Axiata Analyst & Investor Day 2020:

Technology transformation via ‘Collective Brain’

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3rd December 2020

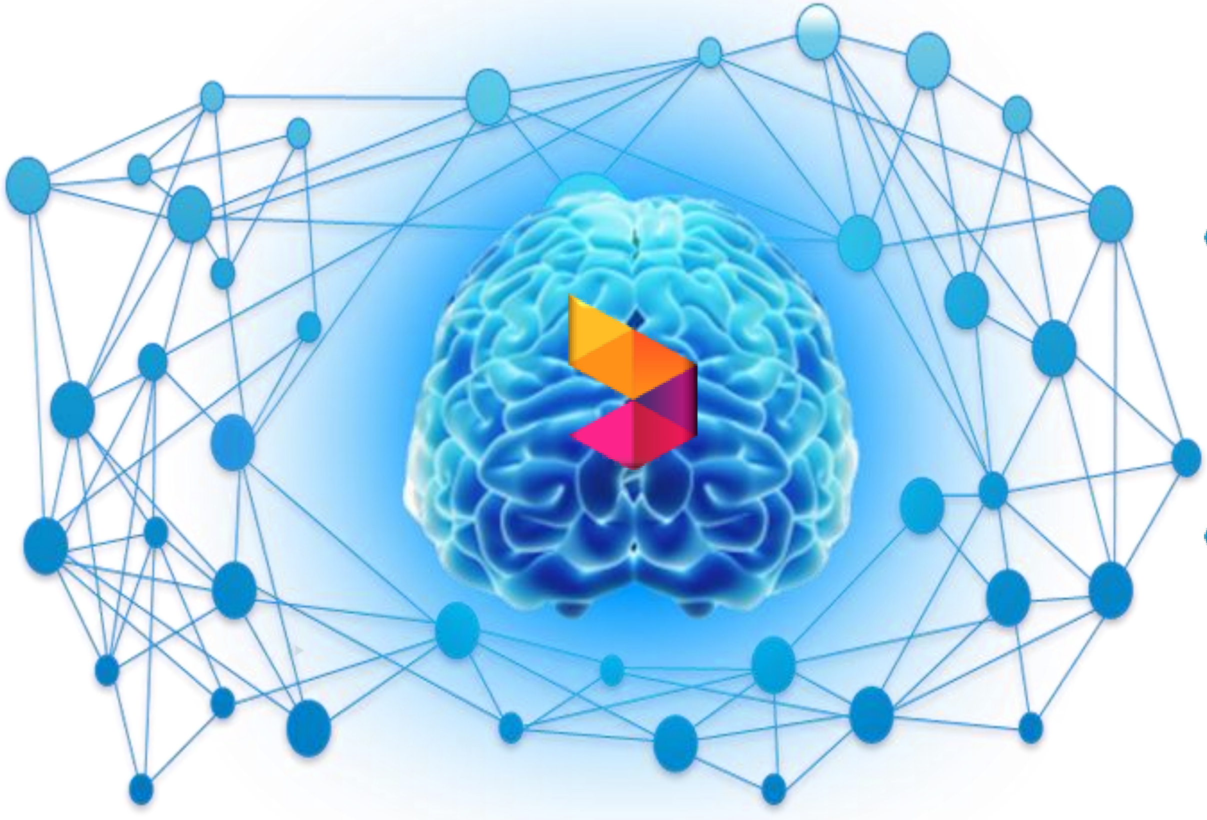
4

Agenda 10: Technology Transformation via "Collective Brain"

"Virtual Centralization" to unlock optimum Group-wide synergy – with a cumulative savings target of between RM 3 billion to RM 4 billion by 2024

The "Collective Brain"

- **OpCo Leaders collectively making Group-wide Tech decisions**
- **OpCo Resources taking on Group targets** *(Financial & Strategic)*
- **OpCo Resources involved in end-to-end execution**



- Spectrum Optimization
- Value-Based Planning
- Tech Efficiency
- VoLTE Maturity
- 3G Shutdown
- Lean Operations
- NFV / SDN / Distributed NW Architecture
- Open Network
- Network De-risking
- Harmonization for Scale in Procurement

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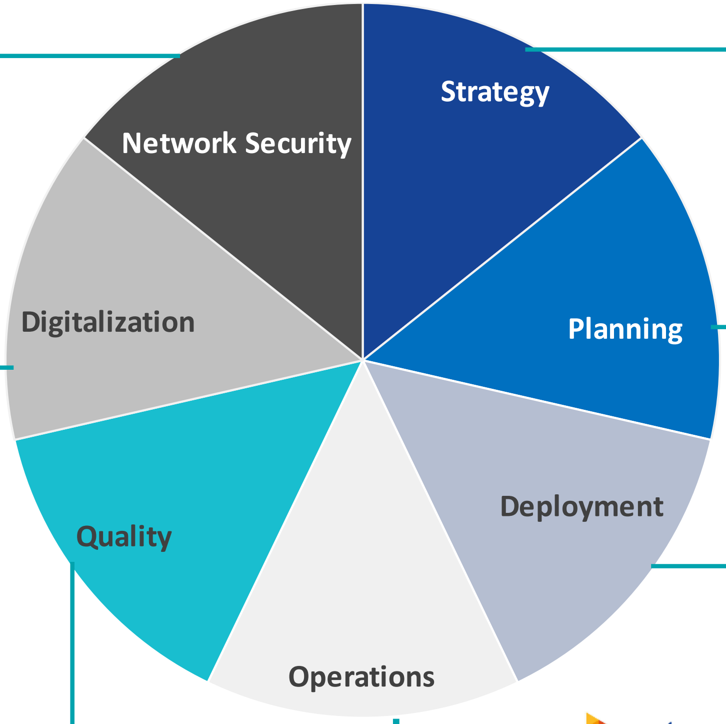
CB Operating Model - Network

Axiata's Collective Brain operating model is aligned with global practices



Network Security

	axiata	Global
▶ Security Strategy	Centralized	Centralized
▶ Security Policy, Standard and Baseline Security	Centralized	Centralized
▶ Security Risk & Compliance Assessment	Partially Centralized	Partially Centralized
▶ Security Monitoring & Response	Centralized	Partially Centralized
▶ Security Architecture & Design	Centralized	Centralized
▶ Security Control Implementation	Partially Centralized	Partially Centralized
▶ Security Operations	Partially Centralized	Partially Centralized

Strategy

	axiata	Global
▶ Network Technologies, architecture and standards	Centralized	Centralized
▶ Network modernisation (incl. SDN & Virtualisation)	Centralized	Centralized
▶ Capex budgeting	Joint	Centralized
▶ Cost structure	Joint	Centralized
▶ Spectrum strategy	Joint	Partially Centralized
▶ Vendor strategy	Joint	Centralized
▶ Asset monetization	Partially Centralized	Partially Centralized
▶ Sun set of legacy technologies	Partially Centralized	Partially Centralized

Planning

	axiata	Global
▶ Radio capacity to be deployed	Partially Centralized	Partially Centralized
▶ Transmission	Partially Centralized	Partially Centralized
▶ Core network	Joint	Joint
▶ Fixed	Partially Centralized	Partially Centralized
▶ Fiber	Partially Centralized	Partially Centralized
▶ Passive Infrastructure	Decentralized	Decentralized

Deployment

	axiata	Global
▶ Radio, Core, Transmission	Decentralized	Decentralized
▶ Site / PoP development		
▶ Network procurement		
▶ Site integration and commissioning		
▶ Vendor management	Joint	Centralized

Digitalization

	axiata	Global
▶ Digitalization roadmap	Centralized	Centralized
▶ Embedding technologies as AI/ ML, RPA, etc. in network functions	Centralized	Centralized
▶ Tools selection	Partially Centralized	Partially Centralized
▶ Implementation & execution	Decentralized	Decentralized

Quality

	axiata	Global
▶ RAN key performance and quality indicators	Centralized	Centralized
▶ Parameter audit	Partially Centralized	Partially Centralized
▶ Customer experience	Decentralized	Decentralized
▶ Network related Customer complaints	Decentralized	Decentralized
▶ Reporting and Governance	Partially Centralized	Partially Centralized
▶ Network optimization	Partially Centralized	Partially Centralized

Operations

	axiata	Global
▶ Core network operations	Decentralized	Decentralized
▶ RAN monitoring and management	Decentralized	Decentralized
▶ Managed services	Decentralized	Decentralized
▶ Fault Management	Decentralized	Decentralized
▶ Performance Management	Decentralized	Decentralized
▶ Workforce Management	Decentralized	Decentralized
▶ Log & Backup management	Decentralized	Decentralized
▶ Network Configuration	Decentralized	Decentralized
▶ Vendor Management	Joint	Centralized

Legend:
- Centralized
- Joint planning between Corporate and OpCo
- Partially Centralized (policy cascaded from Group)
- Decentralized

Source: Group Technology, EY

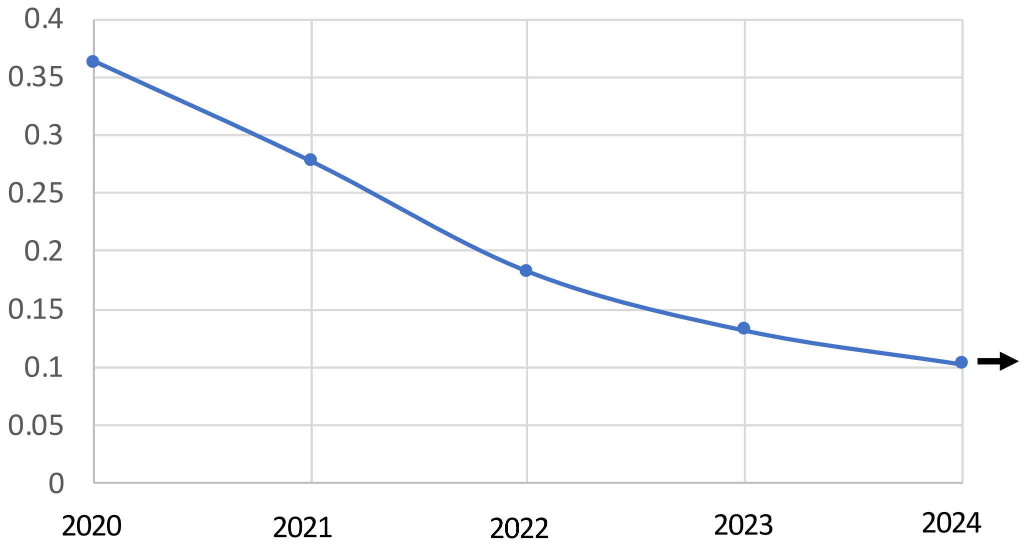
4

Our mission: Production Costs (Cost/GB) below $10c/GB!

Cost structure needs to be continuously improved through Technology transformation as well as OPEX reduction initiatives.

Illustration of a sample OpCo:

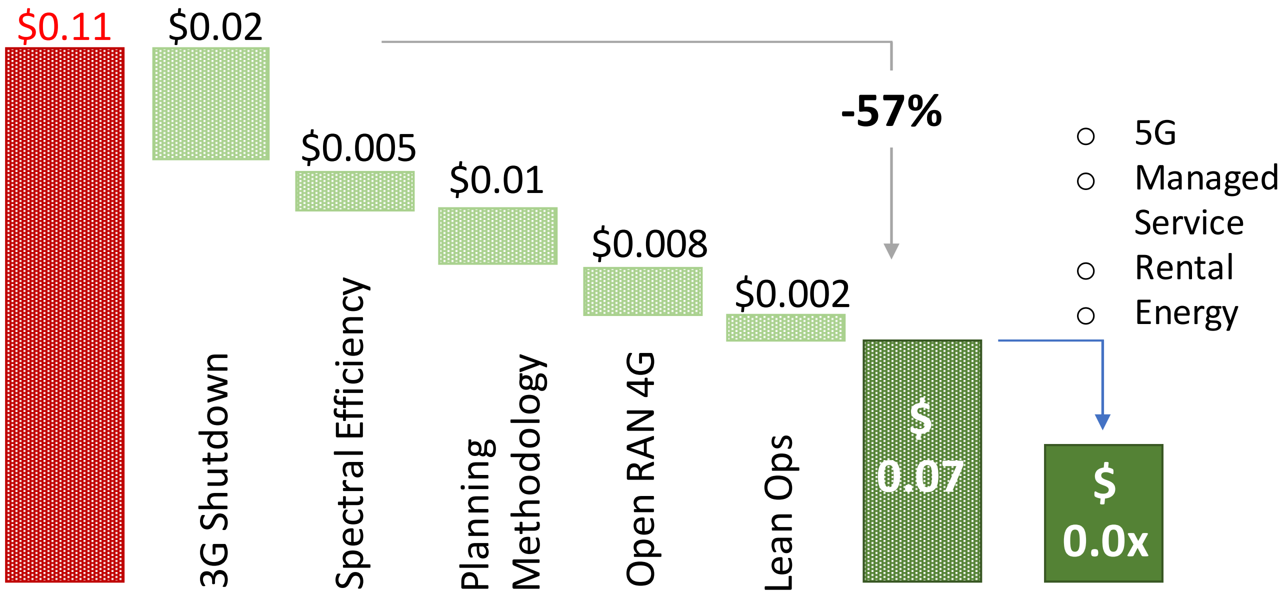
Cost/GB forecast – BAU cost management



1. Cost/GB reduces to $11c by 2024 only with BAU cost management
2. Emphasizes the fact that Technology Transformation is required to bring Cost/GB down below $10c

Further improvement in Cost/GB via Technology transformation

1. Cost can be driven down to $7c via technology transformation.
2. Improve 'factory capacity' via 3G shutdown and re-farming for 4G.
3. Drive up utilization towards 'factory capacity'.
4. 4G OpenRAN has a marginal impact since the 4G network is already matured. 5G OpenRAN will be viable low cost option.



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Technology transformation via 'Collective Brain'

Key Initiatives Work in Progress / To be Implemented

1. **Move to Segment and Service based planning methodology to reduce capital expenditure**
2. **Transitioning into most efficient technologies to deliver voice and data services**
3. **VoLTE maturity in Celcom, Smart, Dialog and XL by end 2022**
4. **3G shutdown and becoming a 4G + 5G network to achieve lowest cost per bit operation**
5. Effective Spectrum Allocation and maximizing Spectral Efficiency
6. LEAN operation via automation, tooling, analytics and upskilling the work force
7. Open networks for low cost, customizable and disaggregated model for future network deployments
8. Virtualized, Software define, distributed network architecture leveraging public cloud providers
9. De-risking the network from Geo-political challenges

Insightfully managing customer experience in order to lower cost with transitioning into most efficient technologies to deliver respective services

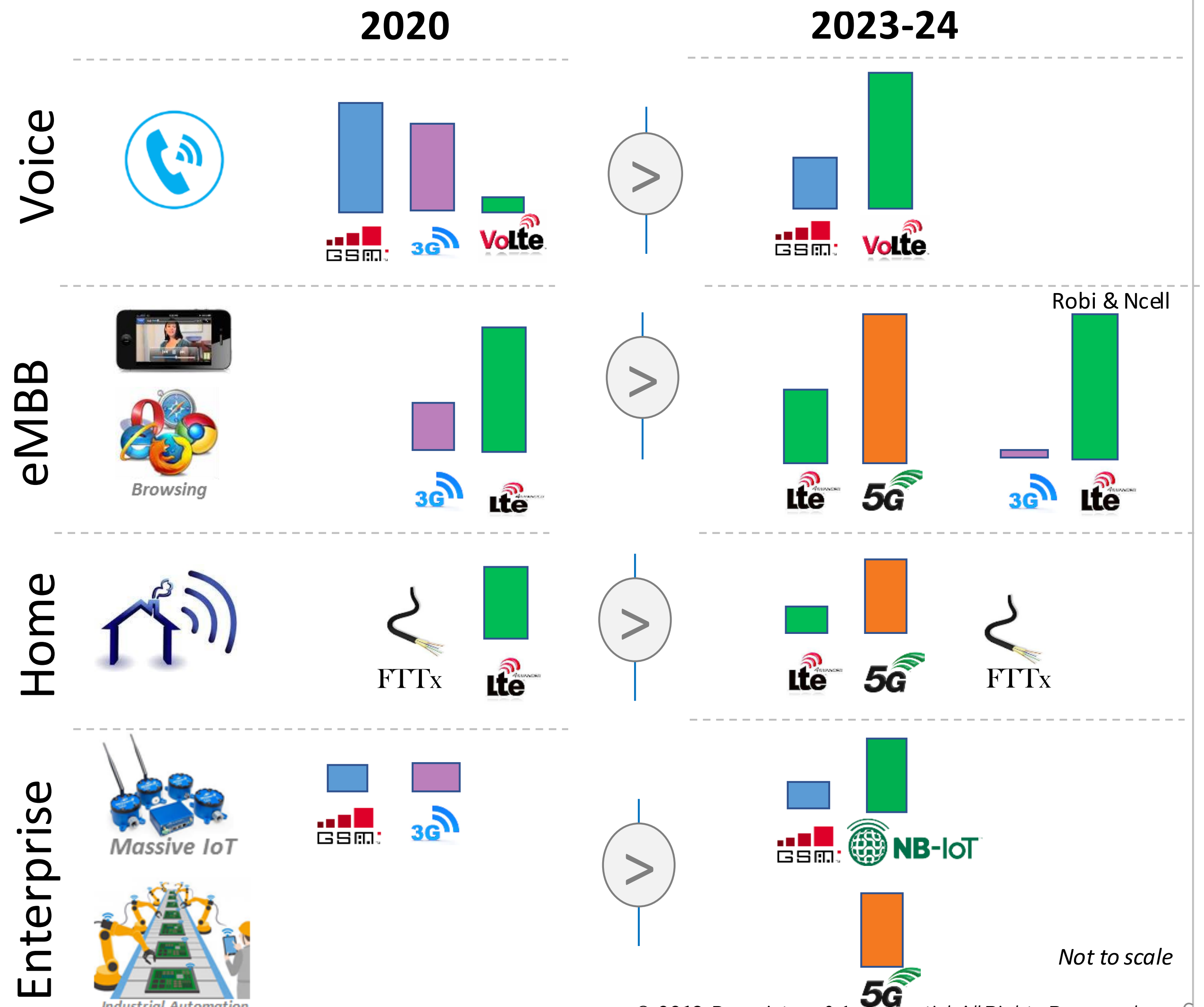
Service & Segment based planning capex efficiency

- Strategize performance criteria for ‘Value Segments’ and ‘Services’ and apply Quality of Service (QoS) for differentiated experience

	Voice Over APP	Default Data	Worry-Free Video
High Value Subscriber	Priority 1	Priority 3	Priority 5
Medium Value Subscriber	Priority 2	Priority 4	Priority 6
Low Value Subscriber			

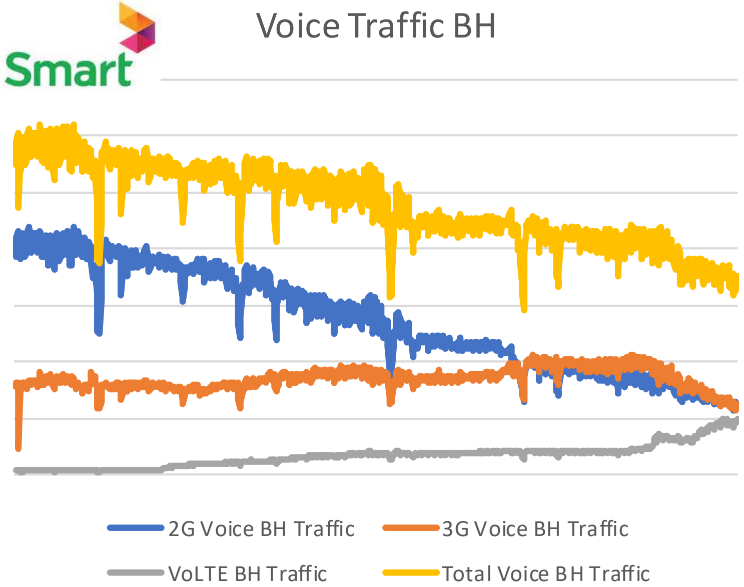
- Improves CAPEX and OPEX efficiency via analytics based targeted investments

4G & 5G at the core of future service delivery



Long journey towards VoLTE maturity… We have already started! Targeting VoLTE maturity in Celcom, Smart, Dialog & XL by end 2022.

VoLTE status with early adopters in Axiata



70%
VoLTE terminals

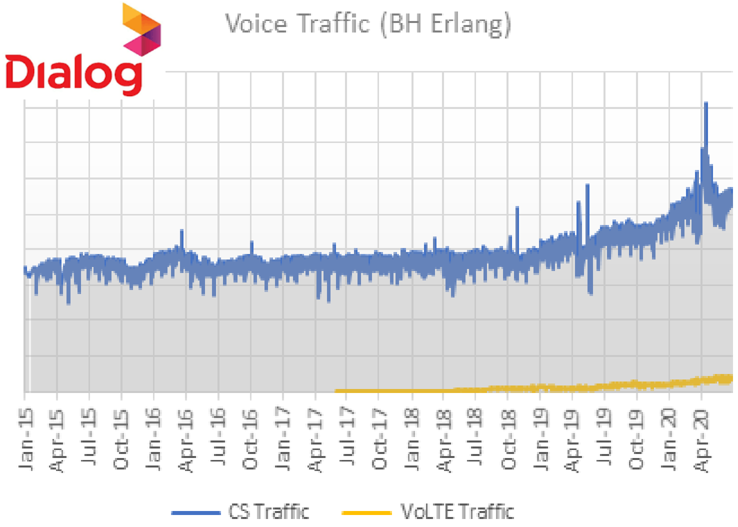
28%
VoLTE Traffic

40%
3G Traffic

40%
VoLTE terminals

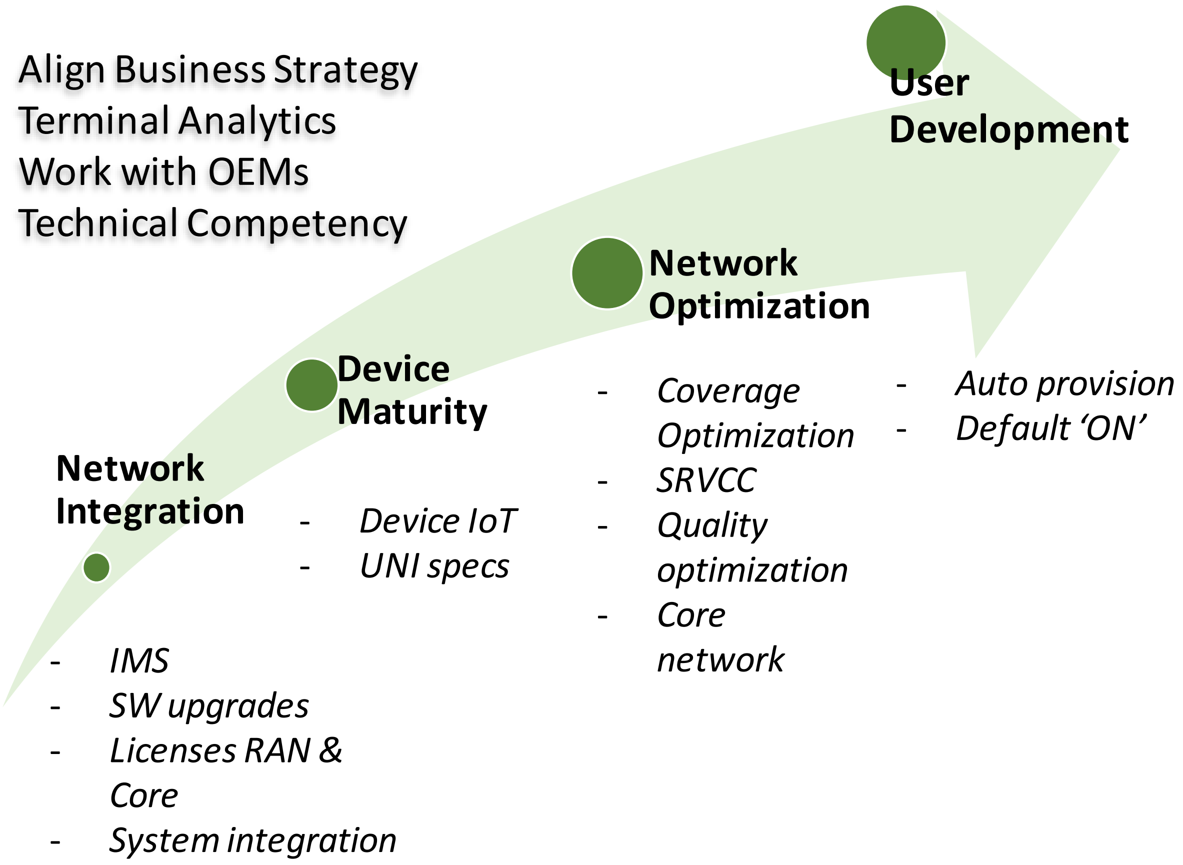
7%
VoLTE Traffic

36%
3G Traffic



Terminal IOT, E2E network plan & optimization

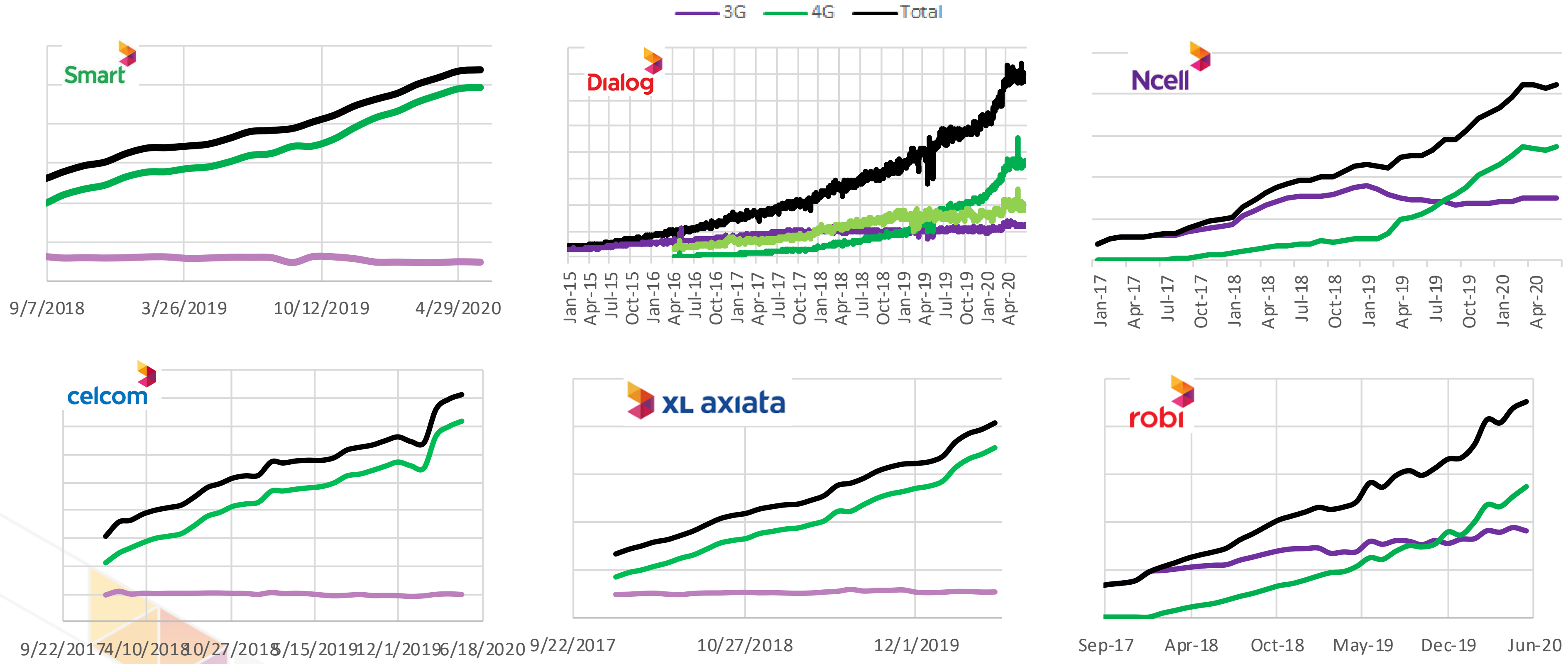
- Align Business Strategy
- Terminal Analytics
- Work with OEMs
- Technical Competency



3G shutdown and becoming a 4G(+5G) network by 2022 to achieve highest 'factory capacity' & avoid upgrades

Smart, Celcom, XL and Dialog looking at an aggressive strategy to shut down/descale 3G. Ncell and Robi will follow suite.

Data traffic (Gbps) evolution of Axiata OpCos indicate less reliance on 3G



3G shutdown adds capacity, only minor cost reduction

Opco	Δ Capacity
celcom	15%-20%
Smart	10%-15%
XL axiata	10%-15%
Dialog	25%-30%
Ncell	30%-40%
robi	50%

Decide & Act >

2G & VoLTE To absorb 3G voice traffic + **No 3G M2M** + **900 LTE** For coverage + **uSIM** Aggressive conversion

4G spectrum will max out in Celcom & Smart by end of 2022. We need **more sites or new spectrum**. 5G will offer the best future proof option.

New 3.5GHz or 2.6GHz spectrum required. Commercial networks should start in late 2021 or early 2022 and gradually scale up in order to prepare the market for a wider adoption to leverage from 5G capacity in 2023.

Three drivers behind 5G

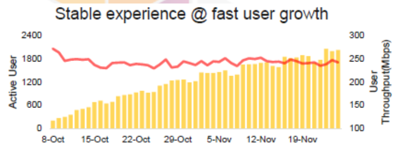
1. eMBB Capacity

+130% GB growth

2. Early mover advantage

3. Use cases

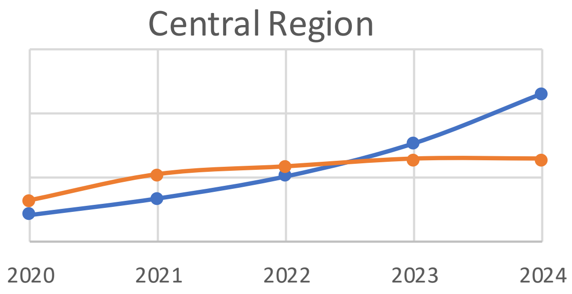
FWA

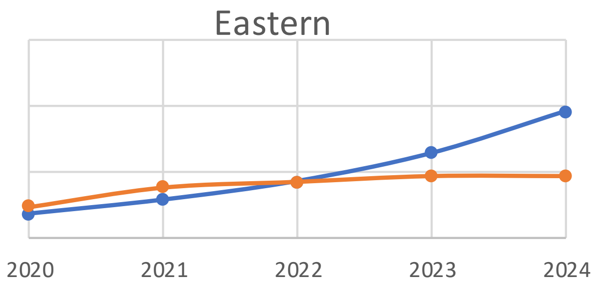


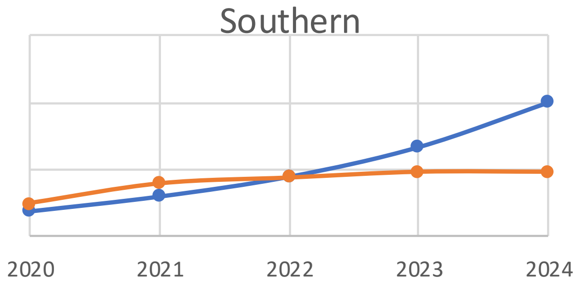
AR,VR, Gaming

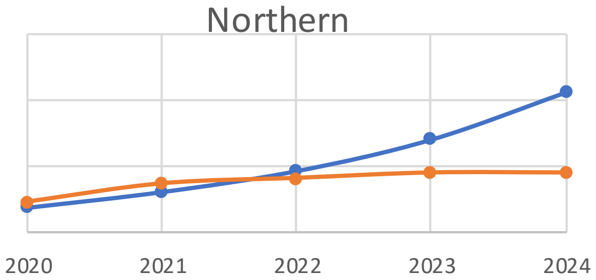
Celcom & Smart need 5G for capacity in 2022 & Dialog in 2023

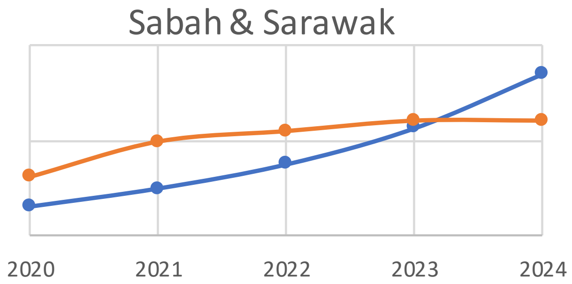
Capacity forecast   Capacity employed



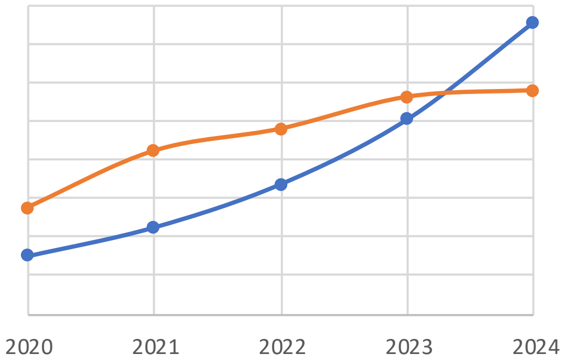


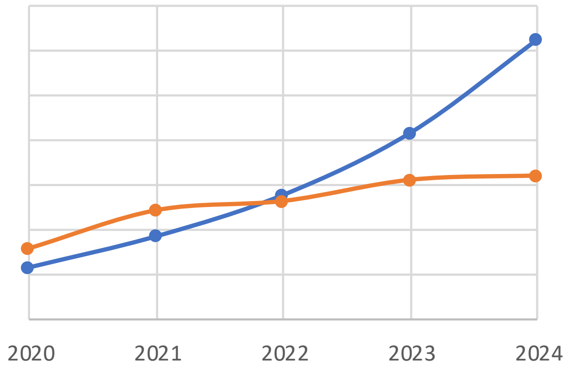






Western Province





Key Assumptions :
1. All spectrum used for 4G
2. No new sites for capacity
3. MBB traffic to grow at roughly 40% CAGR

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