5G & AI for Digital Transformation Acceleration

ITU Annual Forum on "IoT, Big Data and Smart Cities & Societies"
Dubai, 28-29 August 2019

Turhan Muluk
Telecom Policy Director
ITU-D Representative

Agenda

- Success Factors

- Digital Plans

- Importance of 5G and AI

- Conclusion

Key Success Factors for Digital Transformation

- Political support and coordination between different Ministries

- National and regional plans including financing mechanisms

- High-speed, High-quality Intelligent Broadband network and services

- New Technologies (5G, AI, IoT)

- Demand creation programs

- Digital skills

- UAE Vision 2021 and Strategies for the Fourth Industrial Revolution and Artificial Intelligence

Digital Transformation Strategy Need for the Arab Region

Arab Digital Economy Strategy

- The League of Arab States launched the common vision for the Arab Digital Economy during the first day of the Arab Digital Economy Conference held from 16-17 December 2018.

- Digital economy strategy could grow GDP from 2.6 trillion USD up to 4.15 trillion by 2030 and the total digital growth effect at full maturity could reach up to 333 billion USD a year.

African Union: African Leaders Redefine the Future through Digital Transformation (32nd Assembly – 2019)

- African Heads of State and Government today joined chorus of calls for digital transformation of the continent .

- Commissioner for Infrastructure and Energy, H.E. Dr. Amani Abou-Zeid; *"We need to develop a **digital strategy and action plan"**.*

European Union: Digital Single Market

- The Digital Single Market strategy aims to open up digital opportunities for people and business and enhance Europe's position as a world leader in the digital economy.

Usage Scenarios of 5G

IMT for 2020 and Beyond

5G applications drive technical requirements, including type and amount of spectrum

< 1 GHz – for wide area applications, e.g. sensor networks, etc.

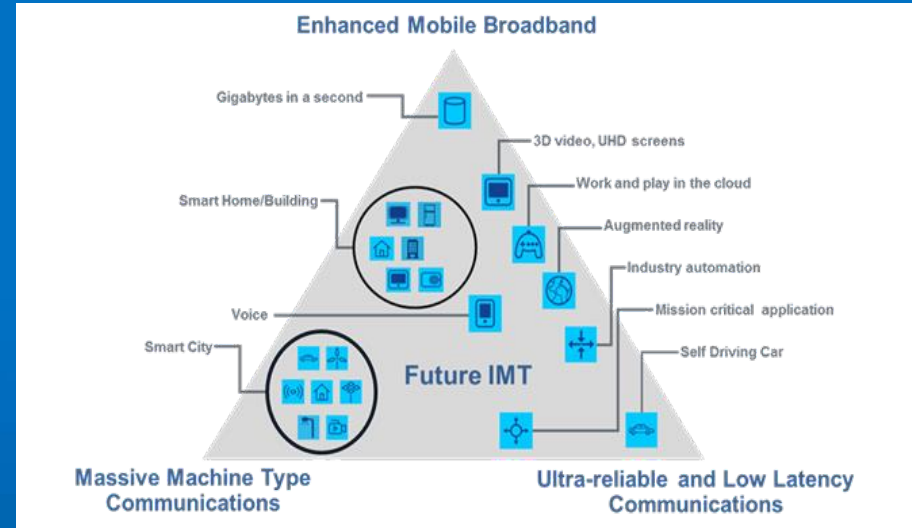< 6 GHz – for coverage/capacity trade-off, e.g. massive MIMO, outdoor-to-indoor

Higher MM Wave – for apps needing ultra-wide channels, e.g. 4k/8k video, VR, etc.

Continuous flow of sufficient, adequate, new spectrum is key to:

Expansion of wireless market to 5G and beyond

Building a strong and healthy eco-system

Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Work and play in the cloud

Augmented reality

Smart Home/Building

Industry automation

Voice

Mission critical application

Smart City

Self Driving Car

Future IMT

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

1 GHz   10 GHz   100 GHz

Average Broadband Speed Ranking 5G?

Mobile Average Speeds (Mbps)			Fixed Average Speeds (Mbps)		
3	Qatar	61.72	39	Qatar	65.12
4	UAE	61.24	27	UAE	83.74
24	Saudi Arabia	42.34	58	Saudi Arabia	41.84
32	Oman	38.12	94	Oman	22.91
33	Kuwait	37.82	67	Kuwait	34.23
37	Lebanon	35.49	169	Lebanon	7.11
56	Bahrain	29.45	55	Bahrain	43.05
64	Morocco	26.74	121	Morocco	17.07
71	Tunisia	23.98	153	Tunisia	9.16
89	Syria	20.77	163	Syria	8.41
100	Egypt	17.37	154	Egypt	9.10
111	Jordan	15.13	63	Jordan	38
133	Libya	10.41	149	Libya	10.09
141	Algeria	7.23	174	Algeria	4.18
143	Iraq	6.59	113	Iraq	18.82
144	Palestine	6.32	131	Palestine	13.82

Source: Speedtest - Global Index

Global Progress to 5G (Trials, Deployments and Launches)

- 293 operators in 98 countries are actively investing in 5G

- 54 operators in 31 countries have deployed 3GPP-compliant 5G technology within their live networks

Powered by Bing
© GeoNames, HERE, MSFT, Microsoft, Thinkware Extract, Wikipedia
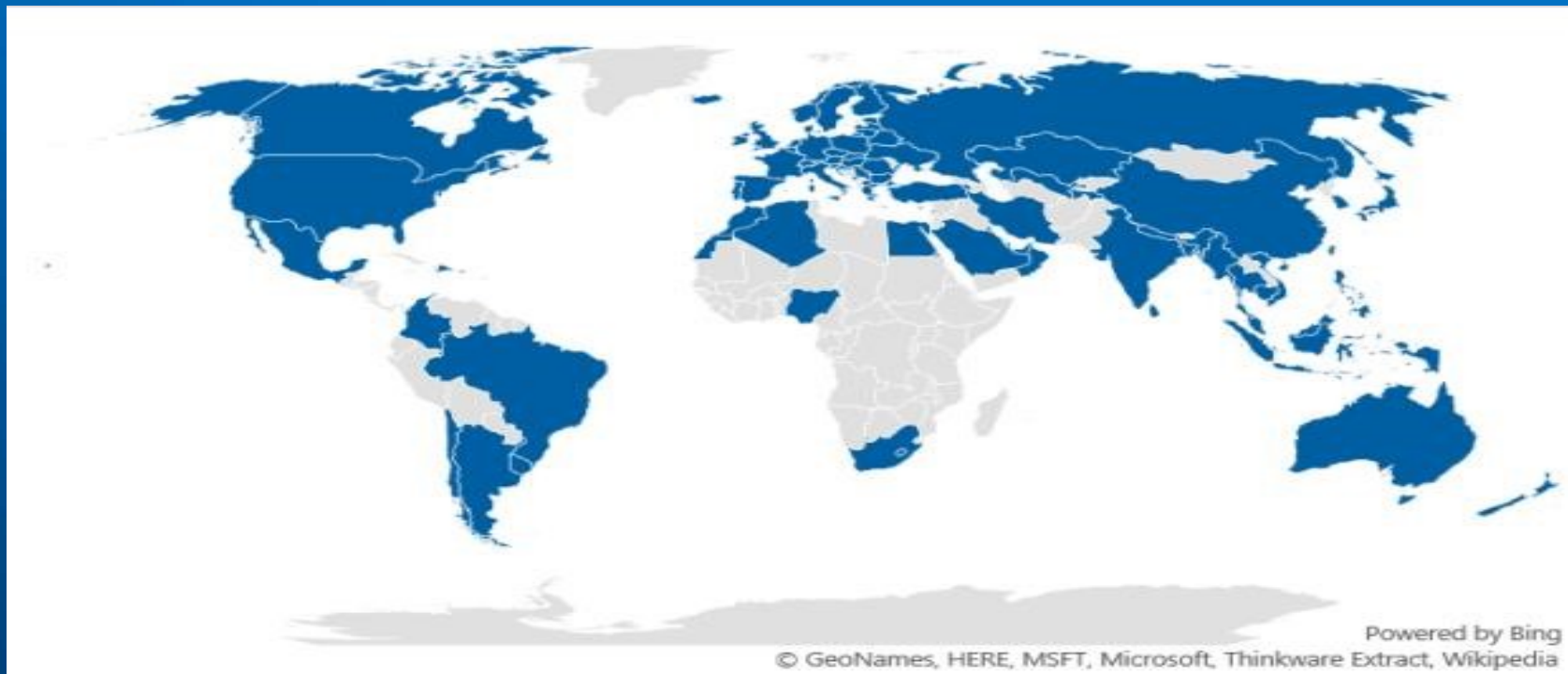
Status of 5G in Arab Region

- 5G spectrum already assigned at 3.4-3.8 GHz in GCC countries (5G services started in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE).

- 5G spectrum assignment is expected by 2020-2021 in other Arab States.

- mmWave spectrum assignment in the region will start after the ITU WRC-2019 conference in November.

Importance of Wi-Fi

- Wi-Fi's ubiquity, flexibility and affordability have been instrumental in the growth of connectivity in emerging markets, where it has been a powerful tool for bridging the digital divide, as well as the driver for IoT and M2M applications.

- Wi-Fi and IMT are the most powerful wireless broadband technologies. Wi-Fi carries most of the traffic – cellular covers most of the geographical landmass. Wi-Fi and IMT are both needed to meet the 5G requirements.

- In the 5G era, more than 70% of mobile traffic will be offloaded to Wi-Fi (up from about 50% today).

- The evolution of Wi-Fi is well-aligned with the IMT-2020 (5G) vision of next-generation connectivity, which is grounded on ambitious and demanding requirements for capacity, latency, density, coverage, efficiency, reliability, spectrum, and number of devices. To meet the IMT-2020 goals, multiple technologies have to converge and contribute.

- New Wi-Fi technologies (such as Wi-Fi6 and WiGig) provide more capacity, lower latency and more flexible and efficient use of network resources for new smart applications.

5G Vertical Industry

Vertical industry	Example use cases and applications	Partners
Healthcare	Connected Care, Precision Medicine, Imaging and Diagnostics, Genomics/Big Data, Remote Surgery	Medical Device Manufacturers, Insurers (public or private), Researchers, Ministries of Health
Automotive	Engine alert and automatic maintenance scheduling, autonomous driving, collision avoidance, V2V	OEM's, Researchers, Ministries of Transportation
Public Safety	Enhanced Incident/disaster alert and response, real time traffic management	Venues (i.e. stadiums, etc.), municipalities and governments, infrastructure vendors, operators, OEMs, etc.
Sustainability/ Environmental	Adaptive air sensors, water management systems, energy	Researchers, Government Parks services, Agriculture
Education	wireless real-time interactions, virtual and augmented reality interactions without visual delay	School Districts, OEM's, Ministries of Education, Regulators, Researchers
Smart City	Remote monitoring of roads and city infrastructure, smart meters/parking	Service Providers, Universities, Local Municipalities, Federal Policy Makers, Utilities, etc.
Public Transportation	Flexible/adaptive bus/fleet management, Allowing more efficient routes	Transit Systems, Operators, Municipal Governments, Researchers, etc.
Wearables	Fully connected devices (no need for a smartphone tether), tagged devices to assist with inventory management	OEM's
Smart Homes	Remote security monitoring and controls (i.e. locks, hi res camera surveillance, etc.)	Infrastructure Vendors, Heating and Cooling Systems, Cable Companies, etc.
Smart Grid	Smart 'end to end' power distribution networks with predictive analytics	See Smart City
Industrial	Sensors with wireless connectivity for crop fields can help optimize growing and minimize use of water and fertilizers through more targeted application.	Farmers/Agriculture, Ministries of Agriculture, etc.

Important 5G Vertical Applications for Arab Region

- **Smart Cities and Society:** 5G will enrich city quality of life, bringing enhanced smart services, actionable insights, and better use of public resources for the people.

- **Smart Transportation Systems:** According to WHO, 90% of the world's fatalities on the roads occur in low- and middleincome countries, even though these countries have approximately half of the world's vehicles.

- **e-health:** Remote surgery will reduce the latency to enable remotely assisted surgery. Specialists are not available in many hospitals and could join a local surgeon remotely to perform procedures which require expert skills (5G's latency will be around one millisecond - unperceivable to a human and about 50 times faster than 4G).

- **Smart Learning:** 5G will enter the classroom and bring new ways of learning to students. Augmented Reality, Virtual Reality and Virtual Presence will mean that students will be immersed in a more visual and interactive learning experience where students and teachers may not necessarily be in the same location.

- **Water Management and Agriculture**: 5G will also bring a solution for smart water management and smart agriculture systems in developing countries. Such as sensors with wireless connectivity for crop fields can help optimize growing and minimize use of water and fertilizers through more targeted application.

- **Oil and Gas Industry:** Analytics to survey land , optimizing well and field work, equipment maintenance and remote performance .

- **And others.**

Intelligent Connectivity: The Fusion of 5G, AI and IoT (GSMA Report)

Intelligent connectivity is the combination of high-speed, low-latency 5G networks, cutting-edge artificial intelligence (AI) and the linking of billions of devices through the IoT.

As these three revolutionary technologies combine they will enable transformational new capabilities in following services, and much more beyond;

-Entertainment Everywhere

-Connected Transport

-Enhanced Public Services

-Industrial Productivity

-Sustainability

-Connectivity

Economic Benefits of 5G and AI

McKinsey; Artificial intelligence has the potential to incrementally add 16 percent or around $13 trillion by 2030 to current global economic output.

Artificial Intelligence could contribute as much as $320 billion to the economies of the six Gulf Cooperation Council countries and Egypt by 2030 (https://www.amcham.org.eg/publications/business-monthly/issues/269/May-2018/3730/what-does-gcc-artificial-intelligenceinvestment-mean-for-Egypt)
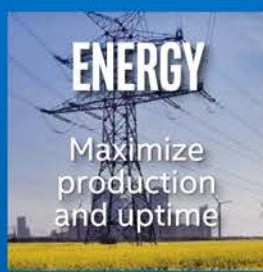
5G will provide a new income of $273 billion to the GCC region within the next 10 years (https://www.huawei.com/en/industryinsights/technology/unlocking-digital-opportunities-with-5g)

According to the European Union's study, socio-economic benefits from the introduction of 5G capabilities in Europe could reach €113.1 billion per year (https://ec.europa.eu/digital-single-market/en/news/5g-deployment-could-bring-millions-jobs-and-billions-eurosbenefits-study-finds)

Global economic value of Wi-Fi® nears $2 trillion in 2018"; estimated the current annual global economic value of Wi-Fi® at $1.96 trillion in 2018, projecting to surpass $3.47 trillion by 2023 (https://www.wi-fi.org/news-events/newsroom/wi-fi-global-economic-value-reaches196-trillion-in-2018)

Introduction of steam engines during the 1800s boosted labor productivity by an estimated 0.3 percent a year, the impact from robots during the 1990s around 0.4 percent, and the spread of IT during the 2000s 0.6 percent.

AI in Every Market

AGRICULTURE
Achieve higher yields & increase efficiency

ENERGY
Maximize production and uptime

EDUCATION
Transform the learning experience

GOVERNMENT
Enhance safety, research, and more

FINANCE
Turn data into valuable intelligence

HEALTH
Revolutionize patient outcomes

INDUSTRIAL
Empower truly intelligent Industry 4.0

MEDIA
Create thrilling experiences

RETAIL
Transform stores and inventory

SMART HOME
Enable homes that see, hear, and respond

TELECOM
Drive network and operational efficiency

Global AI Strategy Landscape

Australia. 'Prosperity Through Innovation'
Four-year, $21m investment from national budget to support the development of AI in Australia.

China. 'Next Generation AI'
Launched July 2017, the most comprehensive AI strategy globally with 2030 targets for a $1T RMB AI industry

France. 'AI for Humanity'
€1.5 billion plan announced in 2018 in the 'Villani Report' to transform France into a global leader in AI.

Ireland. 'AI Island'
Irish Economic Development Agency led process. AI Master program launched in 2018 and is 100% industry driven.

Kenya. Blockchain and AI Task Force
Task Force established Feb 2018 with a five-year planning horizon.

New Zealand. AI Forum
May 2018, AI Forum released a report titled, "Artificial Intelligence: Shaping a Future New Zealand."

Singapore. 'AI Singapore'
S$150m, five-year national program launched May 2017.

Sri Lanka
National Expert Strategy Advisory Committee announced Aug 2018 working on AI Strategy for Sri Lanka

UAE
Announced in Oct 2017. First country to create a Ministry of AI and first in the Middle East to launch an AI strategy

Austria. 'Robot Council'
Established a Robot Council in August 2017, with a one million euros working budget from the Ministry of Infrastructure.

Denmark. 'Digital Growth Strategy'
Broader policy focused on Big Data and IoT launched Jan 2018.

Germany.
€3 billion plan announced Nov 2018 with a dedicated AI strategy to make Germany & Europe a global leader in AI.

Israel. 'StartUp Nation needs AI Policy'
Innovation Authority, tasked with AI policies, has warned that a strategy is needed to prevent falling behind.

Malaysia. National AI Framework
National AI Framework launched in 2018 led by MDEC, expanding the National Big Data Analytics Framework.

Poland. Roundtable
May 2018 Roundtable on AI Strategy focused on healthcare, public administration, education & cybersecurity

Saudi Arabia. 'Robot Citizenship'
Became the first country to grant citizenship to a robot in October 2017. No dedicated AI strategy yet.

Sweden
National Approach for Artificial Intelligence launched in May 2018.

United Kingdom. 'AI Sector Deal'
Announced in April 2018. $1.24B funding as part of the UK's larger industrial strategy.

Brazil. 'E-Digital Strategy'
E-Digital Strategy addresses digital transformation including AI

Estonia. AI Task Force
E-governance forerunner, initially focused on autonomous cars, now building a broader AI strategy.

India. 'Social Inclusion and AI Garage'
Jun 2018 working paper on using AI to ensure social growth, inclusion and positioning the country as a leader in AI

Italy. 'At the Service of Citizens'
Interdisciplinary AI Task Force launched by 'Digital Italy'. White paper March 2018, "AI: At the Service of Citizens".

Malta. 'Malta.ai'
Malta.ai launched Mar 2019 to share vision and process towards an AI strategy.

Qatar. Feb 19 Blueprint
Qatar Center for Artificial Intelligence (QCAI) launched National AI Strategy for Qatar. Announced on 7 February 2019.

South Africa. 'IFPTI considers AI'
Intsimbi Future Production Technologies Initiative" launched in 2018 with aim to advancing manufacturing sector.

Taiwan. 'Taiwan AI Action Plan'
Four-year plan launched January 2018, with 350m annual budget.

United States. 'American AI Initiative'
Launched Feb 2019 by Executive Order promote and protect AI technology. AI.gov launched Mar 2019.

Canada. 'Pan-Canadian AI Strategy'
Five-year, $125m plan announced in 2017 federal budget. Led by CIFAR. Research and talent focus.

Finland. Steering Group
Steering Group appointed May 17 releasing two interim reports. Full strategy expected very soon.

Indonesia
Leading Asia-Pacific market in the adoption of and plans for AI however no dedicated AI strategy as yet

Japan. 'Society 5.0'
Strategy launched in 2017 to create sustainable solutions for better human life in Japan.

Mexico. 'Towards an AI Strategy'
Commissioned by the British Embassy in Mexico and released in June 2018. Sets foundations for a national AI strategy.

Russia. Mar 18 Conference
March 2018 conference made 10 policy recommendations. National Strategy expected very soon.

South Korea
Five-year AI development plan launched May 2018 with $1.95B budget.

Tunisia
AI Task Force and Steering Committee appointed in April 2018. Strategy expected very soon

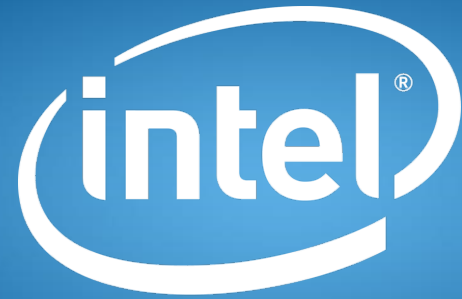# UN Report on Artificial intelligence and Broadband Divide

- The main digital components supporting AI include: (1) the Internet of Things; (2) cloud computing; (3) broadband connectivity; and (4) Big Data

- AI will grow rapidly once all key technologies identified are in place.

- Without **robust broadband connectivity** development and expansion of the digital components of AI would be much more difficult.

AI Public Policy Recommendations

- **Foster Innovation and Open Development**

- **Create New Human Employment Opportunities and Protect People's Welfare**

- **Liberate Data Responsibly**

- **Rethink Privacy**

- **Require Accountability for Ethical Design and Implementation**

(intel)

Conclusion

- Develop regional/national 5G and AI action plans to accelerate the implementation

- Allocate sufficient low-band, mid-band and high-band spectrum for 5G

- Support both licenced and unlicensed (Wi-Fi) frequency spectrum for 5G

- Launch a 5G network at least in one major city by 2020

- Adopt policies/regulations (including incentives to operators) to accelerate the 5G such as small cells and backhauls.

intel®

experience
what's inside™