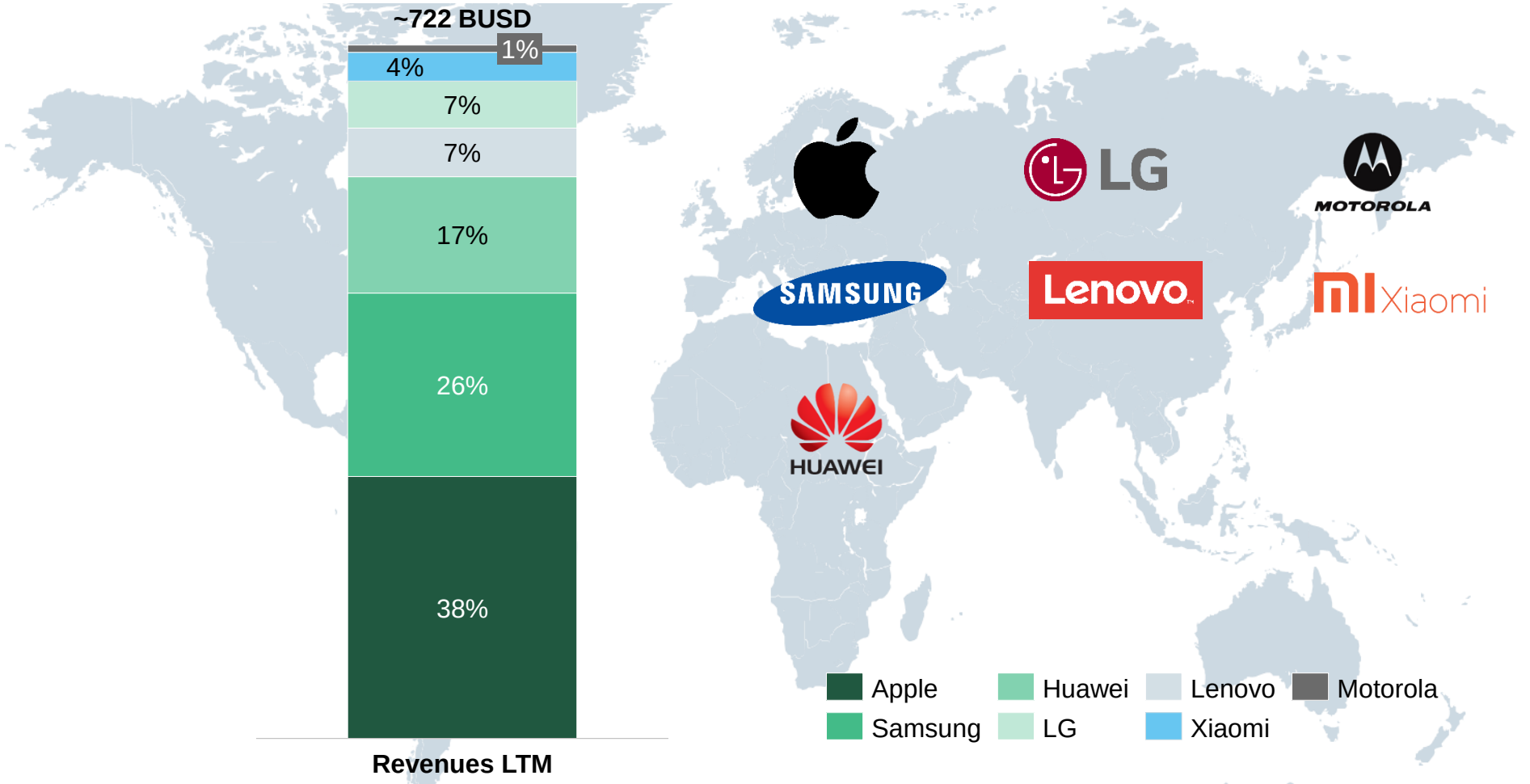


Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Contents

The Q2 2020 report includes seven major device manufacturers

Report overview
Revenue in BUSD, LTM



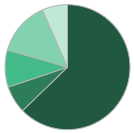
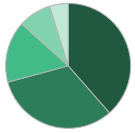
Note: Revenue based on group revenue
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Key takeaways from the Device OEM segment

Key takeaways

Creating Shareholder Value	1. ROIC of Samsung has been falling sharply since 2018 due to substantial increase in COGS 2. Apple consistently achieved ROIC of over 100% from 2016 to LTM, while ROIC of other major players capped at 33% during the same period
Revenue Performance	1. Huawei's revenue increased 49% Q-o-Q in 2Q '20. Due to compounded impact of COVID-19 and sanctions, revenue growth of Huawei in H1 '20 dropped 10 pp. comparing to H1 '19 2. Q-o-Q revenue change is marginal for Apple, Samsung and Motorola, whereas a 11.6% decline is recorded for LG
Margin Performance	1. Apple and Samsung are the most profitable, with EBITDA margins of over 25% in Q2 '20 2. Apple has the largest NOPAT margin of 17.9% in LTM, followed by Motorola and Samsung at 15.6% and 9.6% respectively
Capital Efficiency	1. Samsung has the lowest CTR among its peers mainly attributable to short accounts payable period, which was 37 days shorter than its DSO in the LTM 2. Xiaomi leads its peers in fixed asset turnover, continuous improvement on this front is visible throughout the analyzed period

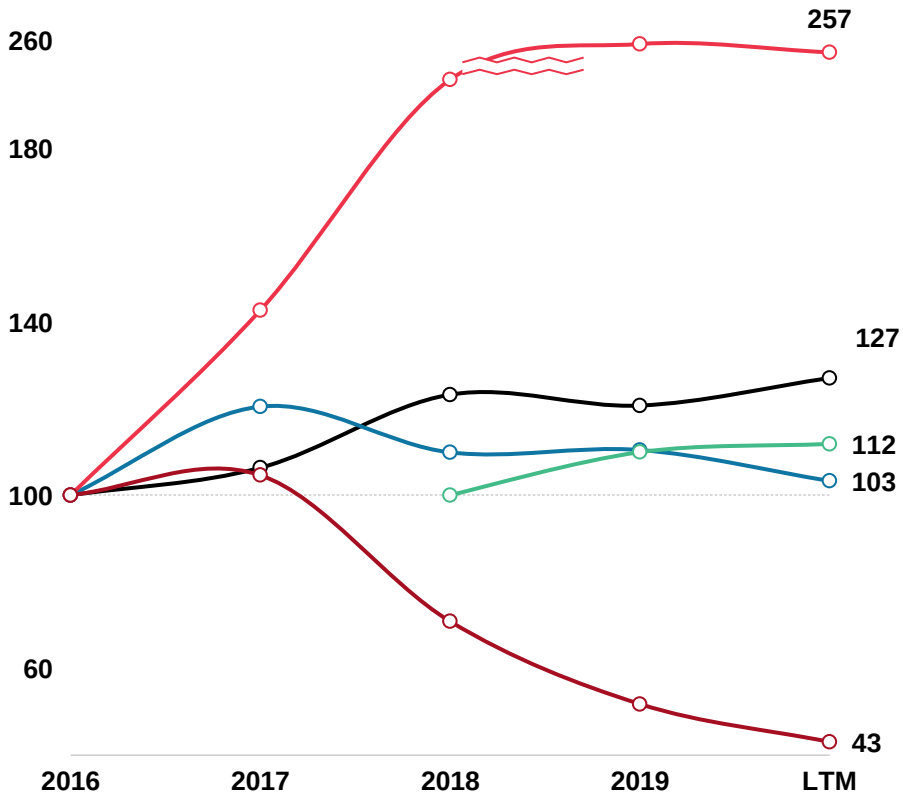
Device OEMs' business segments, revenue split and descriptions

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

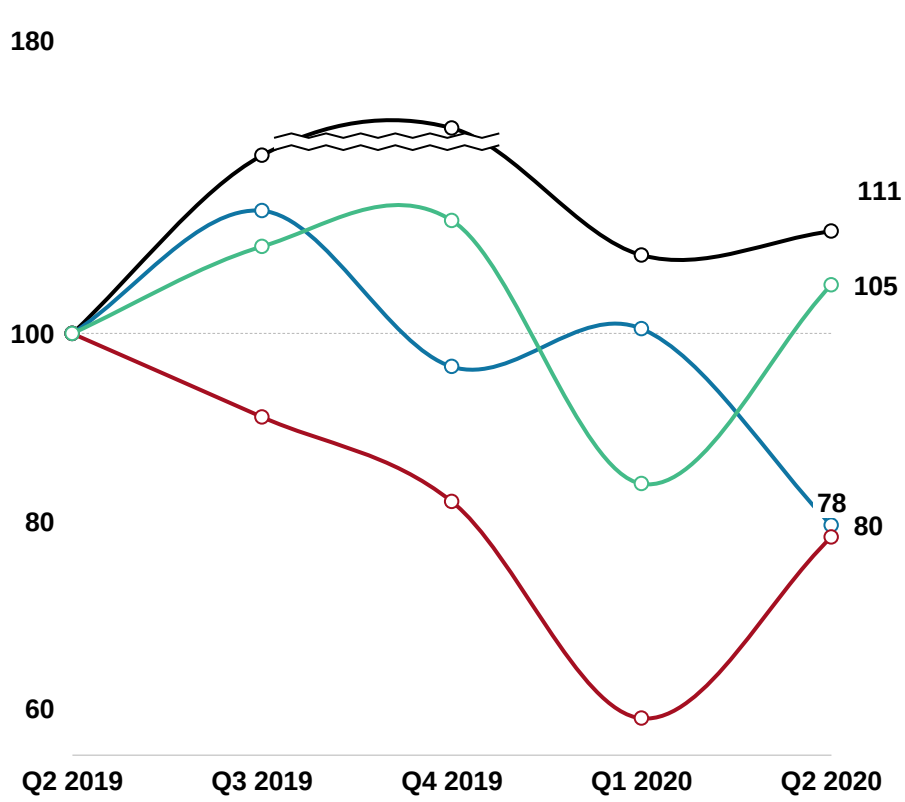
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

YoY segment revenue of Samsung dropped 20% in Q2 ’20 mainly due to closing stores in North America, Europe and India

Segment Yearly revenue development
2016 - LTM (index 2016=100)



Segment Quarterly revenue development
Q2’19 – Q2’20 (index Q2’19=100)



Apple Samsung Huawei LG Lenovo

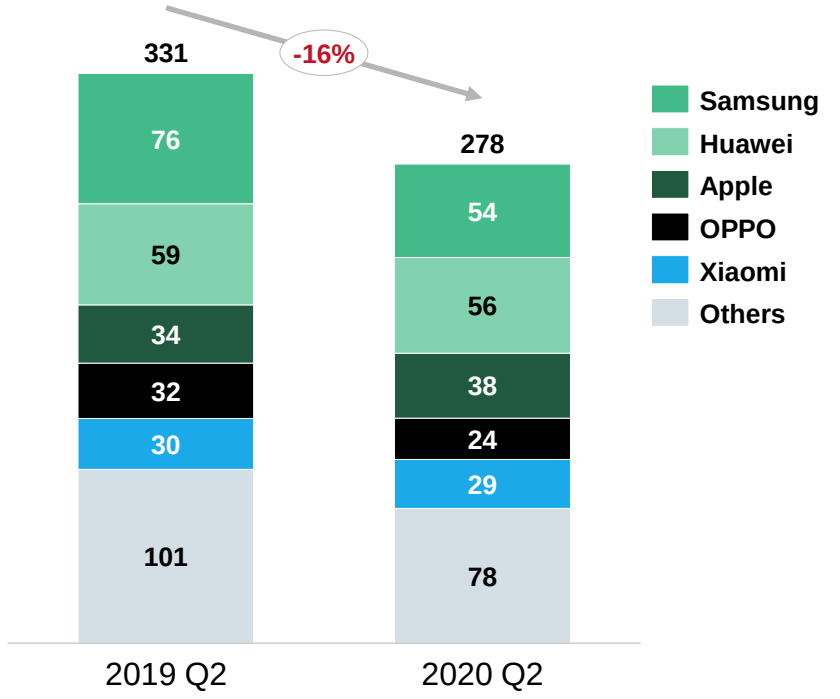
Note: Included segments per company: Huawei (Consumer business), Samsung (Information technology and mobile communication), LG (Mobile communication), Lenovo (Intelligent device), Apple (All segments)
Source: CapitalIQ, Annual/Quarterly/Half Year Reports

Global smartphone shipments continued to decline due to consumer spending contractions

News and happenings for Device OEMs

Jun-2020	**Qualcomm** released new wearable chipsets, Snapdragon Wear 4100 and 4100+ featuring longer battery life, OS at higher resolution and improved connectivity and range.
Jul-2020	India smartphone market witnessed its worst performance in recent years, the overall market declined by 48% YoY for Q2 '20. Of the market leaders, **Samsung** was hit the hardest with a 60% decline in its local sales.
Jul-2020	US smartphone sales saw a 25% YoY decline in Q2 '20 due to COVID-19. The hardest hit brands were **Motorola** (-62%) and **ZTE** (-68%), while **Apple** (-23%) and **Samsung** (-10%) were more resilient due to strong ecommerce presences.
Jul-2020	COVID-19 continues to fuel the decline in European smartphone sales, the market contracted 24% YoY for Q2'20. However, sales are beginning to rebound with lockdowns lifted.
Jul-2020	**Zoom** launched Zoom for Home, a new business line of videoconferencing device. **Poly**, **Logitech** and **Crestron** are partnering with **Microsoft** to offer Team devices.
May-2020	**Foxconn** plans to invest up to $1 billion to expand a factory in Southern India where iPhones are assembled. Prompted by **Apple**, the expansion is part of the OEM's gradual production shift away from China.

Global smartphone shipments
Million units



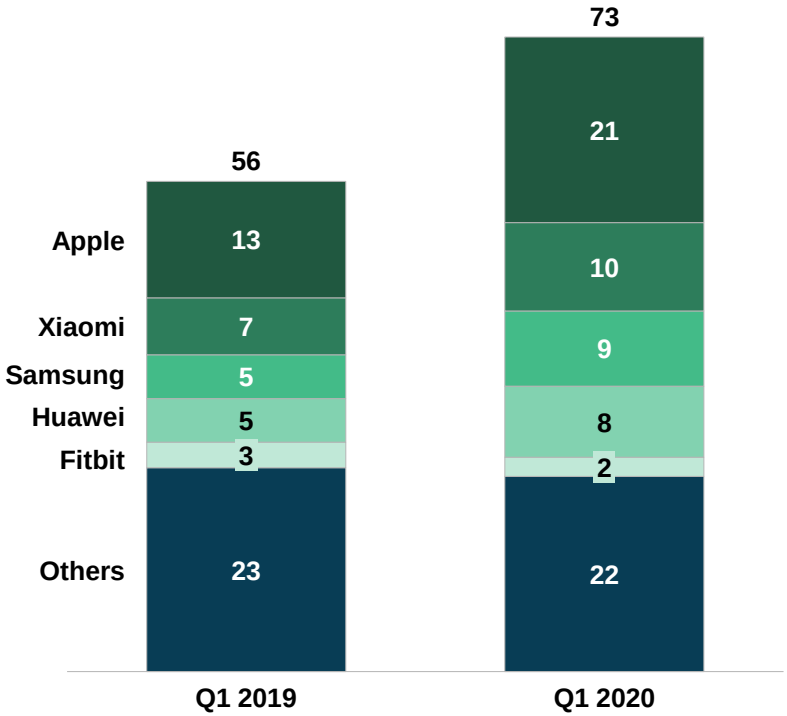
Global smartphone shipments decreased by 16% YoY in 2Q20, directly correlating to reduction in consumer spending; Huawei surpassed Samsung achieving the highest market share (20%), this was largely driven by Huawei's tremendous growth in China (almost 10% YoY)

.

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

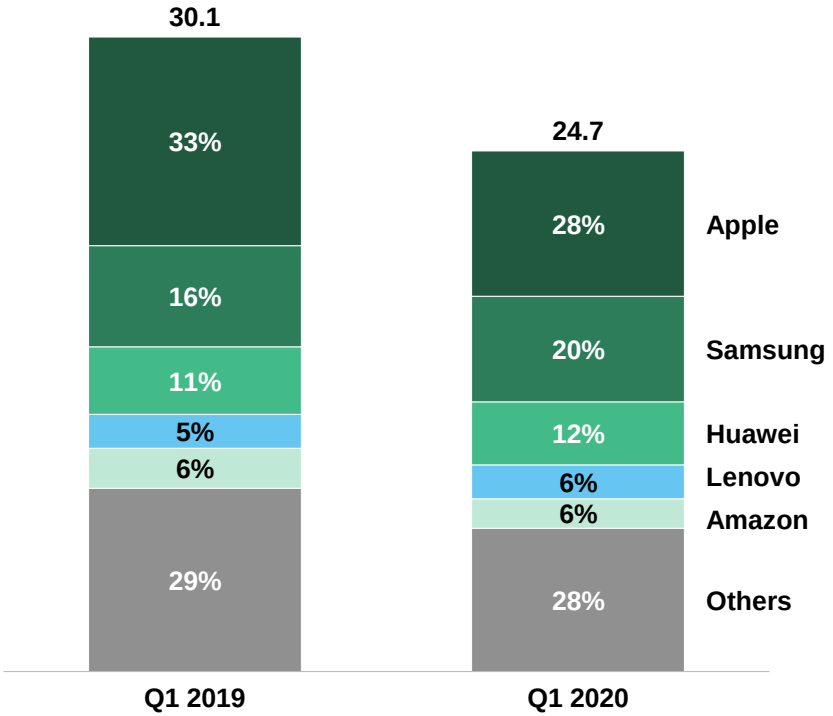
The wearables market grew by around 30% YoY in Q1 2020 while tablets saw a decline due to supply chain disruptions

Global wearables shipments
Million units



Global shipments of wearables grew by 29.7% YoY in Q1'20. Spurred by remote work needs, hearables grew 68.3% and accounted for 54.9% of the entire market.

Global tablet shipments
Million units

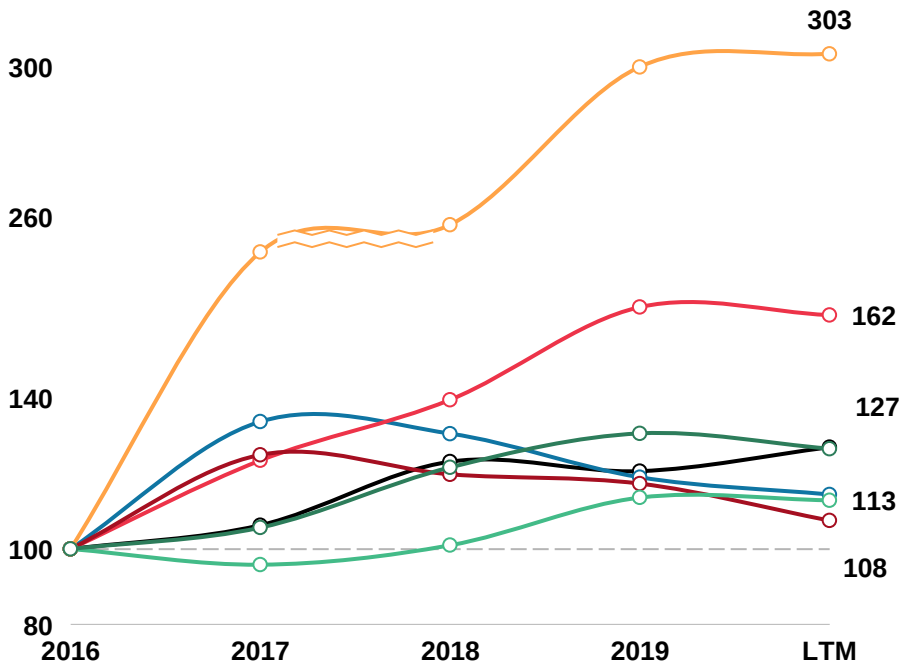


Under persistent impact of COVID-19, global tablet shipment experienced a 18.2% YoY decline in Q1'20. Compared with Q1'19, detachables grew by 56.8%, while slate table shipments declined by 36.4%.

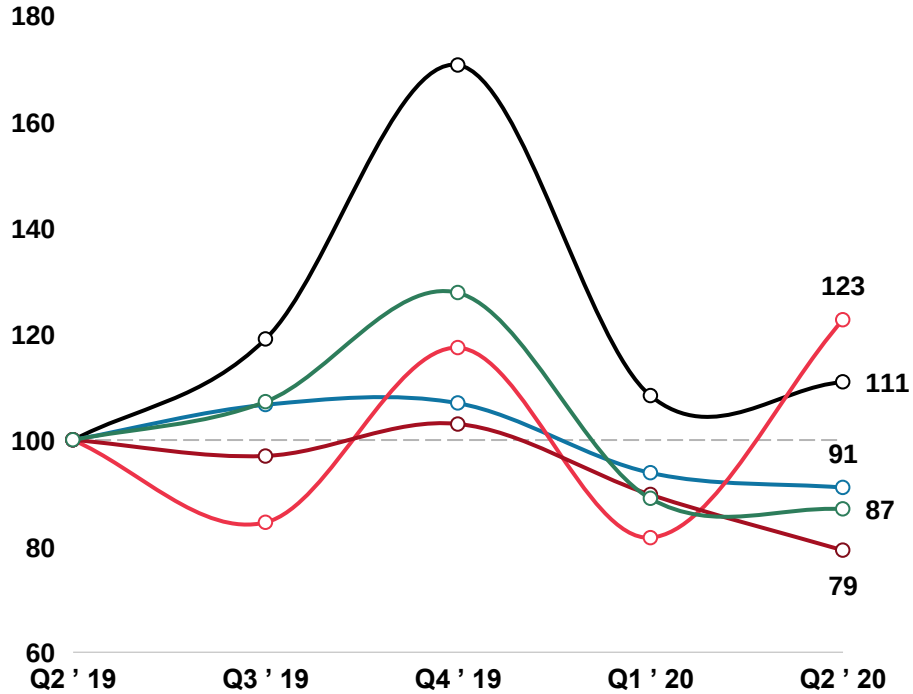
Source: IDC, Counterpoint Research and Applied Value Analysis.

All device OEMs had declining YoY revenue in Q2'20 except for Apple and Huawei, and LG recorded a 14% QoQ decline

Group Yearly revenue development
2016 - LTM (index 2016=100)



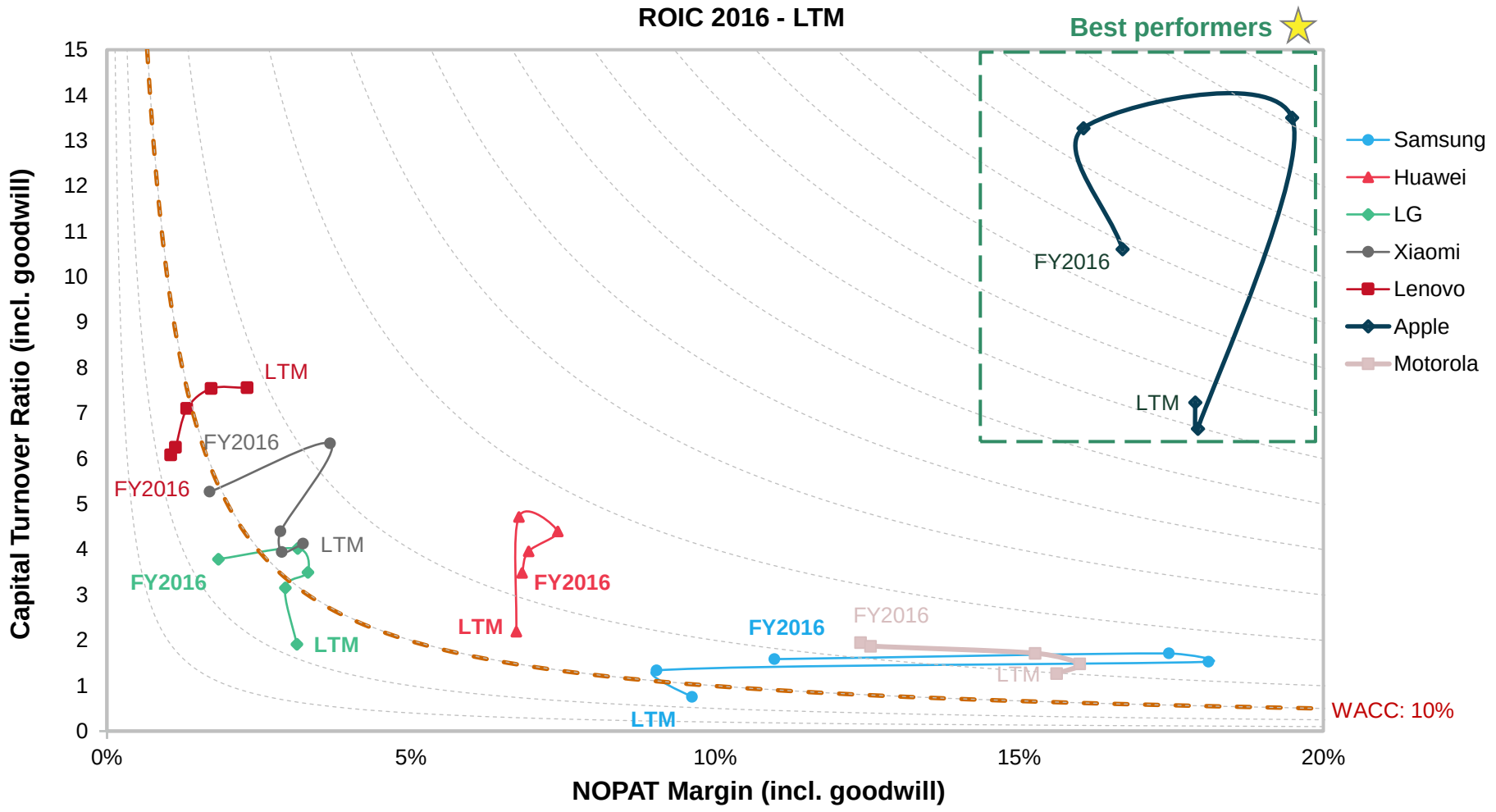
Group Quarterly revenue development
Q2'19 – Q2'20 (index Q2'19=100)



Apple Huawei Lenovo Motorola
Samsung LG Xiaomi

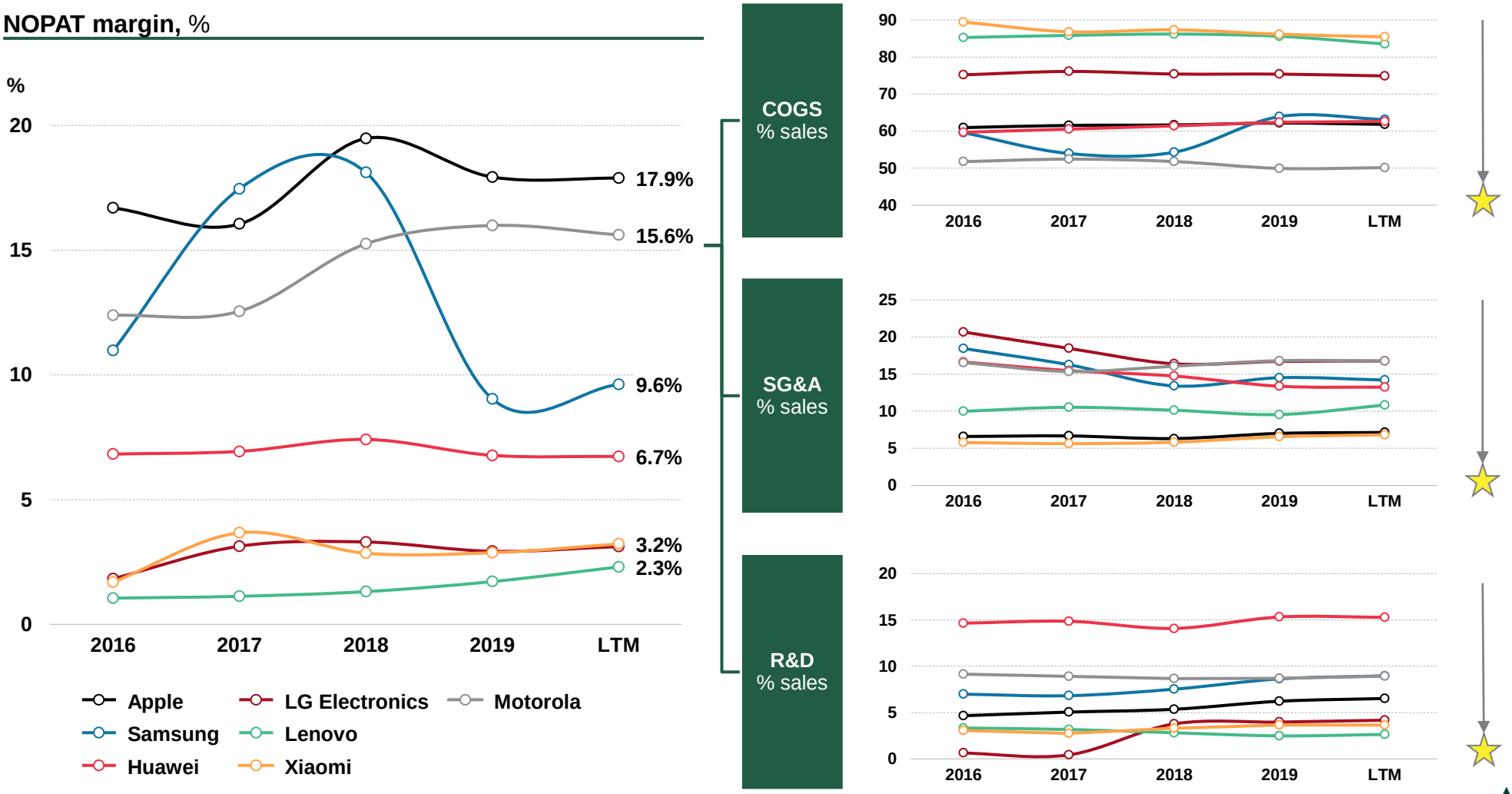
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Xiaomi, Lenovo and Apple saw improvements in ROIC while Huawei underwent a decline of 17 p.p.



Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

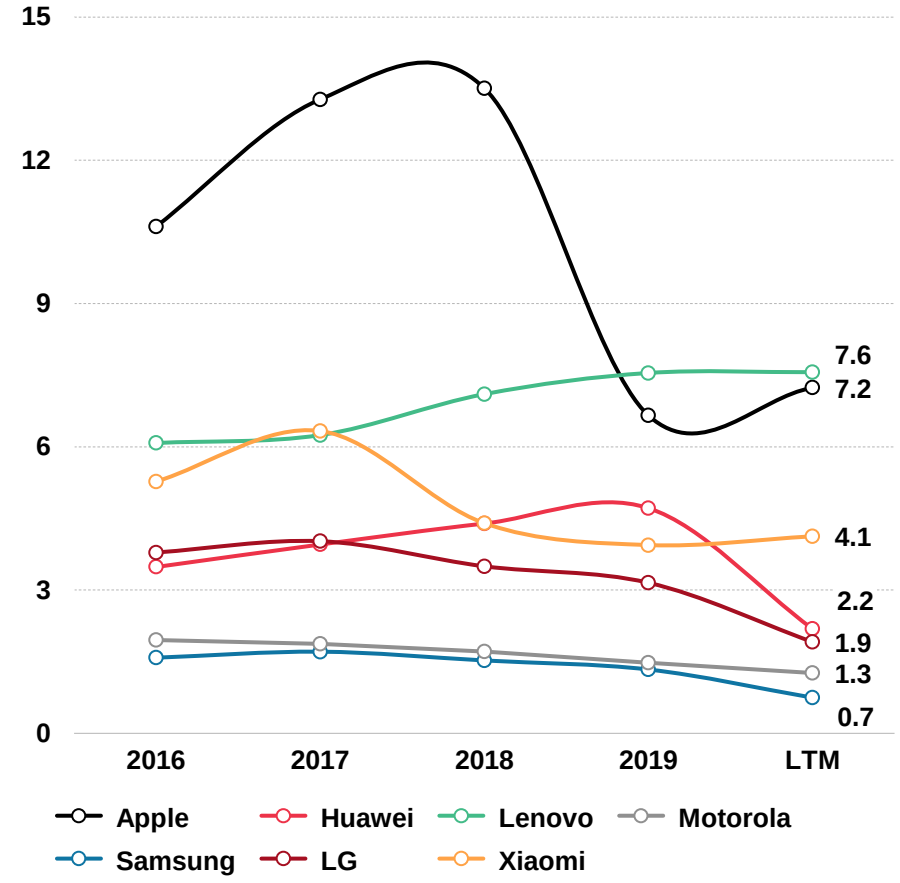
Samsung's NOPAT margin continues to recover, while NOPAT of LG and Motorola decreased slightly QoQ



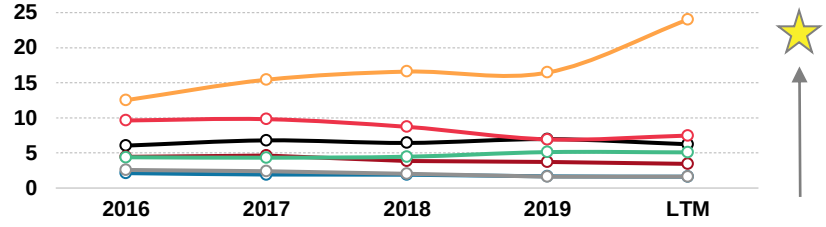
Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Extended inventory turnover period is slowing down Huawei's CTR, and Motorola's DSO is ~50% longer than peer average

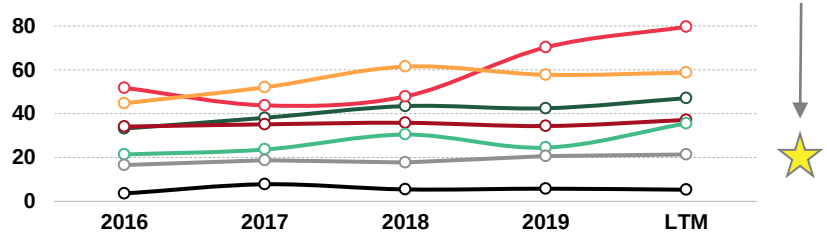
Capital turnover ratio (CTR)



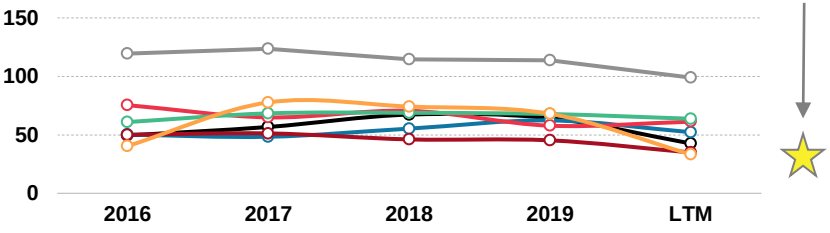
Fixed asset turnover



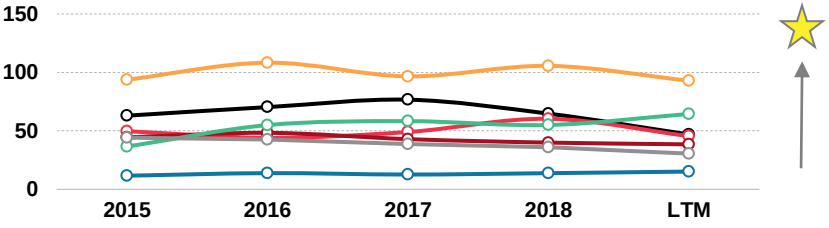
Inv. Days sales



AR Days sales



AP Days sales

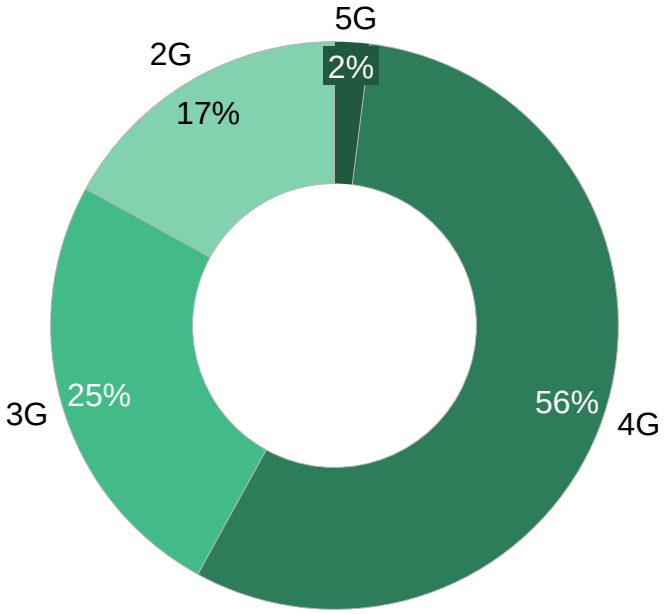


Notes: Fiscal years are used in the yearly analysis. Huawei 2019 & LTM based on estimates.
Source: Capital IQ, Annual & quarterly reports, Applied Value Analysis.

Contents

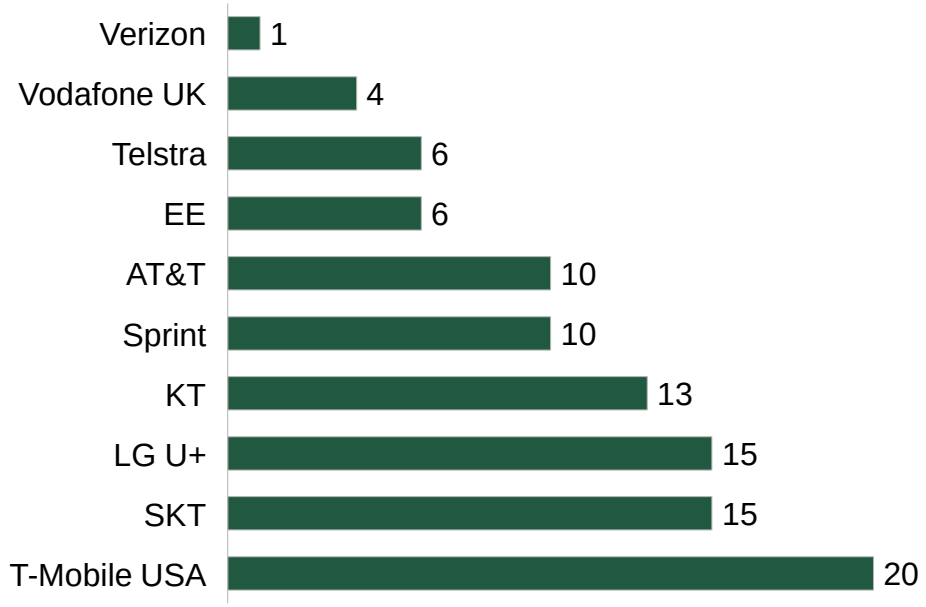
5G coverage remains limited, and operators are exploring new options to scale up coverage utilizing existing 4G networks

Global Mobile Internet Connectivity Distribution



5G Availability by Tier-1 Operator, Q1-20

Unit: Percentage of Users



- Currently around 8 billion mobile internet connections exist worldwide, and 4G remains the dominant means of connection
- Users' average 5G download speed varies significantly based on type of deployment and spectrum used. Verizon's 5G speed, which uses mmWave spectrum exclusively, is ten times faster than T-Mobile's and AT&T's, which employs low-band spectrum re-purposed from 4G services
- DSS (Dynamic Spectrum Sharing), which allows operators to migrate 4G networks to 5G, is gaining traction. Major carriers including Verizon and AT&T are exploring DSS as an option to boost 5G coverage in the US. Ericsson and Huawei leads in DSS in terms of market readiness, at approximately six to nine months

Sources: GSMA， Deutsche Bank AG/London

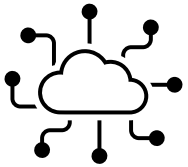
5G spectrum reaches into millimeter waves, pioneering ultra-high speed and extremely low latency

Spectrum and realistic downlink speed comparison between 5G and 4G

	Low Band (Below 1GHz)	Mid Band (1-7 GHz)	High Band (mmWave/24-39 GHz)
Tower Coverage	Hundreds of miles	Several miles	Less than 1 mile
5G Speed	3-250 Mbps	100-900 Mbps	1-3 Gbps
4G Speed	Typical: 15Mbps, Max: 150 Mbps		

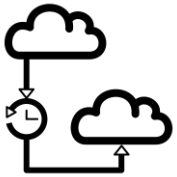
Spectrum & Speed

5G utilizes a broader spectrum of waves comparing to previous technologies. Mid and high band 5G networks are 10 to 50 times faster than 4G LTE.



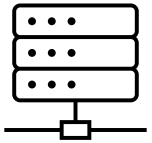
Network Capacity

5G can support 1 million connected devices per square kilometer, 250 times that of 4G. The elevated capacity would accommodate the vast number of IoT devices in the future.



Latency

5G improves the delay between sending and receiving information to 1 millisecond, that of 4G is 200 milliseconds. This will be crucial to autonomous connected cars.



Network Slicing

Enables virtualized and independent networks to be established with the same physical network infrastructure. Each network slice can be tailored to fulfill specific business needs.

Sources: Qualcomm, Venturebeat

Over ten countries have completely or partially excluded Huawei from domestic 5G networks. US pushes Huawei ban via political pressure and financial incentives

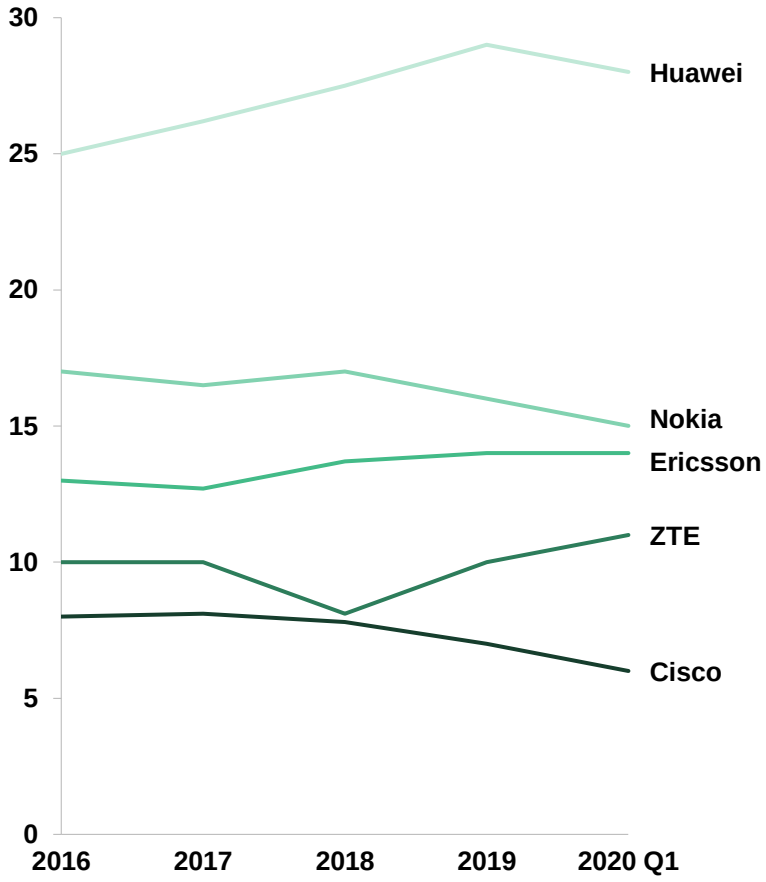
Summary of countries' response toward Huawei
(Check mark denotes contracted vendors post-bans)

	Countries	NOKIA	ERICSSON	HUAWEI	Details
Formal Ban	Australia	✓			Both Huawei and ZTE banned
	Japan		✓		
	UK				Allowing until 2027 for operators to remove existing Huawei equipment
	US	✓			US continues to pressure allies to act in accordance
	New Zealand				
De Facto Ban	Czech Republic		✓		Joint declaration with the US pledging cooperation on 5G security
	France	✓			Limits on Huawei 5G equipment amount to de facto ban by 2028
	Singapore				
Partial Ban	Belgium	✓		✓	Restrictions limit high-risk vendor's participation in local 5G network
	Netherlands		✓		
	Italy				Telecom Italia excluded Huawei from a tender for 5G core network
Pending Decision	Brazil				US offered to fund 5G infrastructure if Huawei excluded
	Canada	✓		✓	
	Germany				Deutsche Telekom chose Ericsson for 5G RAN deployment
	India				Huawei participated in 5G trials in India, however, the US is urging India to diminish its reliance on China for telecommunication supplies

Sources: Reuters and various news agencies

While Huawei struggles to grow market share under multiple bans, Ericsson is filling in the gaps

Global Telecom Equipment Market Share
Unit: Percentage of Sales



Mobile Network Deals Entailing Vendor Changes

Operator	Country & Date	New Vendor	Original Vendor	Domain	Details
Telefónica	Argentina Jun-18	Ericsson	Huawei	RAN	Ericsson grows market share at Huawei's expense
TDC	Denmark Mar-19	Ericsson	Huawei	RAN	Swedish vendor to replace Huawei as TDC rolls out 5G
Telia	Norway Aug-19	Ericsson	Huawei	RAN	As sole RAN vendor, Ericsson will replace Huawei by 2023
KPN	Netherlands Nov-19	Huawei	Ericsson	RAN	Huawei phasing Ericsson out of 4G as it builds 5G network
BT	UK Apr-20	Ericsson	Huawei	Core	Ericsson will replace Huawei in BT's core by 2023
Telus	Canada Jun-20	Ericsson, Nokia	Huawei	RAN	Nordic vendors but not Huawei named as 5G suppliers
BCE	Canada Jun-20	Ericsson	Huawei	RAN	Ericsson but not Huawei named as 5G supplier
Telefónica	Germany Jun-20	Ericsson	Huawei	Core	Chinese vendor ejected from core in favor of Ericsson

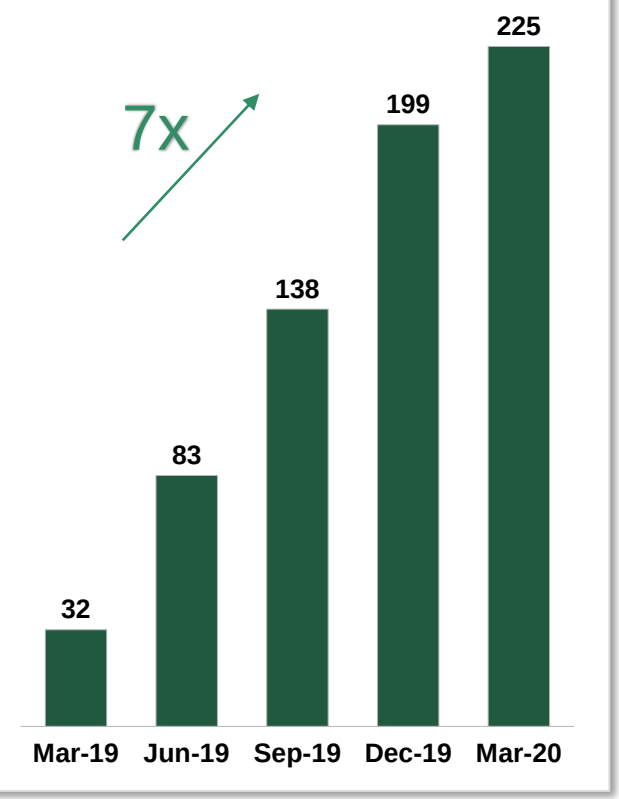
› Despite the restrictions imposed, Huawei still leads in the global telecom equipment market with 28% market share by the end of Q1 2020.
› Security concerns and sanctions from the US are driving many countries to substitute Huawei, the key beneficiary so far has been Ericsson.

Note: global telecom equipment market includes broadband access, microwave and optical transport, mobile core and radio access network (RAN), and service provider router and Carrier Ethernet switch gear

Sources: Dell'Oro Group, companies, newswires

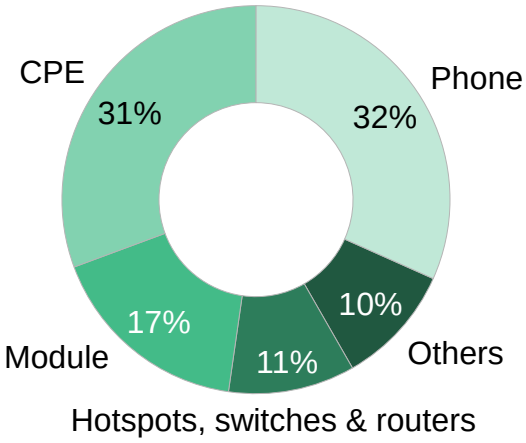
Significant growth in 5G device offerings and proliferation into mid- to lower-tier markets is expected soon

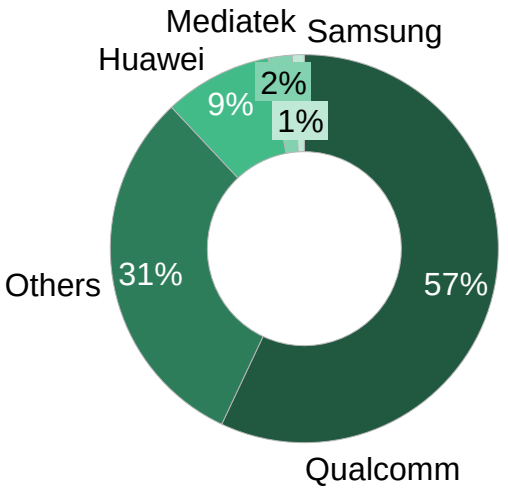
Growth of Announced 5G Devices



- Number of announced 5G devices surged sevenfold from Mar ‘19 to Mar ‘20. Retail prices of 5G devices as low as USD 300-400 are expected in the second half of 2020, reaching mid- to low-tier segments
- Qualcomm dominates the 5G baseband chipset market with 57% market share, it is notable that 31% of the chipset market is occupied by vendors with less than one percent market share
- Although the next Apple flagship iPhone is based on Qaulcomm 5G modem, Apple is also developing its own 5G chipset following the purchase of Intel’s 5G business

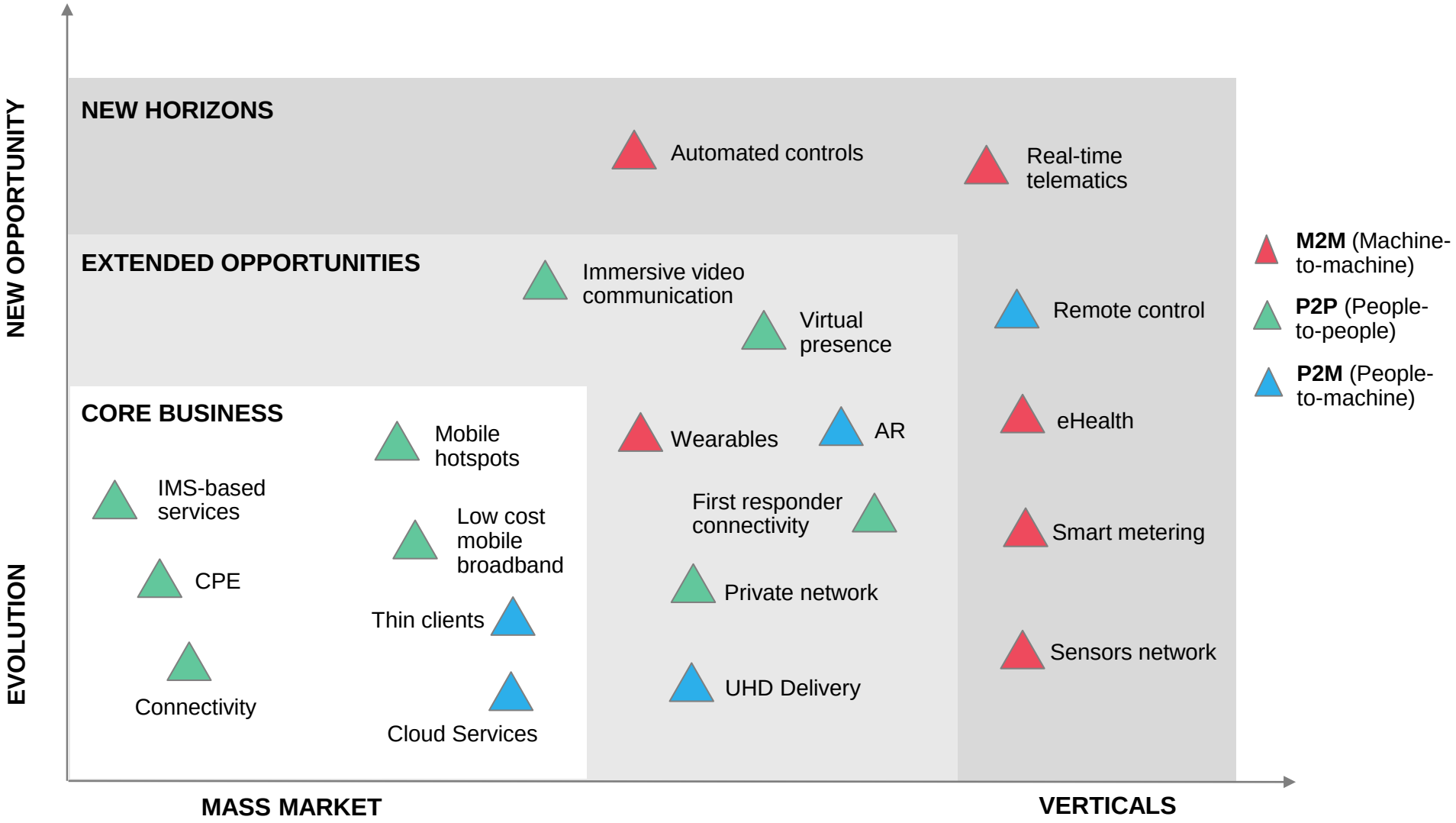
Distribution of 5G Devices and Market Share of Chipset Providers





Sources: European 5G Observatory, GSAcom, Ericsson Mobility Report June 2020

The capabilities of 5G extend beyond speed and low latency, offering a variety of business opportunities for B2B service providers



Source: GSMA

Contents

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**…

KINNEVIK

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

2020

Industries of Expertise

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

Lean Growth Principles

Investments

Selected portfolio companies

HUMAN CARE · COSMOSID · rivermeadow · Bake My Day · Division 5 Inc STEEL FABRICATION · SODERFORS STEEL · KAUNIS IRON

Management Consulting

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

Selected Clients

ERICSSON, SONY, Digicel, MILLICOM, telenor, CellMax Technologies AB, rivermeadow, Sprint, telcel, NOKIA, TELE2, 3, BlackBerry, ascom, Telia Company, Tradedoubler, clavister, FINGERPRINTS

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Applied Value is expanding into Copenhagen, Helsinki and San Francisco to better support out Global Clientele

Applied Value Group