Agenda

❑ Introduction with David Pringle

❑ Overview of 5G-Advanced and recent GSMA paper launch from GSMA

❑ Research findings from GSMAi

❑ Relevance of 5G-Advanced to further MNO business growth from Axiata

❑ Key use cases for 5G-Adavanced from ST Engineering

❑ Panel discussion with Axiata, ST Engineering and GSMA Intelligence

Session moderator

David Pringle
Industry Analyst

Our speakers

Dr Tomasz Gerszberg
Group Head of Future
Networks, Axiata

Terry Tan
Solution Manager
from Enterprise
Connectivity & 5G
Task Force, ST
Engineering

Gloria Trujillo
Technical Director,
GSMA

Peter Jarich
Head of GSMA
Intelligence, GSMAi

GSMA
5G Futures
Community

GSMA™

GSMA industry paper
5G-Advanced: Shaping the future of operator services

DOWNLOAD NOW

5G-Advanced
Shaping the future of operator services

February 2024 GSMA

Business benefits of 5G-Advanced

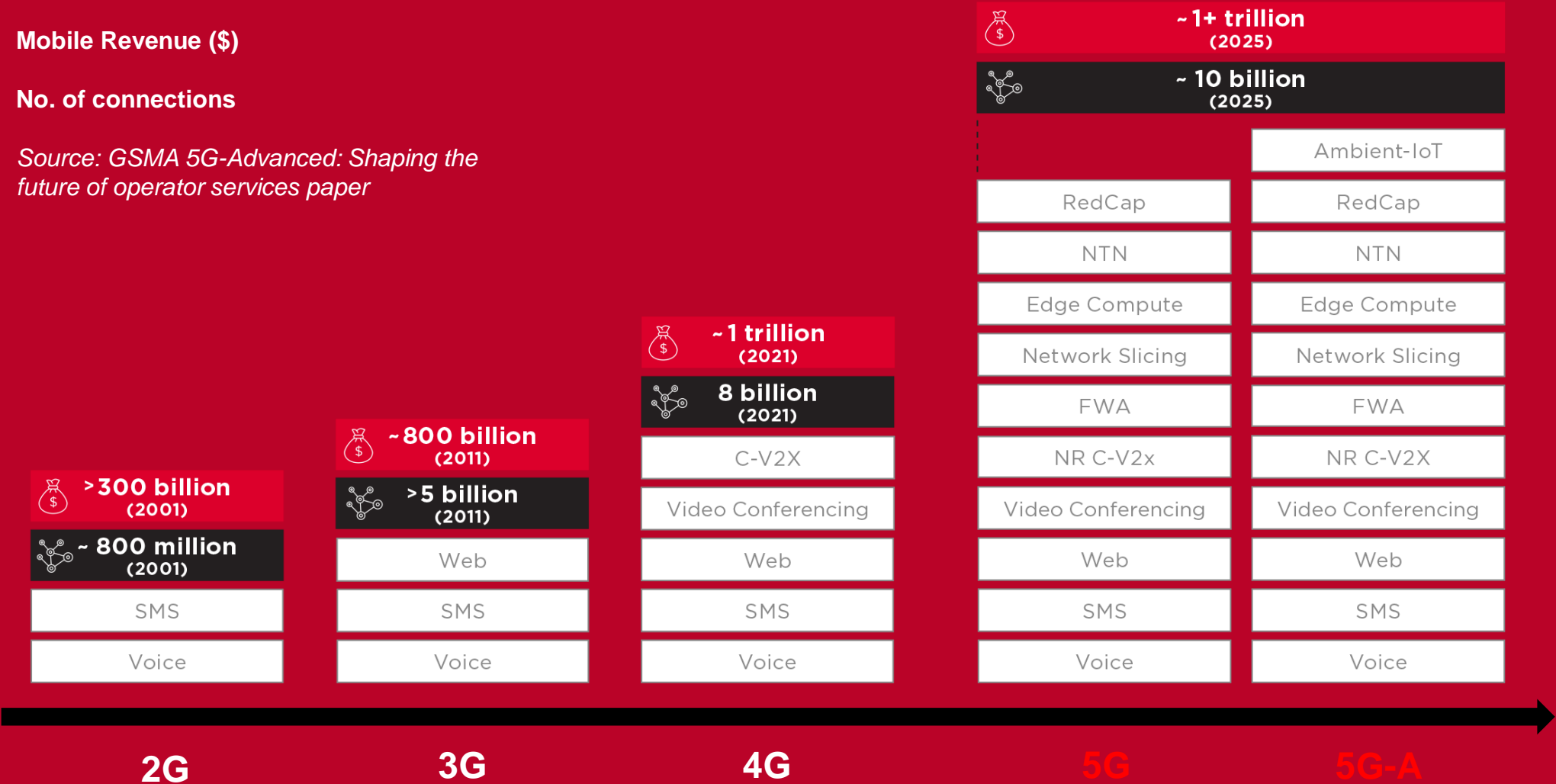Industry applications from leading equipment vendors **Ericsson**, **Huawei**, **Nokia**, **Qualcomm**, **ZTE**

Latest 5G-Advanced insights and market trends from **GSMA** and **GSMA Intelligence**

GSMA

5G-Advanced is the next step in the development of cellular technologies

Mobile Revenue ($)

No. of connections

Source: GSMA 5G-Advanced: Shaping the future of operator services paper

2G	3G	4G	5G	5G-A
			~1+ trillion (2025)	
			~ 10 billion (2025)	
				Ambient-IoT
			RedCap	RedCap
			NTN	NTN
			Edge Compute	Edge Compute
			Network Slicing	Network Slicing
			FWA	FWA
			NR C-V2x	NR C-V2X
		~1 trillion (2021)		
		8 billion (2021)		
		C-V2X	Video Conferencing	Video Conferencing
	~800 billion (2011)	Video Conferencing	Web	Web
	>5 billion (2011)	Web	SMS	SMS
>300 billion (2001)	Web	SMS	Voice	Voice
~ 800 million (2001)	SMS	Voice		
SMS	Voice			
Voice				

GSMA™

Uses cases and applications of 5G-Advanced

Providing customised connectivity

"We are going from a single use case - mobile broadband – that anyone can get best-effort, to suddenly a network that has hundreds of different virtual networks, different use cases, even the same device can have multiple slices"

Sibel Tombaz
Head of Product Line 5G Radio Access Network, Ericsson

Turbocharging fixed wireless access

"5G-A supports a deterministic user experience and ensures low latency for XR and cloud-based services. It will provide an immersive user experience for multiple people in a family scenario"

John Gao
President of Huawei's 5G-A Domain

Enabling asset tracking and anomaly detection

"The ecosystem of endpoints is very diverse. If you walk into a mine, there are different kind of earth movers and big heavy machines. If you walk in into a retail warehouse, you are talking about a lot of robotic arms and if you are talking about an agriculture farm, you have the emergence of drones with very powerful capabilities"

Jitin Bhandari
CTO of Cloud and Network Services, Nokia

Enabling and employing artificial intelligence

"We could have different models for different types of applications and use cases, where the network and the device are interoperating and that will form the basis for the next G."

Sunil Patil
Vice President of Product Management, Qualcomm

Making major events manageable and profitable

"The AAU can sense the flight path of a drone in real time, and alert when the drone flies close to a warning area, thereby greatly ensuring low-altitude safety at the Asian Games."

Hans Neff
Senior Director, CTO Group, ZTE

GSMA

GSMA Intelligence research findings

Peter Jarich
Head of GSMA Intelligence,
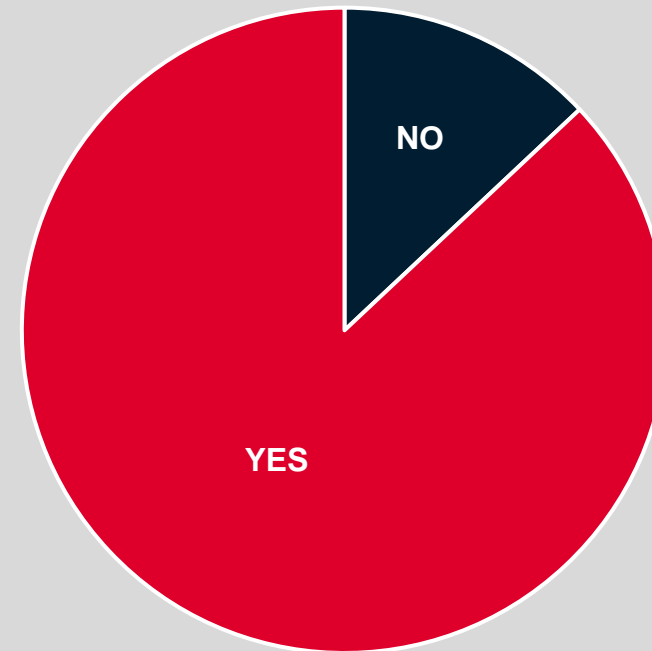GSMAi

in

5G-Advanced in 2024

Why Now and What Next?

5G-Advanced: Why Now?
Standards, investment cycles, early movers and 6G planning

- **3GPP Progress.** Impending standards freeze allowing for commercial deployments from 2024 onwards.

- **5G's CapEx Winter.** Slowing 5G investment following initial rollouts driving ecosystem to look for new opportunities.

- **Ambitious Planning and Prep**. China Mobile committing to major deployment (imminently) and other operators setting groundwork with carrier aggregation.

- **6G Bridging.** Expectation – against backdrop of 6G hype – that 5G-Advanced will be a bridge to future capabilities.
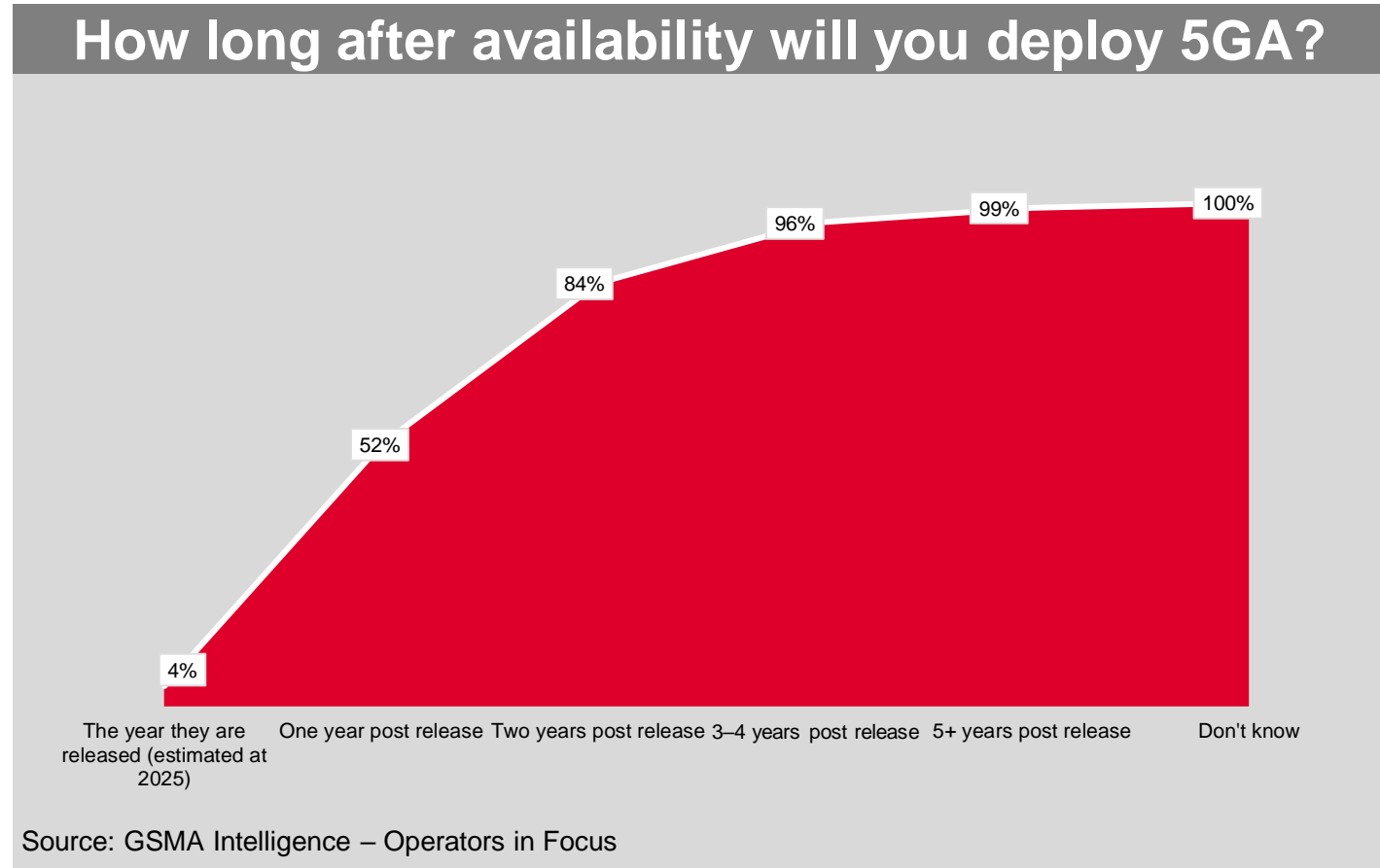
6G R&D Will Enhance Today's 5G Networks?

YES

NO

Source: GSMA Intelligence – Operators in Focus

GSMA Intelligence

5G-Advanced: What Next?
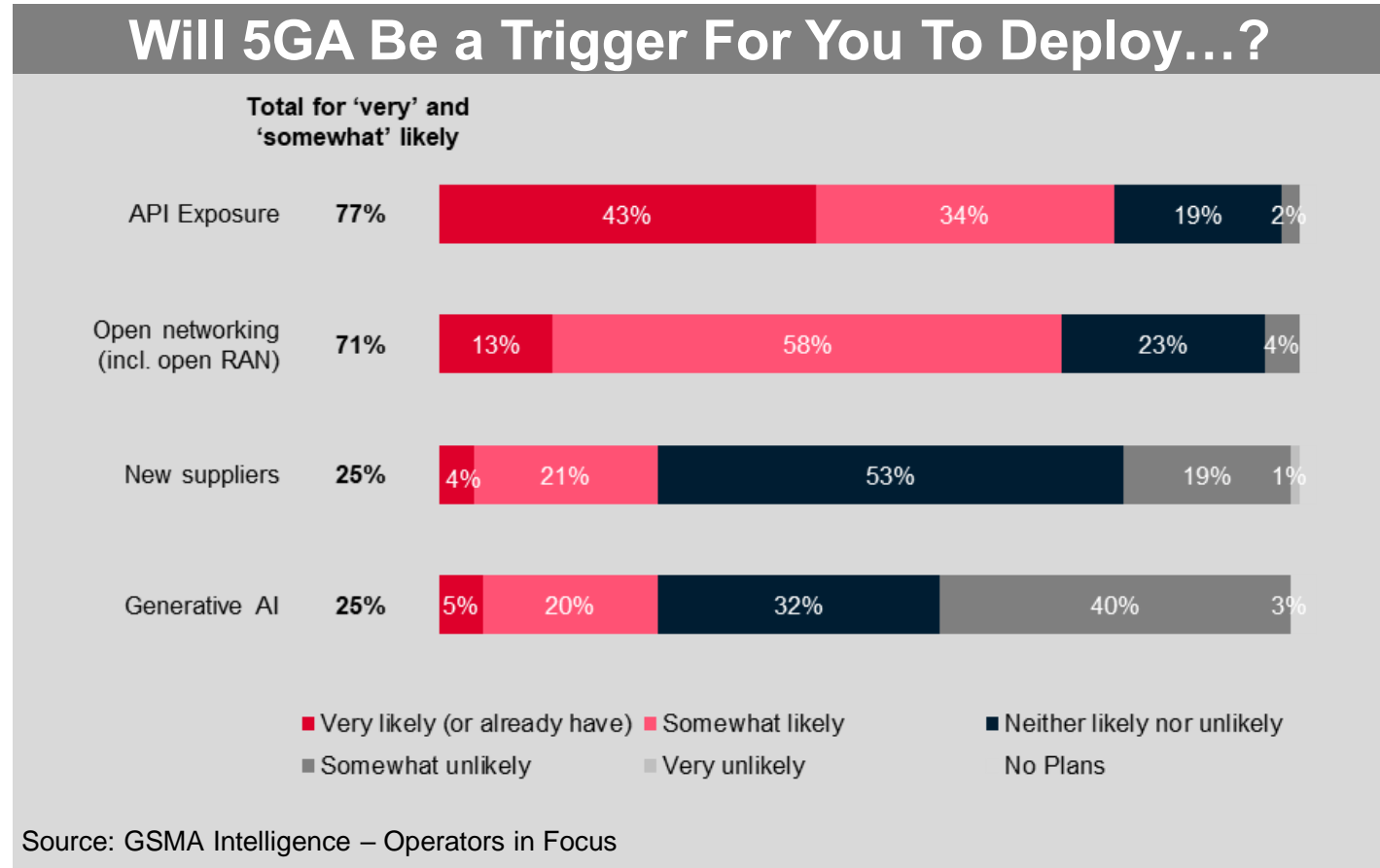## Early use cases, device ecosystems, and a dose of realism.

- **Use Cases, Use Cases, Use Cases.** Application plans will determine 5G-Advanced trajectory. IoT, NTN, and uplink-intensive services dominate thinking.

- **Monetized 5G vs. Use Cases.** Whatever the thinking, use cases will need to be monetized as operators continue to struggle with 5G RoI.

- **Device Support.** Device availability is always a gating factor on new tech adoption; IoT devices, smartphones and FWA devices will all be needed.

- **Rollout Reset.** Initial thinking about 5G-Advanced deployment timing will likely need to be revisited.

- **Strategic Trigger**. A new round of (even incremental) investment represents an opportunity to do things differently and push new initiatives.

How long after availability will you deploy 5GA?

4% — The year they are released (estimated at 2025)
52% — One year post release
84% — Two years post release
96% — 3–4 years post release
99% — 5+ years post release
100% — Don't know

Source: GSMA Intelligence – Operators in Focus

GSMA Intelligence

5G-Advanced: What Next?
Early use cases, device ecosystems, and a dose of realism.

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Will 5GA Be a Trigger For You To Deploy…?

Total for 'very' and 'somewhat' likely

		Very likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Very unlikely
API Exposure	77%	43%	34%	19%	2%	
Open networking (incl. open RAN)	71%	13%	58%	23%	4%	
New suppliers	25%	4%	21%	53%	19%	1%
Generative AI	25%	5%	20%	32%	40%	3%

- Very likely (or already have) ■ Somewhat likely ■ Neither likely nor unlikely
- Somewhat unlikely ■ Very unlikely No Plans

Source: GSMA Intelligence – Operators in Focus

GSMA Intelligence

GSMA Intelligence

Thank you

It has been already 5 years since the 1st 5G deployment

1   5G has been proven as the GREAT TECHNOLOGY

- SBA, cloud-native

- Enhanced security

- Service differentiation and QoS

- Great performance

2   The COMMERCIAL SUCCESS of 5G is disputable

- High frequency fees

- Expensive terminals

- The cost of the technology change

- Unclear customer benefits (B2C)

- ARPU impact

5G challenges

- Unlocking new service revenue streams beyond mobile broadband

- Exposing the capabilities in the global scale
  - E.e. telco public edge

- Embedding 3GPP connectivity in the devices
  - WiFi, BT as men in the middle

- Creating new partnering ecosystems
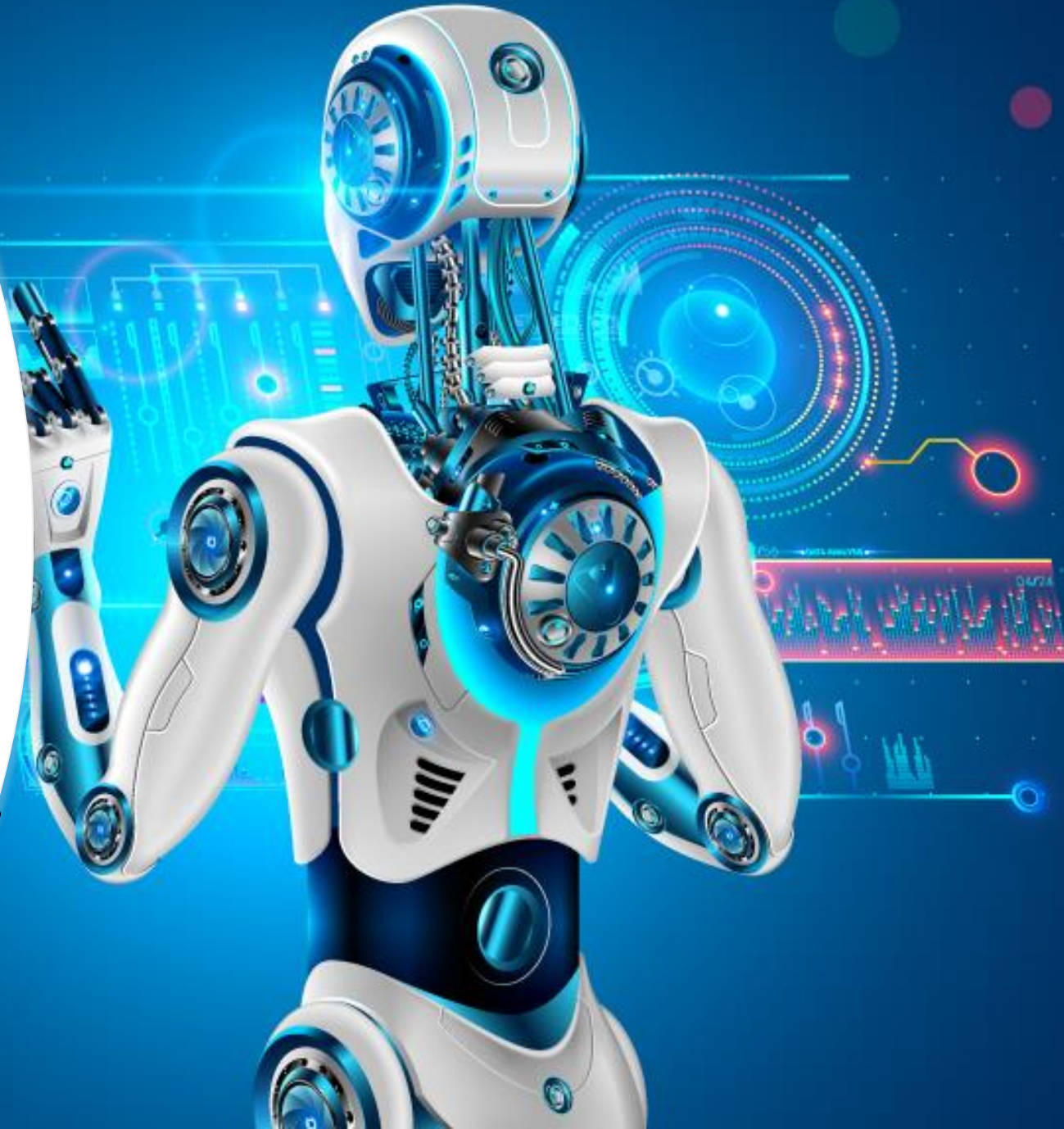
5G Advanced
1st step towards better monetization

- Major expansion of the IoT

- New sensing and location-based services

- Opening to developers

- Public-private, hybrid networks

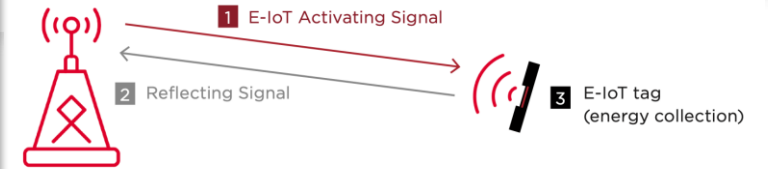# New monetization opportunities with 5G-A

FWA/Redcap

Unserved areas, cheaper
FWA terminals, wearables

Satellite NB-IoT

No coverage white spots,
new use cases enabled

1 E-IoT Activating Signal
2 Reflecting Signal
3 E-IoT tag (energy collection)

Passive IoT

Super cheap IoT tags, battery free,
energy harvesting, enormous
business potential

Precise & GPS-less positioning

Demanded by the developers
(no battery drain), enabler for
many smart services

xR / New Calling

New entertainment, fun calling,
Two-sided monetization opportunity

Open Gateway

"One ring to bring them all,
One ring to rule them all."

Thank you

axiata
advancing asia

HARNESSING THE POWER OF ADVANCED NETWORK

ST Engineering
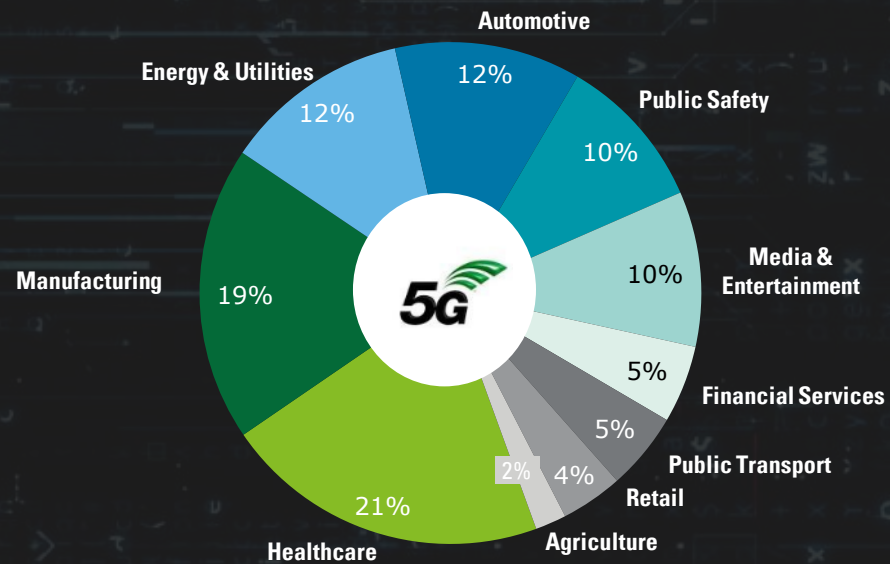
Apr 2024

PROJECTED GLOBAL ADOPTIONS

5G revenue potential for service providers addressing industry digitalization-2030 (*USD Bn*)[1]

700 bn – **35%**[1] on top of **revenues** from **current scope** of business for both ICT players and telecom operators

Pie chart – 5G

- Automotive 12%
- Public Safety 10%
- Media & Entertainment 10%
- Financial Services 5%
- Public Transport 5%
- Retail 4%
- Agriculture 2%
- Healthcare 21%
- Manufacturing 19%
- Energy & Utilities 12%

Source: Ericsson, Nomura and Analyses Mason

Industry 4.0
High tech manufacturing operations

Maritime Operations
Intelligence navigation for autonomous-driven vessels

Urban Mobility
Driverless transportation in the community

Smart City/ Estates

Consumer applications
4K ~ 8K streaming, Cloud, Gaming, Real-time Multi calls

Government applications
IoT, AI and Cloud as the driver for 5G

Operators are eager to tap into the 5G capabilities to enable fintech, e-government, ecommerce, consumer solutions such as enhanced mobile broadband (eMBB), 4K streaming on the go and cloud gaming, and B2B solutions such as immersive education, IoT and Industrial IoT, AR and VR, and robotics.

EMERGING TECHNOLOGIES
Impacting Business in Digital Age of 5G

AR / VR

Mixed reality technology are transforming the way we engage with machines, fata and each other. Organization are using them to enhance execution flexibility, operational efficiency and individual productivity.

IoT

Bring together information from a series of connected devices that allows for the creation of analytic of system. These platforms, devices and datasets have the potential to provide insights, efficiencies and new business opportunities.

AI / ML

Programmed algorithm that automatically parse and apply knowledge based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the most simple to those that are even more complex.
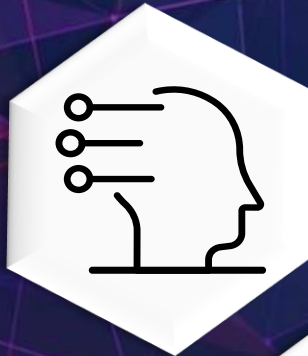
ROBOTIC / AUTOMATION

Is a branch of engineering and computer science that involves the conception, design, manufacture and operation of robots. The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways. Robotics can take on a number of forms

EDGE COMPUTING

Enables organizations to build applications that scale in real time, responding to demand that may change instantaneously by orders of magnitude.

NEEDS FOR EVOLVING SOLUTION

System Integrator's Wish List

FEATURE ● ECOSYSTEM

CSP ● POLICY MAKER

Positioning
- precise network-based positioning and enhance positioning
- support time-sensitive networks,

Enhanced UL
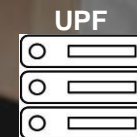- Improved support of UL-MIMO via dynamic waveform

Private Network Slicing

Low Power IoT
- RedCap, NR-Light
- Low Power WakeUp Receiver
- Power saving techniques
- Lower cost device,

QoS
- QoS and XR-specific parameters
- Application aware

UPF

Local Breakout

Private Spectrum

Sidelink
- Enhancement on performance (Unlicensed, CA, Multi-beam)
- Sidelink relay enhancement (D2D, D2N)

COST

How 5G Advanced improves
Smart Port

- Improves Operation

- Reduce carbonization

- Promote digitalization

Automated Guided Vehicle

- Enhanced positioning improves AGVs' routing and movement;
- Improved throughput capability allow more upwards data transmission

Low Power Trackers

- Implementation of low cost, low power tracker improves tracing of Containers
- Improves operation : container movement and yard operation

Tele-Operation

- Improved Uplink throughput enhanced the use of remote operation of gantry and cranes;
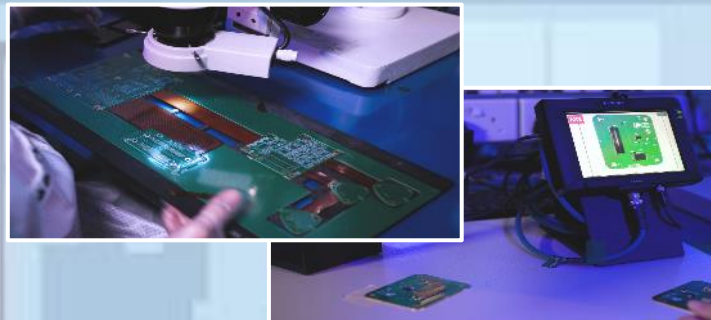- Encourage multiple uses of gantry usage at the same time.

Autonomous

- Improved sidelink and C-V2X could motivate the adoption of autonomous prime mover
- V2X, V2I, V2P reduce incidents.

ST Engineering

How 5G Advanced improves
Manufacturing

- Strengthen Productivity with Remote Assistance work

- Increases light-off productivity

Visual Assist

- QC by AI-enabled Vision Inspection
- Realtime application and analytics at the edge

Autonomous Robotics

- Indoor positioning improves autonomous Retrieval & Placement

Robotic Intelligent Sensors

- Data from machines collected and analyzed at to improve productivity, and reduce wastage

Remote Assistance and Guidance

- Remote assessment and assistance through hands-free smart goggles
- Data sharing from different geo-location
- Recording-able, for training and evaluation purpose

How 5G Advanced improves
Agritech

- Wireless network coverage optimization for remote areas

- Precise & reduce water and fertilizer wastage

- Improve yield and productivity

Drones in action

- Precise & shorter time to dispense fertilizers / pesticides onto crops from manual processes;
- Drone used for crops monitoring & analytics purposes;

Surveillance System

- Video Streams to centralize video analytics can help to predict the crops' growth
- Surveillance Cameras will be used as added security to protect against theft.

Automation & Tele-Operation

- Allows the use of remote operation of tractors for planting as well as harvesting;
- Automate harvesting made possible

Sensors in Agriculture

Unified sensors provide information about soil / air temperature, rainfall, leaf wetness, chlorophyll, relative humidity, atmospheric pressure, air pollution.

Thank you

ST Engineering

Panel discussion

Dr Tomasz Gerszberg
Group Head of Future
Networks, Axiata

Terry Tan
Solution Manager
from Enterprise
Connectivity & 5G
Task Force, ST
Engineering

Peter Jarich
Head of GSMA
Intelligence, GSMAi

Thank you

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