Telcos as natural growth accelerator
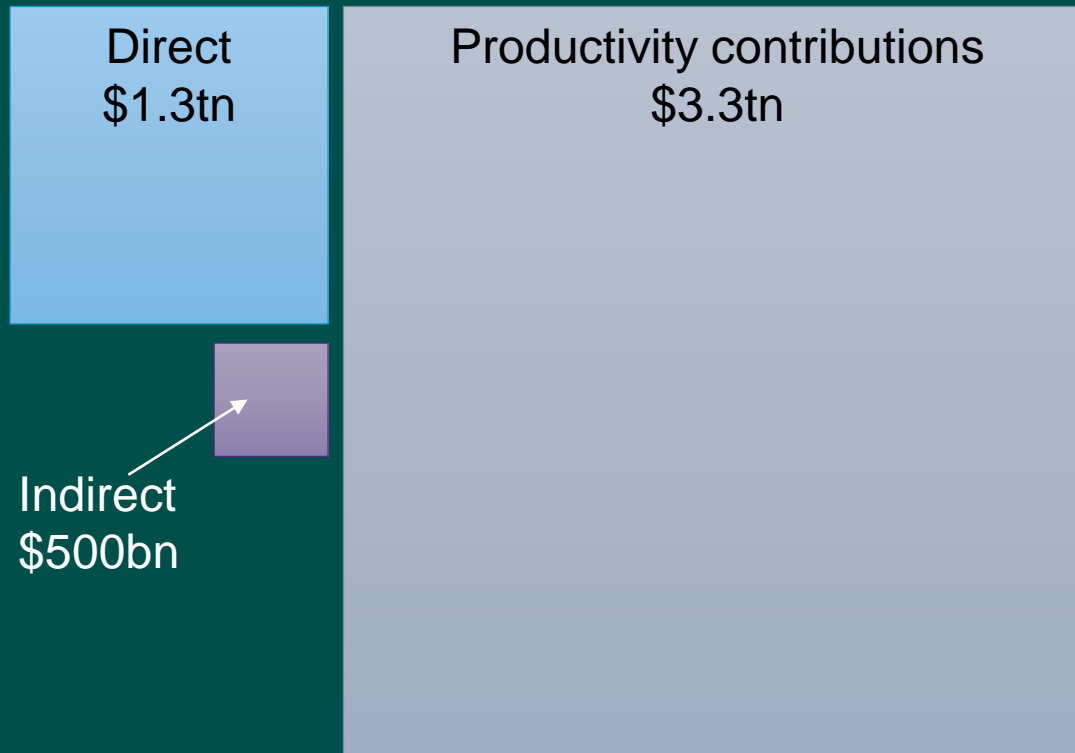
Dimitris Mavrakis

Research Director

June 2020

What was the contribution of 4G in global GDP?

2019 estimates

| Direct $1.3tn | Productivity contributions $3.3tn |

Indirect $500bn

4G = a truly global technology standard, and the foundation for applications that we rely on daily for both work and life
Mobile broadband networks are established as key pillars for national growth

Use cases and examples of past innovation

2G

M-PESA

Launched in 2007 in Kenya

Bank the unbanked

Introduced:
Loans, solar power, merchants, agri, healthcare, education and more

50% of Kenya GDP in 2019

3G

NTT DoCoMo

Launched 3G & "Mobile 2.0" in 2007

Introduced web browsing on mobile devices

40K devices sold on 1 weekend

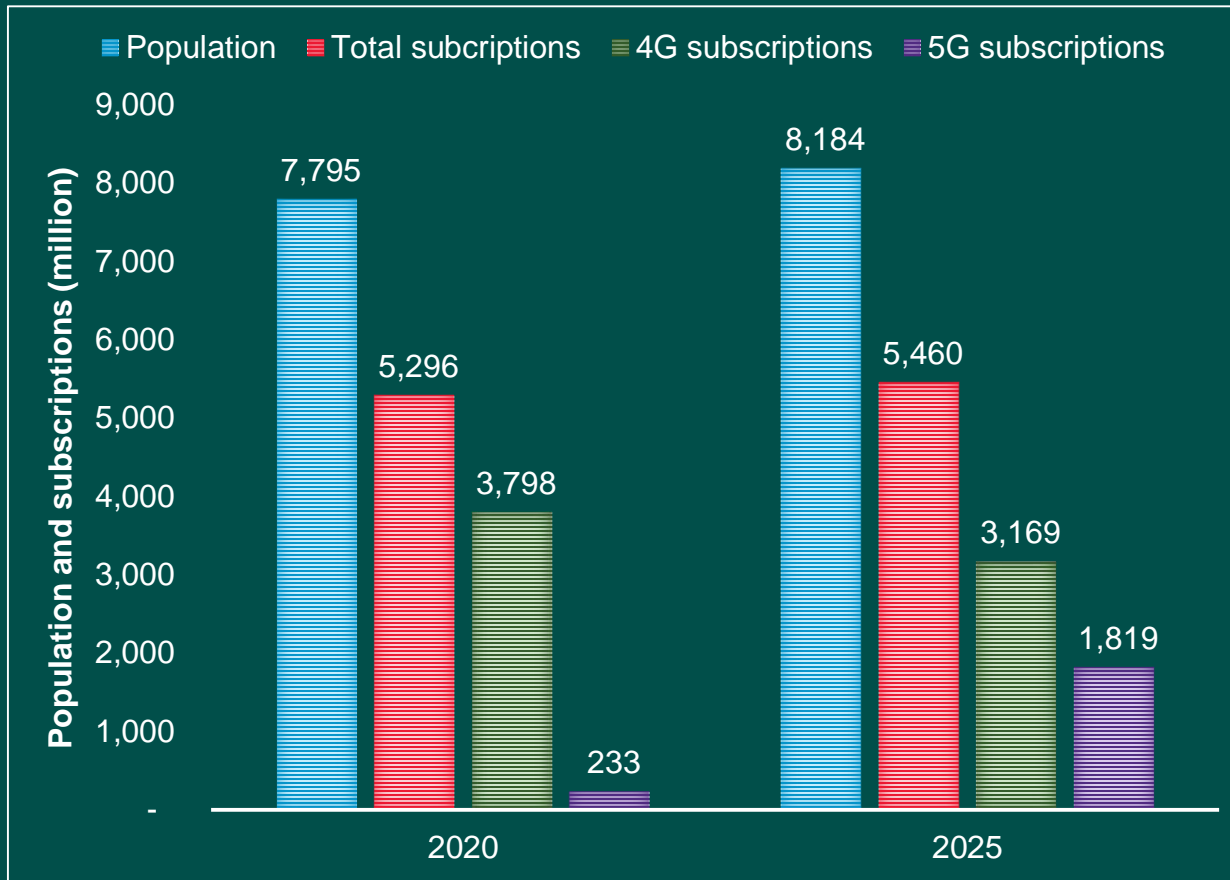Beginning of the mobile web

4G

Telia

First to launch 4G globally

Commoditized mobile broadband

Created social networks, sharing economy and video calling

Created the "mobile first" economy

4G well established today, 5G introducing new applications

Population and subscriptions (million)

Legend: ▦ Population ▦ Total subcriptions ▦ 4G subscriptions ▦ 5G subscriptions

|	2020	2025
Population	7,795	8,184
Total subcriptions	5,296	5,460
4G subscriptions	3,798	3,169
5G subscriptions	233	1,819

~ 70% of global population is connected to a mobile network

~ 50% of global population is connected to a 4G network

4G is providing a consistent mobile broadband foundation while 5G is starting to introduce new applications
Carriers will spend >$1.5tn in the next 5 years to sustain these subscribers

Use cases where 4G and 5G are making a difference today
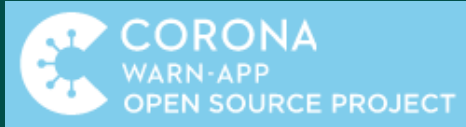
4G being used to track virus spread throughout the world

Verizon's COVID-19 Network Reliability report.

Throughout the first 90+ days of the country's COVID response, Verizon's networks performed remarkably well, maintaining pre-COVID reliability levels even in the midst of dramatic usage spikes and shifts in demand.

10.3+ trillion megabytes of data*

519+ billion text messages*

58+ billion phone calls*

297+ billion minutes of talk time*

Equivalent to 7.7 billion hours of video calling, 2.1 trillion songs streamed, or 10.3 trillion Instagram photos (1MB/photo).

Connected consumers with timely, trusted information during COVID-19

In addition to the significant usage on our wireless and fiber optic networks, Verizon Media properties helped consumers connect and consume timely trusted content during COVID-19.

4.8 billion page views

602 million users globally

29 Verizon Media events

87 million streams

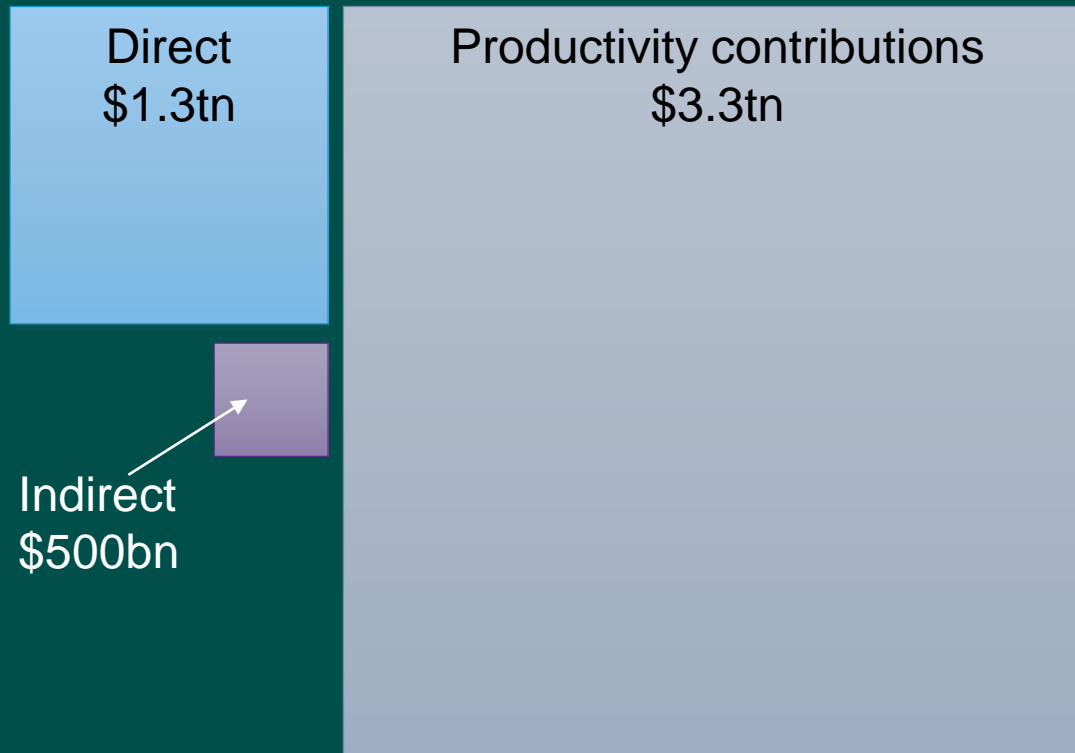*Data reporting period: March 1 – May 31.

5G innovation

Broadband connectivity for new hospitals

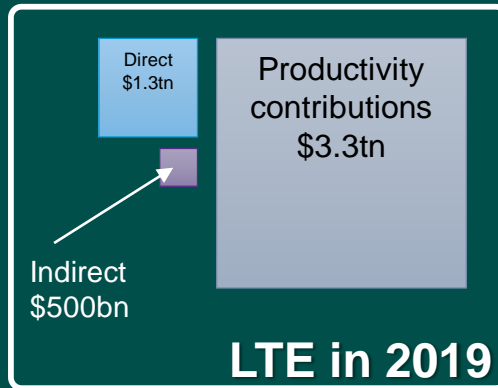
Thermal imaging cameras throughout a city

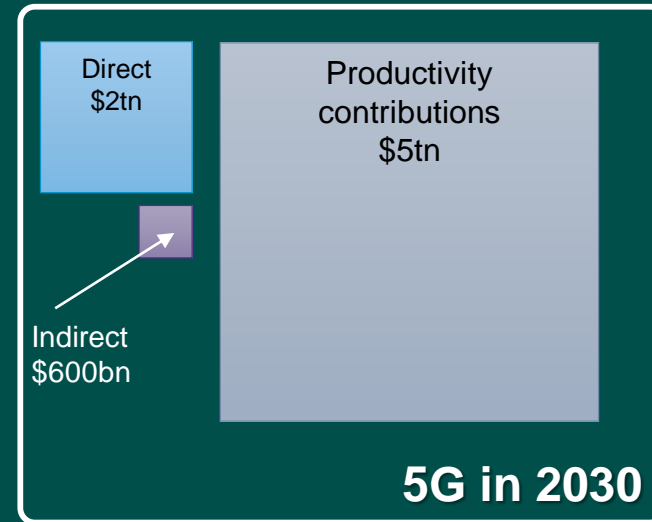# Revisiting 4G contribution to GDP in 2019

Contribution of 5G to GDP in 2030

Direct $1.3tn	**Productivity contributions** $3.3tn
Indirect $500bn	**LTE in 2019**

Both are ~10 years after standard is frozen

Direct $2tn	**Productivity contributions** $5tn
Indirect $600bn	**5G in 2030**

- A new generations typically takes 10 years to reach full maturity

- 5G is different: its enterprise focus will likely make it a longer term technology

- 5G will transform enterprise verticals the same way 4G transformed the consumer app ecosystem

Favorable policies and continuous investment are needed

Ruling bloc approves tax reforms to boost tech investment in Japan

Korean operators to invest $3.4 billion in 5G infra in H1 2020: Report

22 provinces announce 5G development goals for 2020

2020/3/10 上午12:25:53

China, Japan and South Korea have issued policies to accelerate 5G construction, such as tax cuts or subsidies or increased investment.

News story
Government agrees measures with telecoms companies to support vulnerable consumers through COVID-19

A joint statement from the Government, Ofcom and the telecommunications industry.

Published 29 March 2020
From: Department for Digital, Culture, Media & Sport and The Rt Hon Oliver Dowden CBE MP

Saudi Arabia - Assign all remaining spectrum

Saudi Arabia has committed to assigning all of its remaining spectrum to network providers STC, Mobily, and Zain.

This spectrum is for the 700MHz and 800MHz bands.

It has been assigned on the condition these network providers go live with it in three weeks and offer free access to specific websites.

Mobile operators get 'emergency spectrum' to help with internet demand during South Africa's lockdown

Staff Writer 6 April 2020
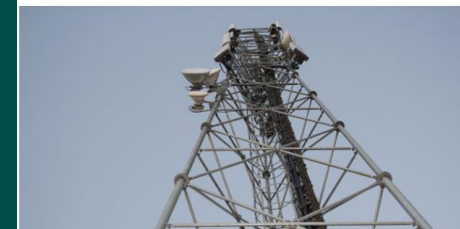
In Europe, Middle East and Africa, regulators are accelerating the release of spectrum and increasing investment during the pandemic.

Industrial manufacturing: 5G use cases

Collaborative robotics	<u>Current state</u>: • Devices connected via Ethernet and are largely immobile <u>5G capabilities</u>: • High bandwidth (eMBB), low latency (URLLC) <u>5G opportunities</u>: • Remote control of cobots, Augmented Reality applications
Reconfigurable production lines	<u>Current state</u>: • Industrial Ethernet, proprietary protocols (e.g. Profinet), custom WiFi, OPC UA <u>5G capabilities</u>: • As above, can replace several of these existing proprietary protocols <u>5G opportunities</u>: • Introduction of consistent wireless connections for both devices and humans
Automated Guided Vehicles	<u>Current state</u>: • WiFi throughout the factory floor, disconnections when moving between APs <u>5G capabilities</u>: • Millisecond handover, soft-handover, high accuracy positioning and location <u>5G opportunities</u>: • Remote control for AGVs, cm-level location capability

Smart cities: 5G use cases

Surveillance and safety	<u>Current state</u>: • Cameras using a mix of private and public infrastructure <u>5G capabilities</u>: • High bandwidth connectivity for HD streams, edge computing for analytics <u>5G opportunities</u>: • Machine vision for suspect and behavior identification
Traffic optimization	<u>Current state</u>: • Same as above: mix of public and private communication infrastructure <u>5G capabilities</u>: • Massive and low latency capabilities for near-real-time control and monitoring <u>5G opportunities</u>: • Monitoring and control as a service by specialist companies, utilizing 5G
Smart grid	<u>Current state</u>: • Public infrastructure for smart metering, shift to distributed & renewable energy <u>5G capabilities</u>: • Consolidate eMBB, URLLC and mMTC options until single standard <u>5G opportunities</u>: • Near-real-time monitoring of smart meters, substations and energy generation

Conclusions and recommendations

➢ 3G and 4G have created the foundation for so many innovations

➢ The importance of telecom networks is very often ignored in favor of value chain neighbors

➢ Covid-19 has proven that telecom networks are national infrastructure

➢ 5G will continue this innovation in the enterprise domain

Thank you

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