هيئة الإتصالات وتقنية المعلومات
Communications and Information Technology Commission

TELCO PROVIDERS COLLABORATION OPPORTUNITIES

Executive Report | DECEMBER 2019

Executive summary

- While globally mobile & fixed subscriptions are growing, KSA's market has been declining since 2014, with most players' revenue growth lower than benchmark. However, local players have been able to maintain higher margins than benchmark, relying on high revenue per user and lower investment levels
- This context increasingly incentivizes Telco operators to diversify their activity by looking for revenue sources outside the core business, and look capital investment efficiency through new partnerships
- In KSA particularly, the local large-scale digital transformation is creating opportunities for Telcos to diversify in several sub-sectors
- Among those, CITC has been tasked to assess the feasibility & potential impact of a collaboration between telco players in specific plays: National IoT Platform, Data monetization platform, National mobile payment platform and NEOM infrastructure sharing
- Of the identified plays, there is strong identified value for Telcos in collaborating to build NEOM connectivity infrastructure, and monetize & pooling their data to unlock new national opportunities
- Beyond these plays, different models of collaboration for IoT (through standardization of mobile IoT connectivity) or deeper use-cases in or Fintech (e.g., identity authentication) could unlock significant value for both the Telcos and the broader ecosystem
- Additionally, strong value-add potential can be derived from identifying adjacencies to the core business where the Telcos have a local right to win (e.g. KSA edge computing architecture, hyper-scale data centers)

Telco Collaboration Opportunities

Objectives of this document

- Identify collaboration plays for local telecom providers across selected verticals
- Detail and analyze a selection of collaboration plays
- Present our perspective on collaboration opportunities (impact, feasibility, challenges, …)

Telco Collaboration Opportunities

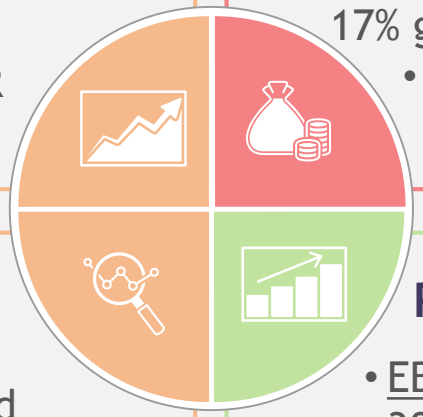
The dialog on collaboration is already open

First meeting with all Telecom operators, on 26/11/2019

Context: Saudi Telecom market profitable but stagnant

Market size & growth:
- Subscriptions (both mobile & fixed) have decreased at ~5% CAGR since 2016, vs. 4% growth globally
- Total market size decreasing at ~2% CAGR since 2016, but still largest in GCC

Private investment
- Capex investments have been below global benchmark since 2017 (~14% of total sales vs. 17% globally)
  - However, recent commitments on 5G roll-out investments show recovery signs



Competitive landscape
- Mobile: STC still major player with >50% market share, but increasingly challenged by other MNOs and growing MVNOs
- Fixed BB: STC largely dominating fixed market with more than 83% market share

Profitability
- EBITDA margins have increased from 36% to 38% on average (vs. 34% avg. for top players)
- Net profit margins have increased for all players, averaging 8% vs. 2% benchmark[1]

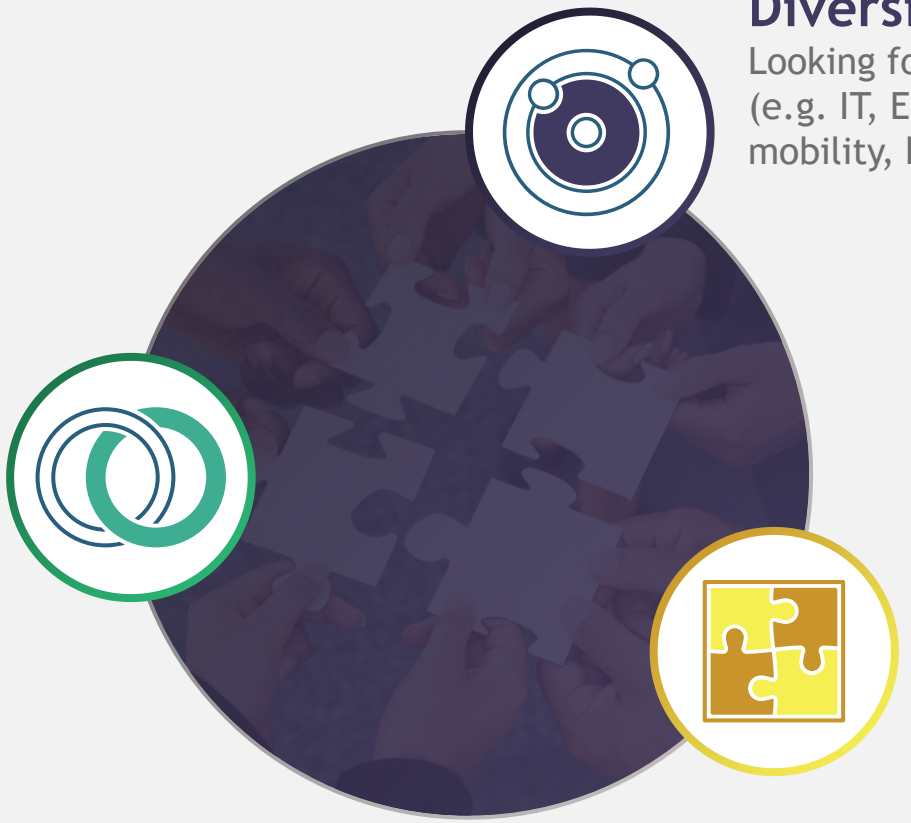
1. Benchmark composed of top 5 EU Telco players

Source: CITC, MCIT Telecom sector review, CapitalIQ, Ovum, Annual Reports, BCG analysis

In order to maintain growth and profitability, players need to seek new options

Diversify beyond the core business

Looking for new revenue streams in adjacencies (e.g. IT, Emerging Tech) or in new verticals (e.g. mobility, healthcare)



Pool capital spending

Decreasing balance-sheet exposure through collaboration on major capital projects (e.g. FTTH roll-out, tower deployment, …)

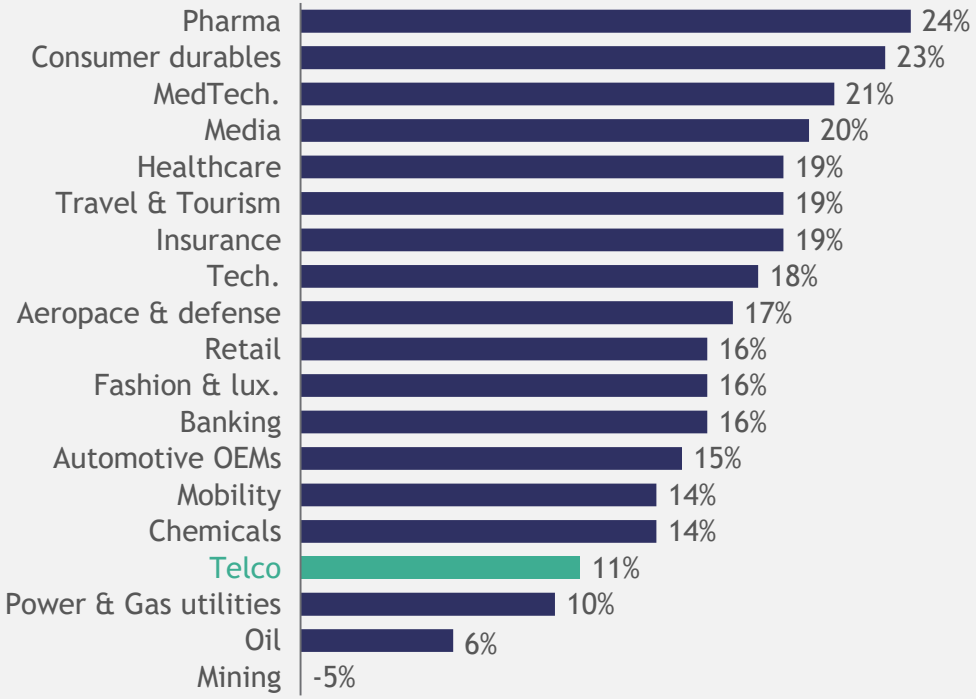
Seek cost synergies

Finding ways to reduce the cost-exposure through innovation in business models (e.g. strategic partnerships, buy v. build decisions), and through optimization of current spend

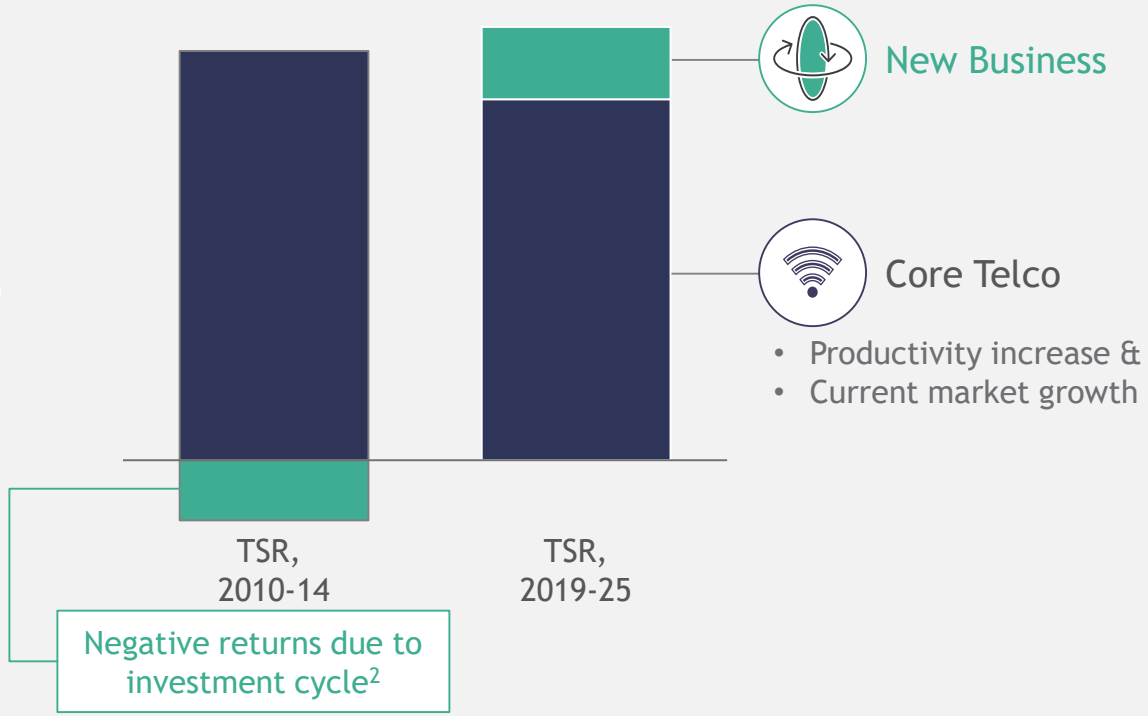
Globally, lower value creation in Telco core business has driven players to diversification…

Lower historic returns for Telco sector

2014-2018 Total Shareholder Return (TSR[1]) (%)



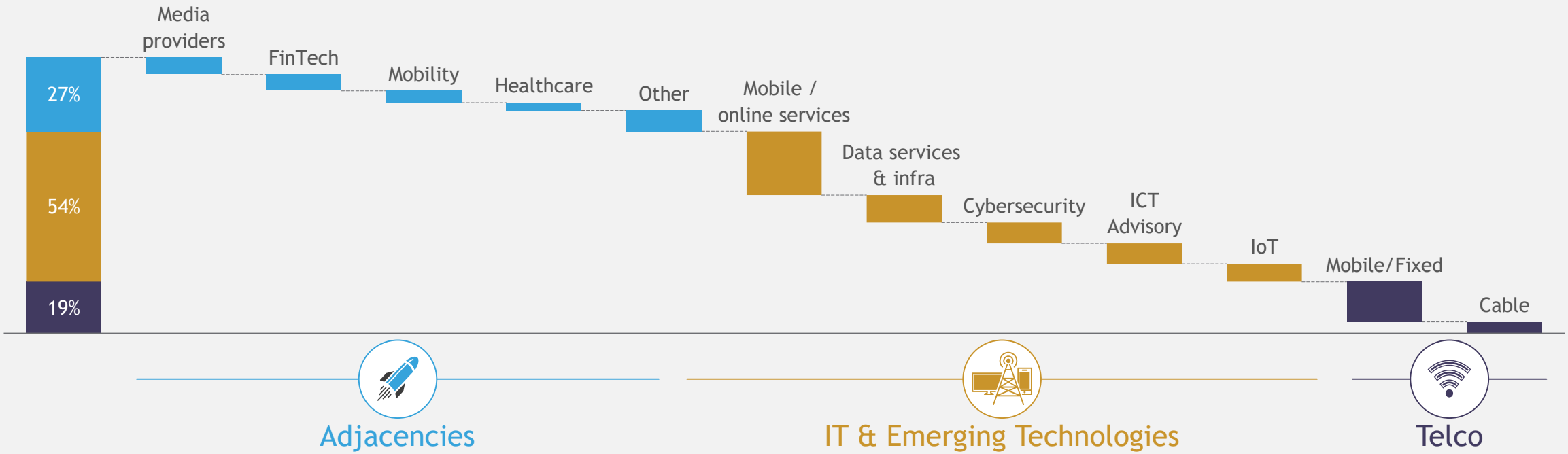
Telcos betting outside the core to grow



1. TSR calculated based on dividends payouts & share price appreciation over time 2. Negative 2014-2018 TSR driven by high capital investment and corporate growth (M&A, VC) in early-stage solutions, expected to yield revenues & profits only in mid/long-term / Source: S&P Capital IQ; BCG ValueScience® Center

… with opportunities spanning diverse business areas

Distribution of 2011-2018 Telco M&A activity by sector (in volume)



1. Company network with 2,491 acquisitions. Sample considered: Altice, America Movil, AT&T, Axiata, BCE, BT, China Mobile, China Telecom, DT, Etisalat, KDDI, KPN, KT, MTN, NTT, NTT Docomo, Orange, Rogers, SKT, Singtel, Softbank, Swisscom, TI, Telefonica, Telenor, Telia, Telstra, Verizon, Vodafone
2. Only deals where value was publicly disclosed, all pending deals (eg T-Mobile/Sprint or Telenor/Axiata are not included
Source: Quid, Capital IQ, BCG analysis

KSA's transformation & Vision 2030 are unique opportunities for Telcos to grow in new areas

ICT is core to digital transformation

"A connected digital Kingdom, enjoyed by everyone"

"In NEOM, everything will be connected, everything will be smart"

"Opening financial services to emerging tech players to spur innovation and growth"

"A shared, open & connected infrastructure generating valuable national data"

Key opportunities for telecom providers

- Upgrading the current connectivity layer to enable future use-cases (e.g. massive IoT, 5G)
- Building the ICT infrastructure of the future (e.g. NEOM, smart cities)
- Accelerating growth of key verticals of the digital society (Fintech, …)
- Leverage unique data depth to fuel other sectors growth (retail, finance, tourism,…)

Source: Vision 2030 website, NEOM website, National Digital Transformation Strategy, Financial Sector Development Program, BCG analysis

However, the window of opportunity is shrinking, with all market sizes expected to surge in coming 5 years

ICT is core to digital transformation

"A connected digital Kingdom, enjoyed by everyone"

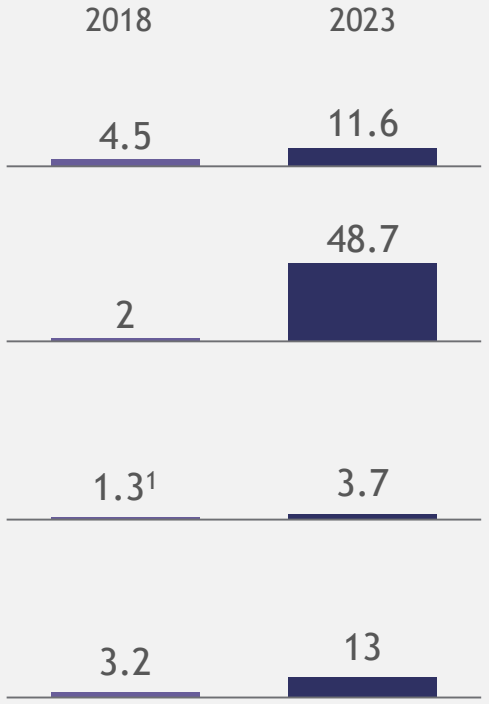
"In NEOM, everything will be connected, everything will be smart"

"Opening financial services to emerging tech players to spur innovation and growth"

"A shared, open & connected infrastructure generating valuable national data"

Key opportunities

KSA Market size (SAR B)



1. Based on KSA estimated share of global transaction value (*Global Fintech Market Overview*) and global market size CAGR (2018-2023)
Source: Saudi Arabia Internet of Things Market Forecast and Analysis, IDC, June 2019, Data Monetization Market, May 2018, Markets and Markets, Global Smart Cities Market, Mordor Intelligence, Statista, Global Fintech Market Overview, Prnewswire, BCG Analysis

Several potential plays identified for telecom providers…

Selection of plays

				
Telco	• Cellular IoT connectivity enablement (NB-IoT, LTE-M1, 5G BB, …) • Unlicensed IoT (LoRa, Sigfox) connectivity	• High-standards network infrastructure development (e.g., quality, resilience, capacity)	• NA	• Churn optimization • Customer value-creation (e.g., upselling/ cross-selling) • Infrastructure planning
IT & Emerging Technologies	• Revenue management for IoT providers (e.g. white-label billing) • Device management • Customer-care services	• Operating platform for smart cities services (incl. data pooling, cleaning, aggregation, …)	• Development of platforms to host solutions / services of other fintech providers (e.g. IT platform for mobile banks)	• Data merchandising • Targeted advertising • Personalization • Customer insights development (i.e., advisory)
Adjacencies	• Solutions development for IoT network for other verticals (e.g. smart cities, healthcare, …)	• Smart city services design for 3rd parties (e.g., smart metering, pollution monitoring, traffic management, …)	• Deployment of new fintech B2B / B2C services (e.g. white-label billing, insurance, credit scoring) • Scaling existing mobile wallet solutions	• Citizen level data services (e.g., identity check, credit scoring)

Source: Gartner, Ovum, Expert interviews, BCG analysis

… some with potential value for collaboration

Value created by collaboration

Telco

National IoT connectivity platform *(MNOs, MVNOs)*

NEOM connectivity infrastructure sharing *(MNOs, Fixed)*

- NA

- Churn optimization
- Customer value-creation (e.g., upselling/ cross-selling)
- Infrastructure planning

IT & Emerging Technologies

- Operating platform for smart cities services (incl. data pooling, cleaning, aggregation, …)

National mobile payment platform *(MNOs, MVNOs)*

- Insurance, credit scoring)
- Scaling existing mobile wallet solutions

National Telco data aggregation & monetization platform *(All)*

Adjacencies

- Solutions development for IoT network for other verticals (e.g. smart cities, healthcare, …)

- Smart city services design for 3rd parties (e.g., smart metering, pollution monitoring, traffic management, …)

Source: Gartner, Ovum, Expert interviews, BCG analysis

More details in individual concept papers

Collaborating could unlock key value levers…

✓ Main value levers

Telco

- ✓ Accelerated network rollout for IoT solutions
- ✓ CAPEX savings on network deployment
- ✓ CITC support to enforce standards and new norms

- ✓ CAPEX saving opportunity from network roll-out
- ✓ CITC's support in contract assignment

- NA

- Churn optimization
- Customer value-creation (e.g., upselling/ cross-selling)
- Infrastructure planning

IT & Emerging Technologies

- Operating platform for smart cities services (incl. data pooling, cleaning, aggregation, …)

- ✓ CITC support to get regulatory approvals
- ✓ Interoperability of systems increasing customer value
- ✓ CAPEX savings on platform building and deployment

- ✓ CITC support to get regulatory approvals
- ✓ New market unlocked (national services) with unique value proposition
- ✓ Undercutting of 3rd party aggregators / monetizing companies
- ✓ Increased user data privacy / protection

Adjacencies

- Solutions development for IoT network for other verticals (e.g. smart cities, healthcare, …)

- Smart city services design for 3rd parties (e.g., smart metering, pollution monitoring, traffic management, …)

insurance, credit scoring)
- Scaling existing mobile wallet solutions

Source: Gartner, Ovum, Expert interviews, BCG analysis

…and compete at par with strong incoming players

More details in individual concept papers

	IoT	NEOM	Fintech	Data monetization
Telco	sigfox, ORACLE, Jasper*, IBM Watson*, ARMIS, cisco*, vodafone*, SAP*, NOKIA*, IoTium	Global telco players	• NA	• Churn optimization • Customer value-creation (e.g., upselling/ cross-selling) • Infrastructure planning
IT & Emerging Technologies		• Operating platform for smart cities services (incl. data pooling, cleaning, aggregation, …)	adyen*, orange bank, Pay*, فاتورة Faturah*, مدى mada*, TransferWise, Revolut	Microsoft*, instarea*, factual, acxiom*, IBM*, SAP*, Google*, Facebook*
Adjacencies	• Solutions development for IoT network for other verticals (e.g. smart cities, healthcare, …)	• Smart city services design for 3rd parties (e.g., smart metering, pollution monitoring, traffic management, …)	• Deployment of new fintech B2B / B2C services (e.g. white-label billing, insurance, credit scoring) • Scaling existing mobile wallet solutions	

Source: Gartner, Ovum, Expert interviews, BCG analysis

*Player with an existing footprint in KSA

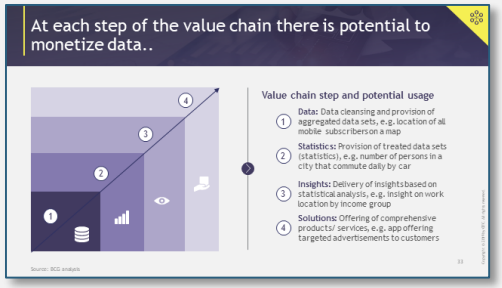
We conducted a detailed assessment of the individual plays…

More details in individual concept papers

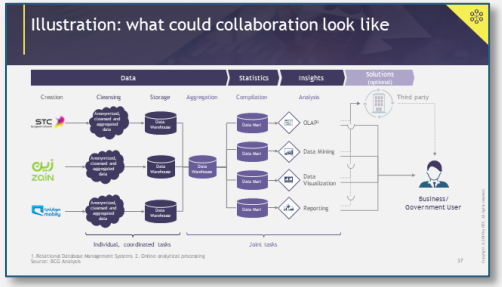
Individual concept papers per play

(20-30 pages)

Rationale for collaboration



Scope of collaboration and opportunity



Description of collaboration models option space

Source: BCG Analysis

…validated by diverse pool of industry experts…

Nicolas Hunke
Global Leader of Digital in TMT topic, BCG

Christian Bartosch
BCG Senior Expert in Telco Infra & Networks

Ugo Cotroneo
Managing Director, Head of Digital Finance Topic, BCG

Andreas Lundmark
Head of BCG Big Data & Analytics, Stockholm

Telco professionals

Richard Saggers
Former MD Go-to-market strategy, Vodafone, 18+ years of experience

Lewaa Hamadeh
Head Of Technology at Maddict (Data monetization), 10+ years of experience

Eric Kuisch
Former CTO at Vodafone Germany, 20+ years of experience

John Foster
Former Data Strategy Director, Telefonica, 17+ years of experience

Regulatory experts

Michel Combot
Former MD, ARCEP (French Telco Regulator)

Sean Williams
Former Competition Partner & Board Executive at Ofcom

…and a detailed benchmark of existing collaboration models globally

Detailed case studies in appendix

Telco

Smart cities (NEOM)

Creation of a joint venture to develop 5G network

Collaboration to ensure FTTH in medium dense areas

Smart cities (NEOM)

IT & Emerging Technologies

Fintech

Creation of a joint venture offering interoperability of mobile payment services

Provision of identity services for digital service providers

Data monetization

Adjacencies

IoT

Partnership with Los Angeles to develop IoT platform

Creation of financial profiles for individuals who have no previous credit history

Fintech

Data monetization

Source: BCG Analysis

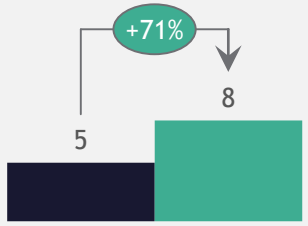
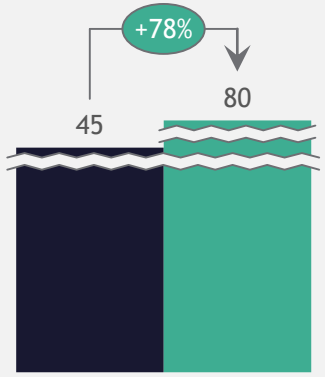
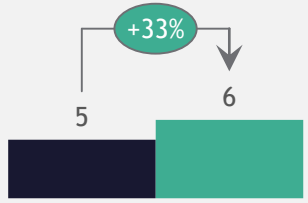
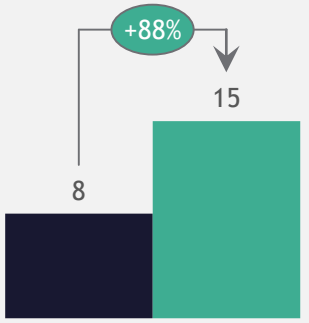
هيئة الاتصالات وتقنية المعلومات
Communications and Information Technology Commission

Opportunities assessment

Financial impact estimated based on investment and profit upside vs. solo play

More details in individual concept papers

Top-down analysis

Main play identified	National IoT connectivity platform	NEOM connectivity infra sharing	National mobile payment platform	National Telco data aggregator / monetization platform
Upside potential (2019-2023, SAR Bn) - *CAPEX Saving* - *Profit upside*				

Upside without collaboration

Upside with collaboration

Source: BCG analysis

Beyond the direct financial impact, collaboration could generate several indirect benefits

	 IoT	 NEOM	 Fintech	 Data monetization
Industry	**Easier scalability** for local providers **Wider access** to new entrants		**Easier scalability** for local Fintech providers	
Government	**Higher security** of IoT network for nation-wide applications (e.g. smart meters, IIot)	**Better resources usage** overall (energy, capital etc.) **Avoid duplication** of infrastructure	**Increased safety / security** & resilience of financial services **Single point of contact** for regulatory bodies	**Improved availability** of citizen-level data sets **Simplified governance** of user data privacy
End-user	**Improved quality & resilience** of network **Reduced cost** of switching provider	**Lower prices** on telco services[1] **Improved connectivity** (denser network)	**Ensures inter-operability** between fintech providers	

1. Customers will bear less of the cost of network infrastructure, while operators still compete on services
Source: BCG analysis

Feasibility assessed based on existing opportunities …

More details in individual concept papers

- **Softer partnership model**, based on collaboration and alignment on standards (vs. JV approach)
- **Relatively easy to enforce,** with regulator well-placed to push for collaboration on standardization

- **Well established concept** with 100+ use cases globally
- **Proven benefits** including large capex savings and improved network connectivity
- **Multiple models** feasible, catering to different appetites for collaboration

- **Nascent know-how and experience on fintech products** for current players (esp. mobile payment)

- **Observed** model of collaboration in other countries, e.g. Weve in the UK
- **Distinct use cases** requiring entire data sets enabled by collaboration

Source: BCG Analysis

… and local barriers / risks that can hinder collaboration

More details in individual concept papers

- **Existing IoT initiatives** among existing players (e.g. STC IoT Solutions, Mobily/Ericsson partnership) already based on existing platforms
- **Connectivity deployment** already started (e.g. Zain with Nokia) making it more difficult to align on common standards

- **First instance** of collaboration between MNOs on infrastructure sharing
- **Different appetites** for large greenfield CAPEX investment among existing players

- **Complex / costly** to build robust digital fintech platform from scratch vs. strategic partnership with existing provider (e.g. Mobile connect)

- **STC market size** already allows them to leverage most KSA user data
- **Existing partnerships** in monetization (e.g. STC w. Instarea) capturing part of upside potential
- **Reluctance** from Telco players to share customer data with 3rd party

Source: BCG Analysis

Additionally, several challenges have been faced by global telcos to collaborate

More details in individual concept papers

Lack of scale and know-how

Currently IoT platforms are dominated by global tech giants (e.g. Google, Amazon, GE, …) and Telco-funded platforms have only been successful at very large device scale (e.g. AT&T, Telefonica)

Anti-competitive legacy agreements

Telstra entered agreement with Australian government to develop network infra for remote areas against subsidies, removing incentive to share infrastructure

Lack of Telcos commitment

Softcard was a JV between AT&T, T-Mobile and Verizon to launch NFC mobile wallet in 2012. With limited adoption after 3 years, the JV was dismantled, and assets bought by Google in 2015

Anti-Trust Regulation

Targeted advertising Telco JV WEVE has battled over 2 years to get clearance from EU's anti-trust commission because resulting aggregating dataset could prevent new entrants in data monetization market

Source: BCG Analysis

We assessed the opportunities based on expected impact & feasibility

More details in individual concept papers

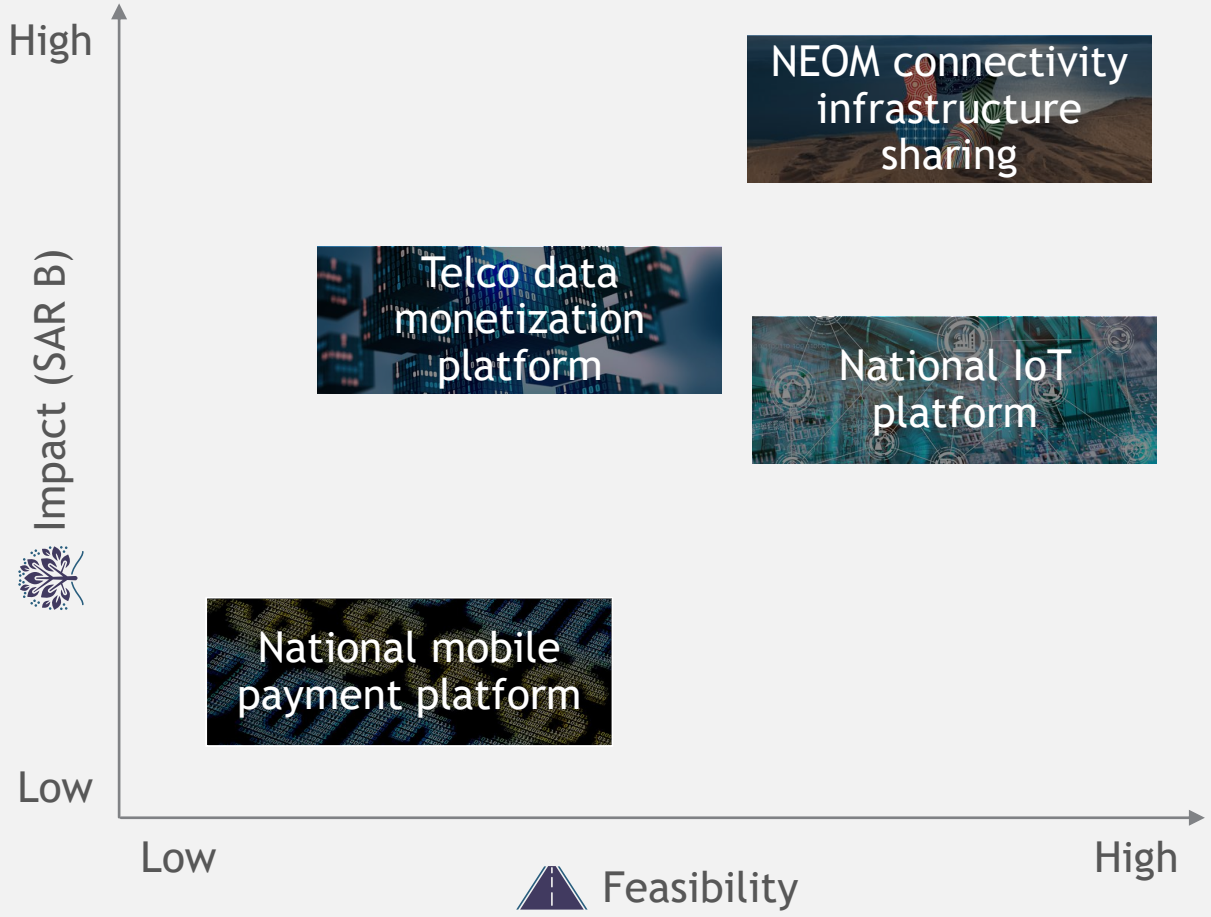
Impact

- Estimation of **financial synergies** on each play (e.g. cost reduction opportunities, revenue upside potential)
- Qualitative estimation of **ecosystem impact** (e.g. on society, supply chain, local content, …)

Feasibility

Assessment of the **ease of implementation**

- Barriers to collaboration (regulatory, economic, …)
- Future challenges to be faced



Source: Expert interviews, BCG analysis

More details in individual concept papers

Summary: Our perspective on the plays

National IoT connectivity platform

- With strong market momentum, KSA Telcos have **already started to enter the IoT stack** leveraging global tech partners (e.g. Nokia)
- Particularly, Telcos have a native role to play in capturing value from the **mobile IoT** (LTE-M, Nb-IoT) with high synergies with their existing network
- Co-developed mobile IoT standards (e.g. types of frequencies, SIM requirements) would highly **benefit local IoT ecosystem** able to easily scale their solutions, and reduce need for bespoke approach
- Additionally, **costs synergies** for Telcos could be realized by pooling deployment of IoT modules

NEOM connectivity infrastructure sharing

- **NEOM unique greenfield telco development** provides a key opportunity for KSA Telcos to deploy their network
- However, **the project scale will require massive investments**, with network building being the most relevant part for Telcos
- To guarantee financial capacity to undertake the project, **KSA Telcos will have to collaborate** and agree to share network infrastructure (despite current lack of sharing)
- On top of **costs savings and potential revenue upside**, play is also key to maintain highest quality network without duplicating infrastructure

National mobile payment platform

- KSA Fintech market is booming, and **Telcos are well positioned** individually to assist in deploying fintech solutions / products
- However, a national platform **presents several challenges** (e.g. existing services migration) and go-to-market longer vs. existing solutions (e.g. Mobile Connect)
- Additionally, most **telco initiatives (incl. collaborative) on mobile payment failed to deliver** expected upside globally
- A collaboration on **other Fintech services** (e.g. identity & transaction authentication, credit scoring) would have a **higher potential value-add** for Telcos and for the ecosystem

Telco data monetization platform

- Depth and width of data collected by Telcos reinforce value-add potential from data monetization
- By collaborating, Telcos can help **unlock specific use-cases** where national-level data is needed (e.g. national data on media viewership, …)
- Additionally, a JV to pool and cleanse Telco data **would bring significant benefits to the overall ecosystem** through API/SDK availability for other players (e.g. OTT, advertisers, governments, …)

Source: BCG Analysis

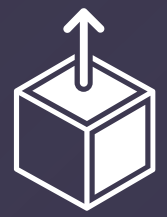
'Softer' collaboration models could be a first step to enter some of the verticals

More details in individual concept papers

	IoT	Fintech	Data monetization
Potential collaboration model	Industry Association		Strategic partnership
Collaboration level	Low		Medium
Description	Neutral association acting as voice for overall industry (e.g. for standards-setting, lobbying, …)		Partnership e.g. mutual commitments between MNOs or with 3rd party (startup, IT company..) to realize collaboration potential
Benchmark	TIA lobbying for common IoT standards across industry	Non-profit platform facilitating collaboration between stakeholders within Fintech	Start-up partnered with all Slovakian Telcos to monetize their data

Source: BCG analysis

Beyond identified plays, new use-cases for collaboration



New use-cases in other verticals

Telcos could expand their offering in targeted use-cases where collaboration is a key value proposition

E.g.,

- *Insurance: Credit scoring tools based on national telco data*
- *Mobility: National fleet management solution (requiring deep coverage of remote areas)*

Niche use-cases close to the core

Telcos can leverage their expertise and collaborate in other use-cases closer to their core business

E.g.,

- *Data infrastructure: collaborate in building / operating hyperscale datacenters, and edge-computing infrastructure*

Next steps

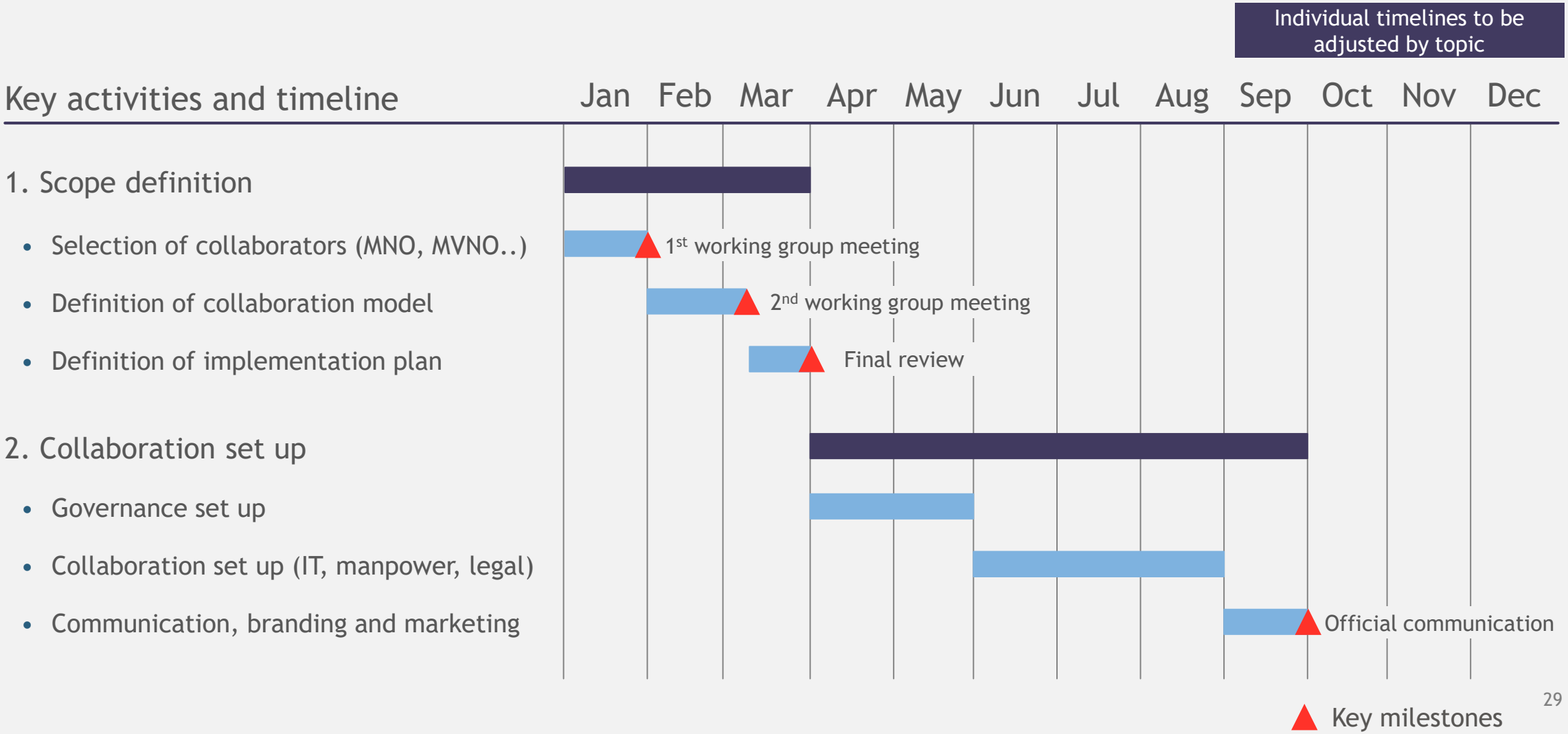
Conduct introductory meeting with telco taskforce

Validate initial hypotheses in workshop with telco taskforce

Facilitate and support discussion to formalize collaboration

Scope definition first step to successful collaboration

Individual timelines to be adjusted by topic



هيئة الاتصالات وتقنية المعلومات

Communications and Information Technology Commission

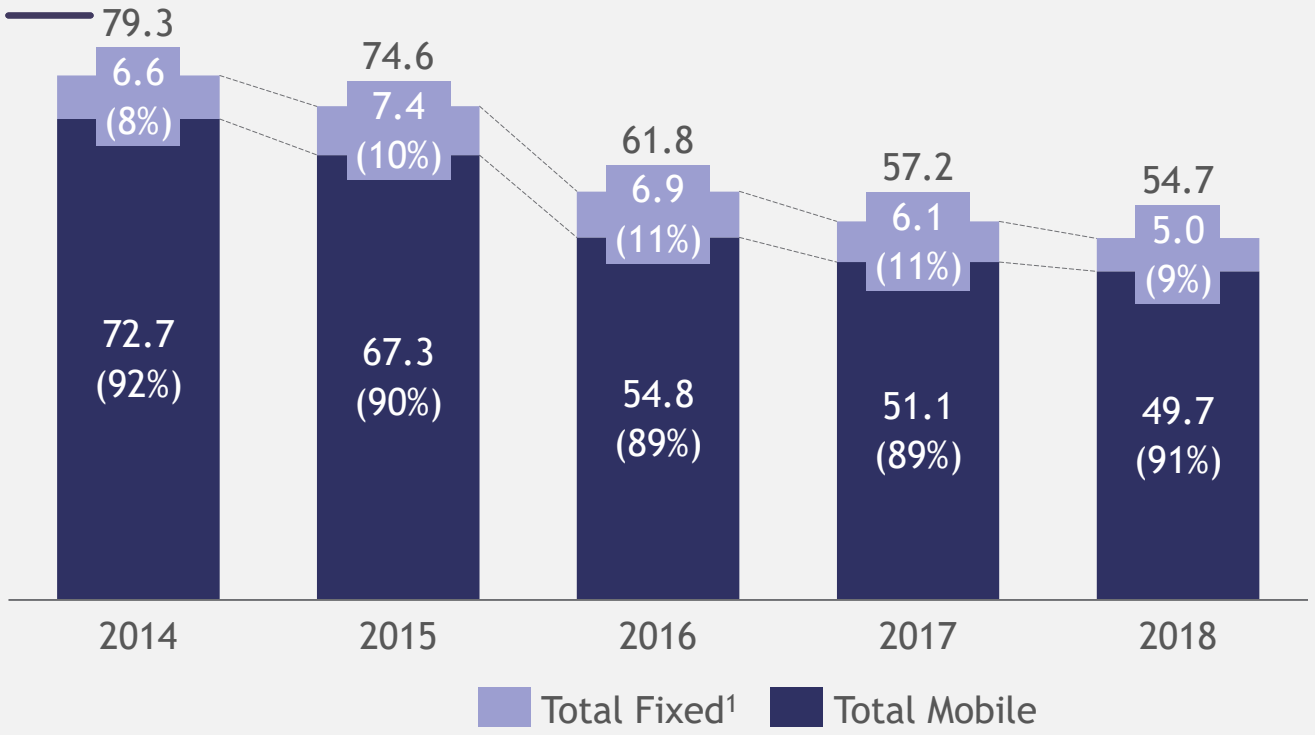
citc.gov.sa

Appendix – Market baseline

KSA Telco market decreasing since 2016 when global subscriptions market has been growing

KSA Telco subscriptions evolution

(Millions)



Subscriptions' growth rates

(%)

	2y KSA CAGR 2016-2018	2y world CAGR 2016-2018
Overall	-5.9%	+4.2%
Fixed	-14.9%	+3.2%
Mobile	-4.8%	+4.4%

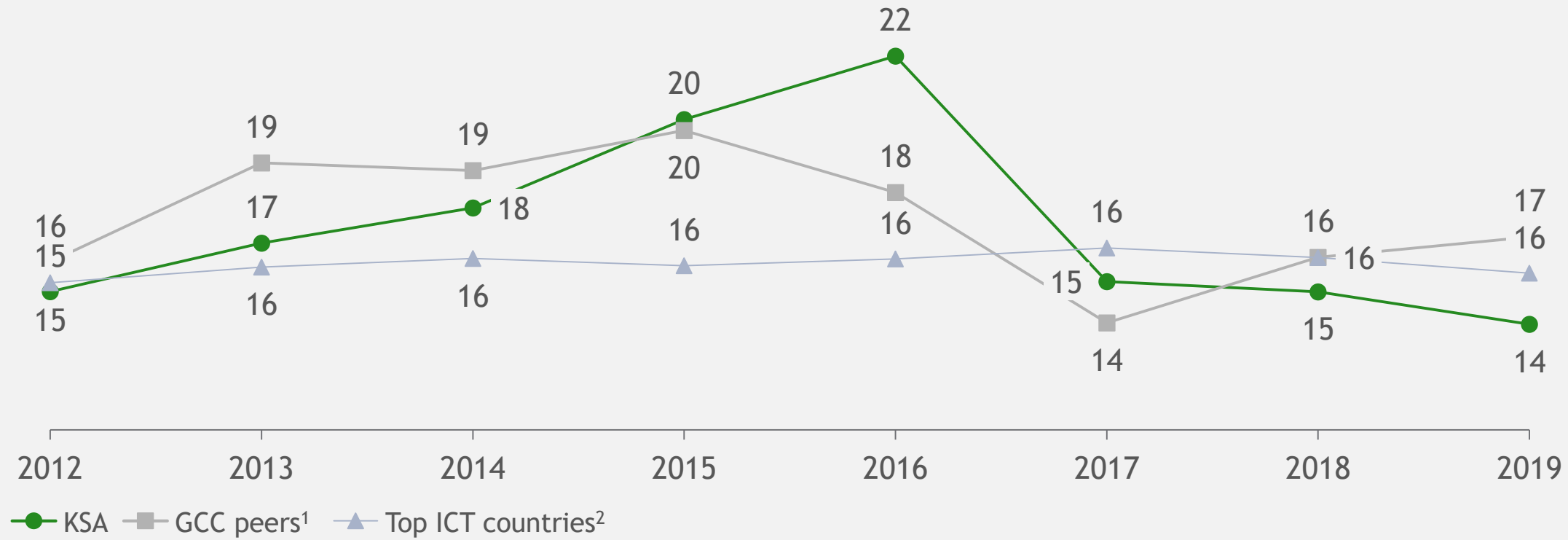
1. Fixed includes fixed voice and fixed broadband subscriptions

Sources: Saudi Arabia: Mobile, Broadband, TV, and OTT Video Report by Ovum, Total Fixed Broadband subscription and revenue forecast 2019-2024, Total Fixed Voice subscription and revenue forecast 2019-2024, Ovum

Additionally, overall telco investment has shrunk for the past 3 years

Capital intensity ratio evolution

(2012-2019, in %)



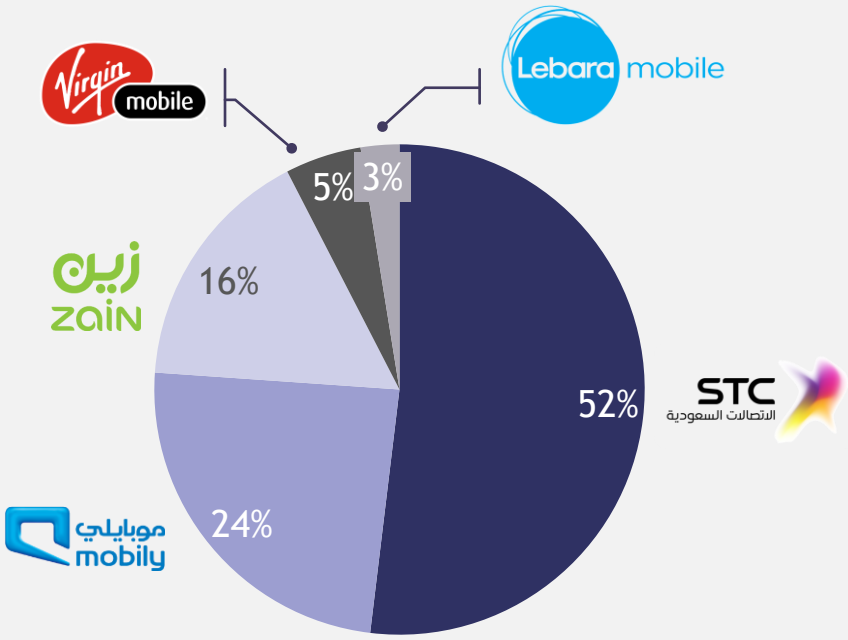
Note: Capital intensity defined as Capex/Revenue, includes fixed and mobile communications service providers – 1. United Arab Emirates, Qatar, Bahrain, Kuwait and Oman 2. Includes Taiwan, South Korea, Singapore, Sweden, Japan, Germany, Finland, Switzerland, UK, Denmark, USA, Netherlands, Austria, Norway, New Zealand, Australia, Hong Kong, and Canada

Source: Ovum Communications Provider Revenues & Capex Forecast: 2017-22, BCG analysis

Saudi telco market is polarized with STC dominating both fixed and mobile

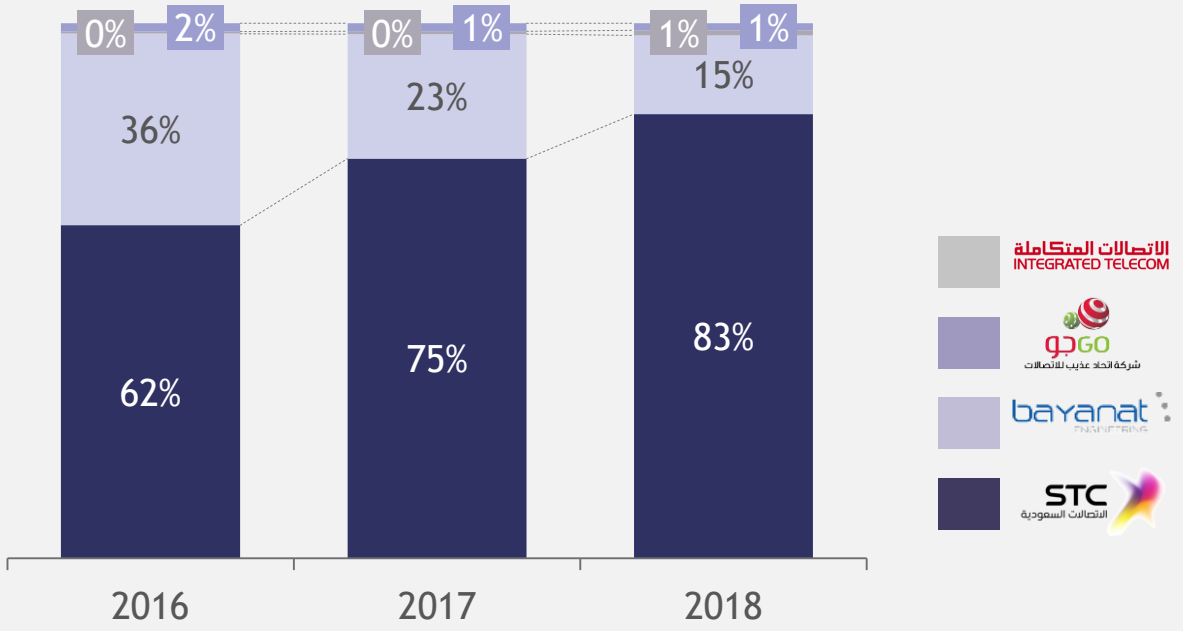
KSA mobile market split by competitor

(2018, in % of total subscriptions)



Fixed broadband market split evolution

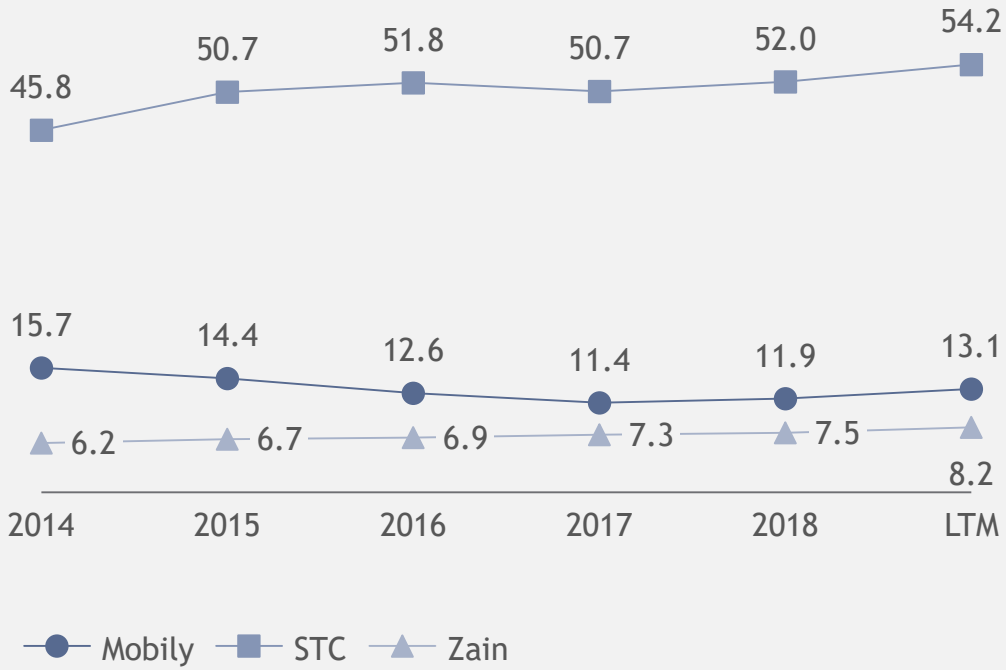
(In % of total subscriptions)



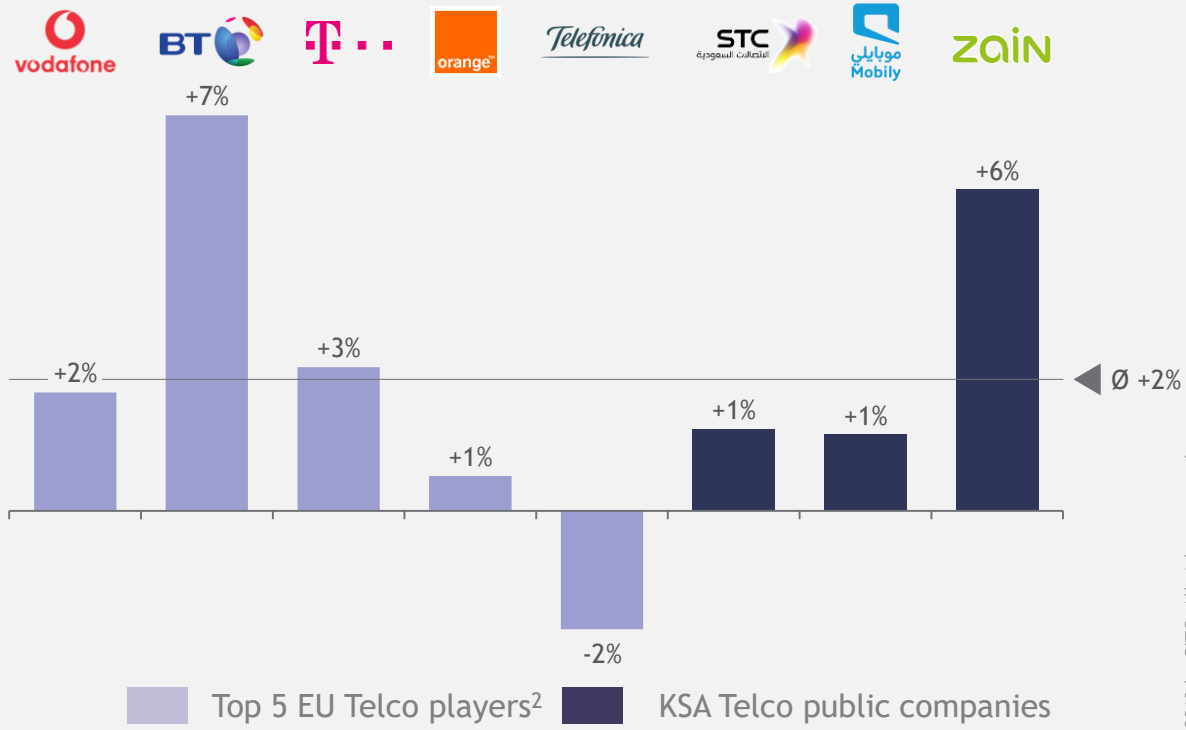
Source: World Cellular Information Service (Informa & Telcos & Media Limited 2018), CITC

Individual telco players growth is overall on par with global competition…

MNOs revenue evolution
(2014-2019Q3, in SAR Bn)



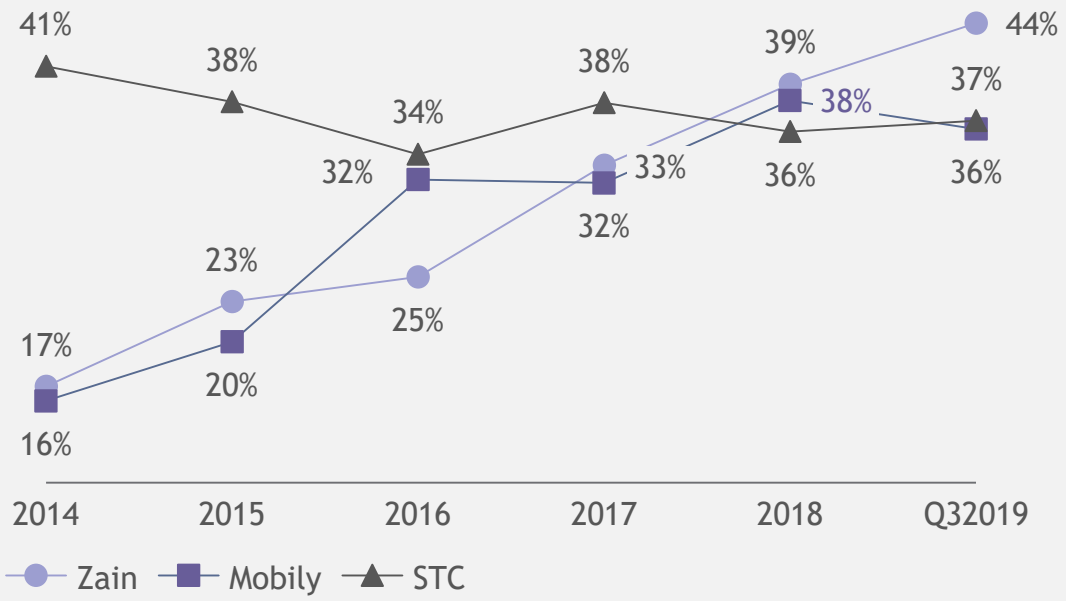
Historic revenue growth benchmark
(2016-2019 CAGR[1])



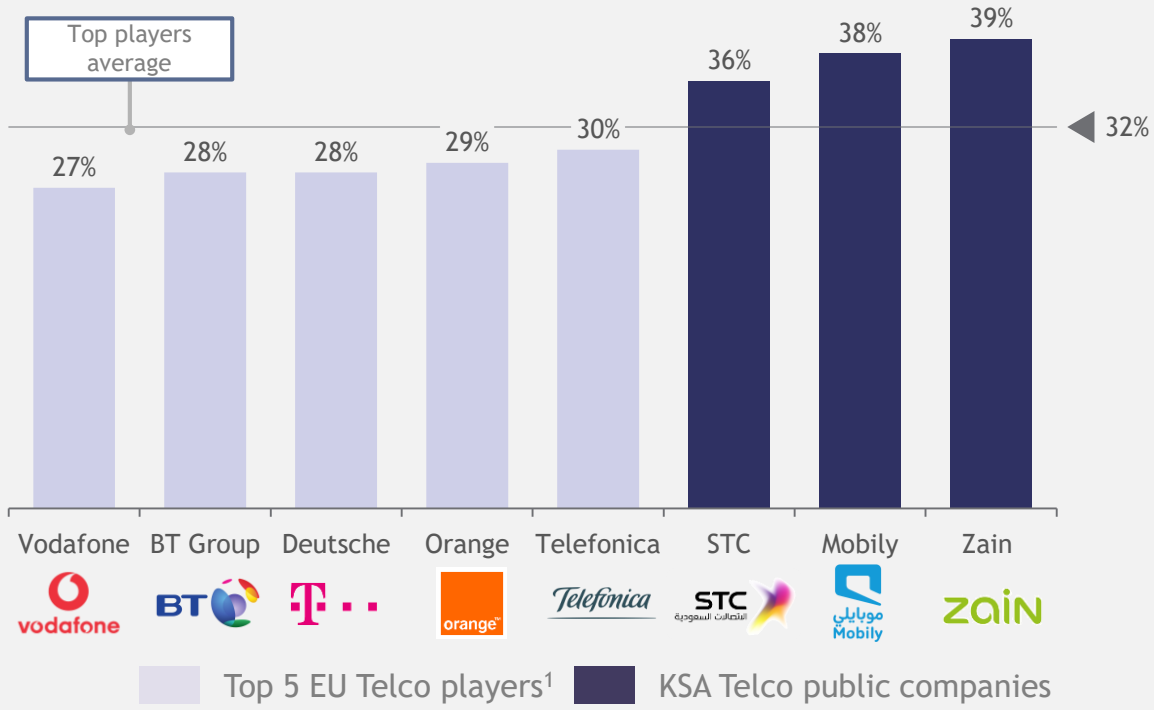
1. For Vodafone and BT Group, CAGR has been calculated over 2015-2018 2. Top European players in terms of revenues
Source: MCIT Telecom strategy, MCIT Telecom sector review, CapitalIQ, Annual Reports, BCG Analysis

… while EBITDA margins are actually higher than global benchmark…

EBITDA margin evolution by MNO
(2014-Q32019)



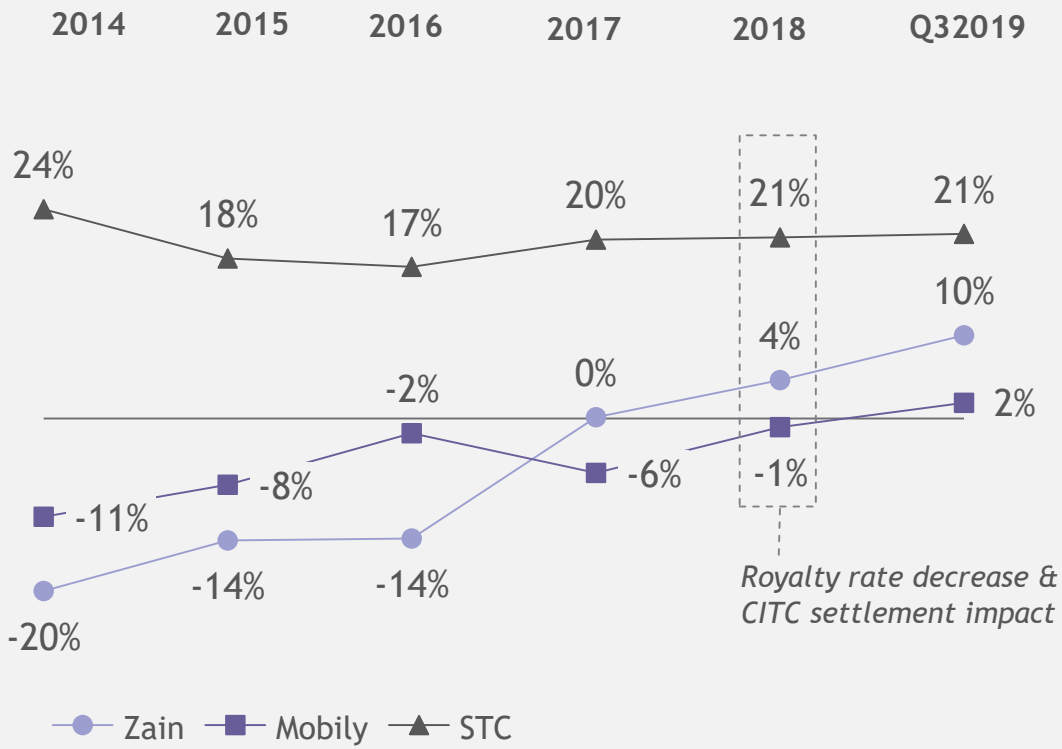
EBITDA margin comparison with benchmark
(2018, in %)



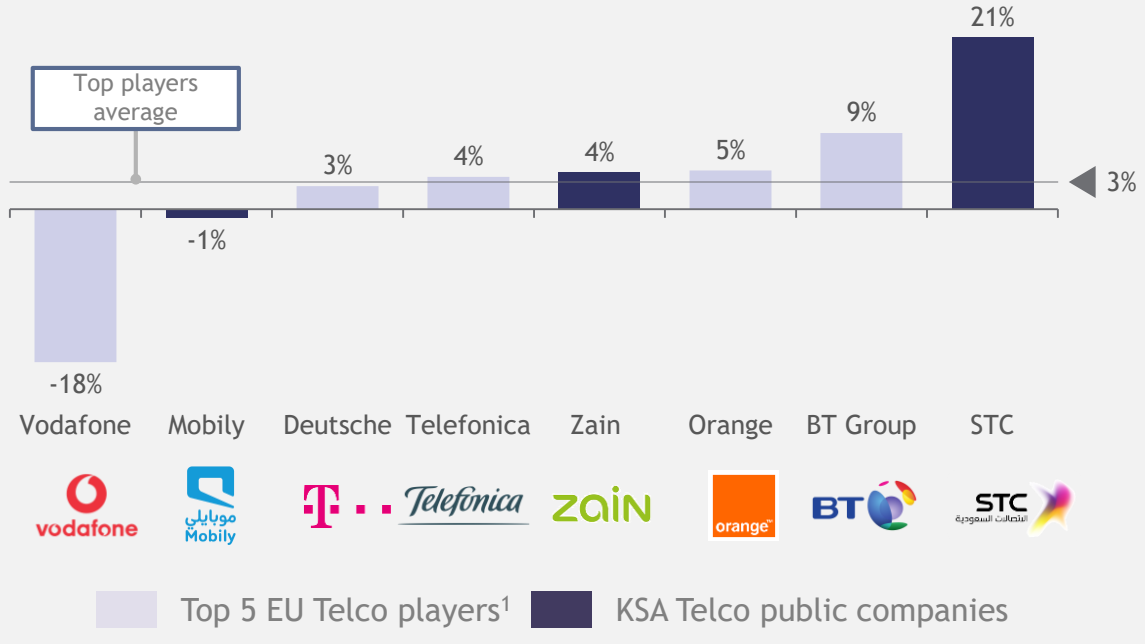
Note: Profitability benchmark includes public companies only; Zain and Mobily data refer to KSA operations whereas STC data refer to overall group 1. Top European players in terms of revenues
Source: MCIT VRO monthly reporting, MCIT Telecom strategy, MCIT Telecom sector review, CapitalIQ, Annual Reports

… and net profitability has increased for all players

Net profit margin evolution
(2014-2019Q3)



Net profit margin comparison with benchmark
(2018, in %)



Note: Profitability benchmark includes public companies only; Zain and Mobily data refer to KSA operations whereas STC data refer to overall group 1. Top European players in terms of revenues
Source: Capital IQ, Annual reports, BCG analysis

Appendix – Concept papers

هيئة الإتصالات وتقنية المعلومات
Communications and Information Technology Commission

NEOM

Concept paper | DECEMBER 2019

NEOM opportunity relevant for MNOs and fixed network operators

Mobile Network Operators (MNOs)

Mobile Virtual Network Operators (MVNOs)

Fixed Network Operators

Three main topics covered in this document

Rationale for collaboration

Scope of collaboration

Collaboration model

Findings validated with panel of BCG experts and industry professionals

BCG's team of experts | **Telco professionals** | **Regulatory expert**

Christian Bartosch
Senior Expert in Telco Infra & Networks

Arnaud Voguet
Senior Knowledge Analyst, Telco Diversification

Eric Kuisch
Former CTO at Vodafone Germany, 20+ years of experience

Jacques Tamisier
Former Director Strategy and Transf., Orange Spain, 15+ year of experience

Michel Combot
Former MD, ARCEP (French Telco Regulator)

In Neom …

… everything will be connected

… humans and machines will live in harmony

… novel technologies will constantly be introduced

Source: NEOM website

4 key areas of infrastructure investments identified

Mobile network

Network of mobile radio cells and associated backhaul ensuring connectivity

Fixed local network

Dedicated fiber lines (FTTH) to all homes and offices in the city

Data centers

Hyper scale and edge secure data centres providing cloud storage

IOT sensors

IOT sensors for all citizens and businesses

Source: NEOM website, BCG insights

Most relevant opportunities for Telcos lie in networks

Mobile network

Network of mobile radio cells and associated backhaul ensuring connectivity

Fixed local network

Dedicated fiber lines (FTTH) to all homes and offices in the city

Networks

Data centers

Hyper scale and edge secure data centres providing cloud storage

IOT sensors

IOT sensors for all citizens and businesses

Source: NEOM website, BCG insights

NEOM is a big undertaking..

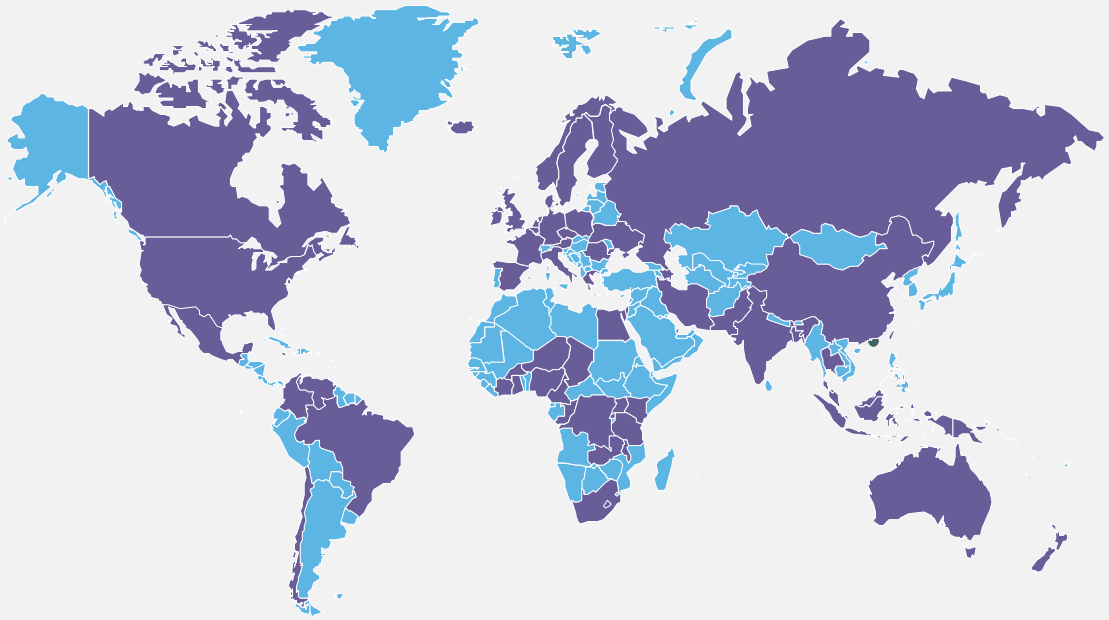
- Providing access to 5G network across 26,500 km^2
- Installing fiber lines for 1M inhabitants and 5M visitors
- Collaborating smoothly with a wide range of construction partners

..with network sharing providing the potential to share the burden

Source: NEOM website, media interviews NEOM CEO Nadhmi al-Nasr

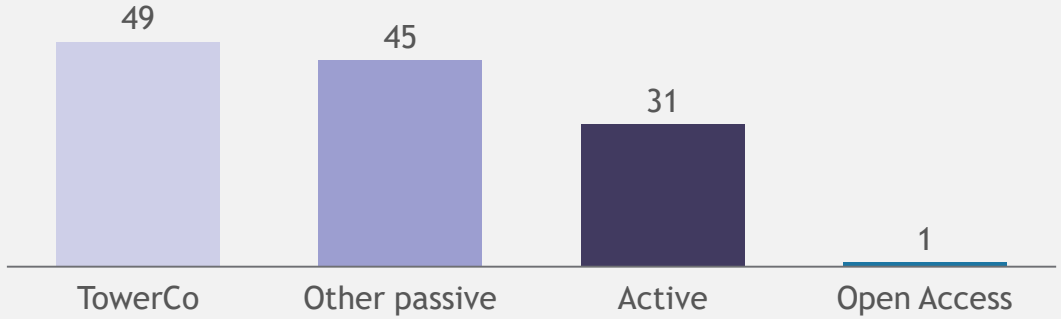
Globally, network sharing is a common phenomena

Network sharing in ~60 countries

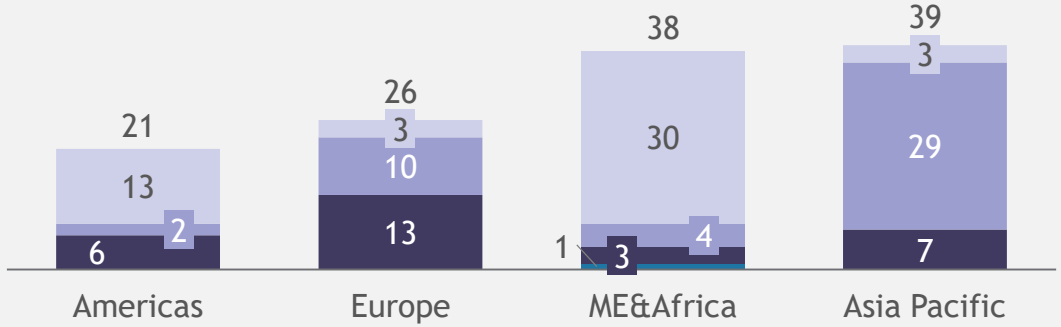


Countries with NW sharing MNOs Countries without NW sharing MNOs

~126 network sharing deals



Distribution of deals per region

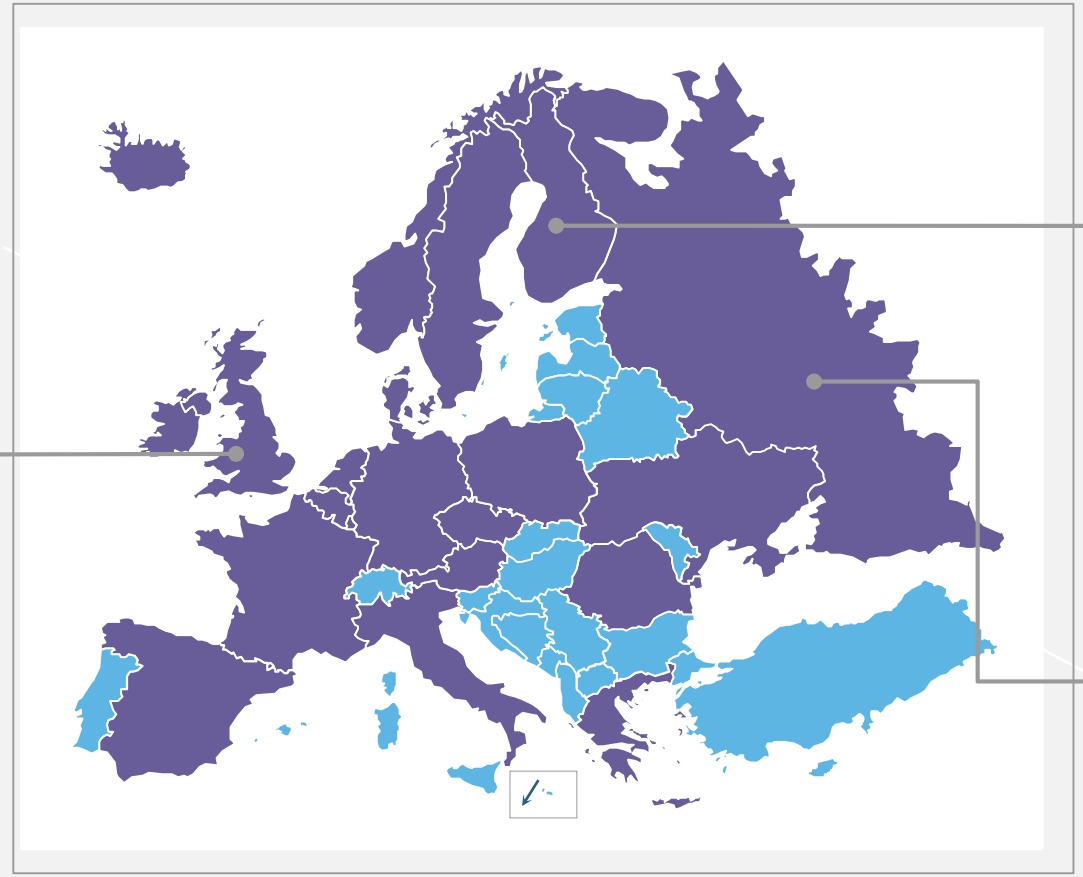


TowerCo Active[1]
Other passive Open Access

Source: Coleago, BCG research

Example: Active network sharing deals are widely spread in Europe

Telefonica & Vodafone operate UK wide shared grid
- Sharing extends to RAN elements
- JV owns equipment & sites



DNA & Sonera cover rural Finland with active NW Sharing
- All spectrum in area shared
- JV owns equipment & sites

Vimpelcom & MTS cover 36 Russian regions with active NW sharing
- Sharing of 2600MHz LTE spectrum, sites & equipment in the regions

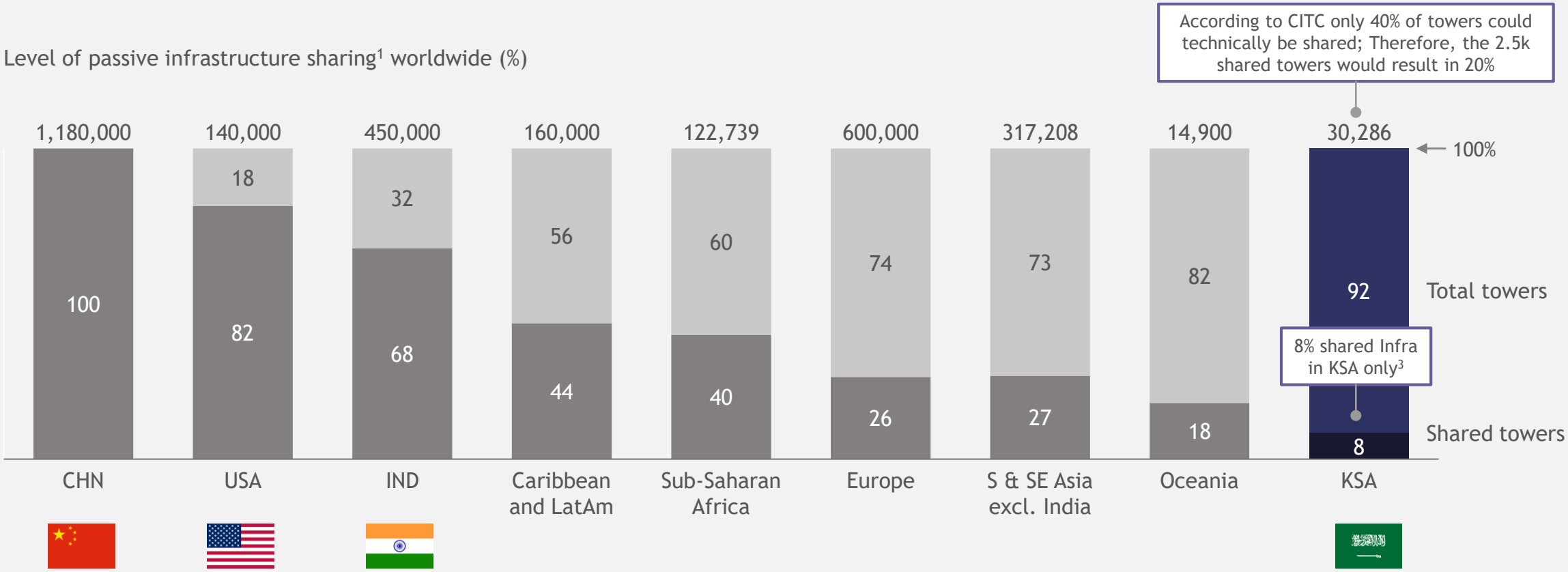
Countries with NW relevant sharing MNOs

Countries without relevant NW sharing MNOs

Source: BCG research

However, KSA level of infrastructure sharing is considerably lower than global leaders

Level of passive infrastructure sharing[1] worldwide (%)



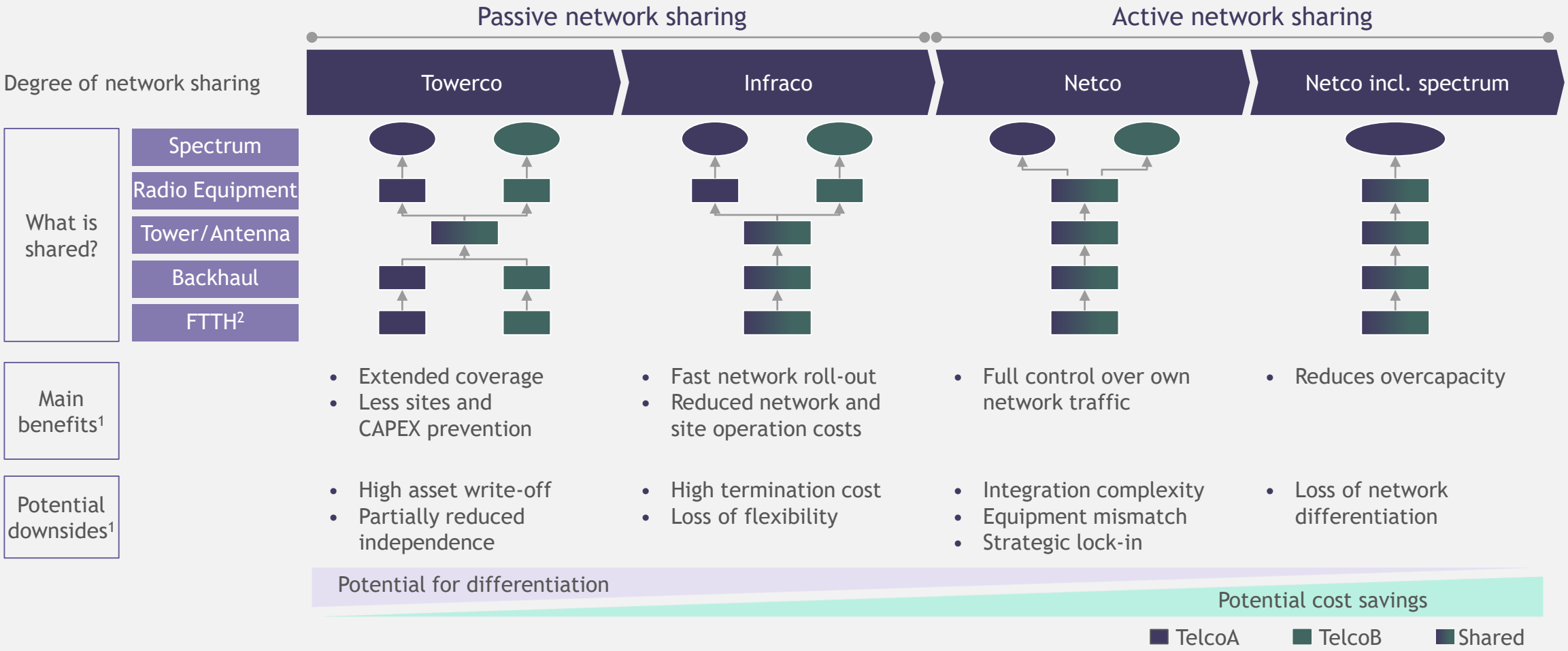
1. TowerCo penetration is used as a proxy for level of passive infrastructure sharing; 2. Includes JV infraCos as TowerCos, independent TowerCos own 9%; 3. Numbers reported by CITC [input from Rabeea T. Bakhsh on 7.8.2018]
Source: CITC for KSA and MCIT Technology Strategy

Multiple benefits of collaborating on networks observed

Lever	Opportunity
Speed to market	• Quicker to realize revenues • Accelerated network deployment, especially in rural areas
Rollout Cost savings	• Lower capex driven by reduced number of sites • Significantly lower opex over asset lifecycle • Combined purchasing power
Further collaboration potential	• Pooling and building rollout best practices • Well positioned for future sharing initiatives

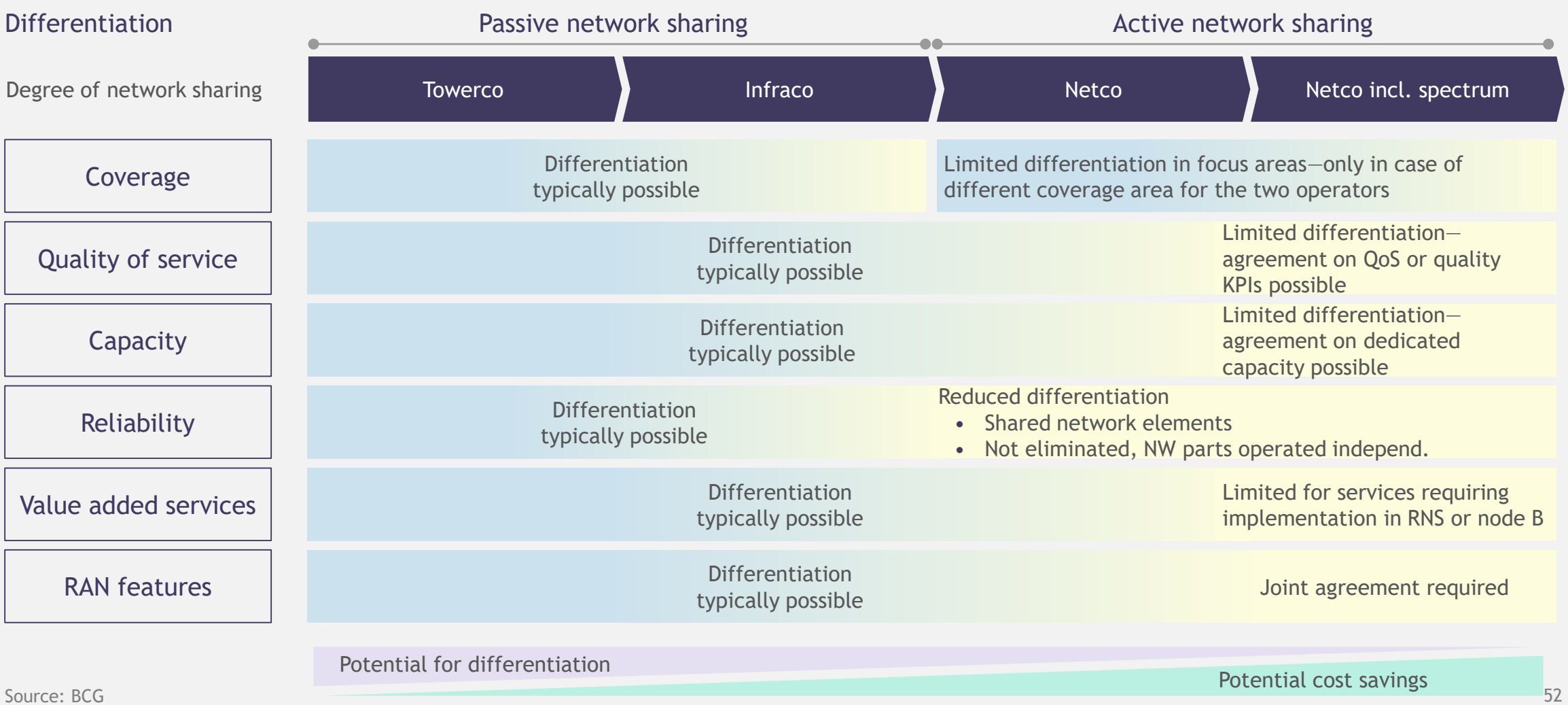
Source: BCG case experience

Network sharing types vary significantly in scope



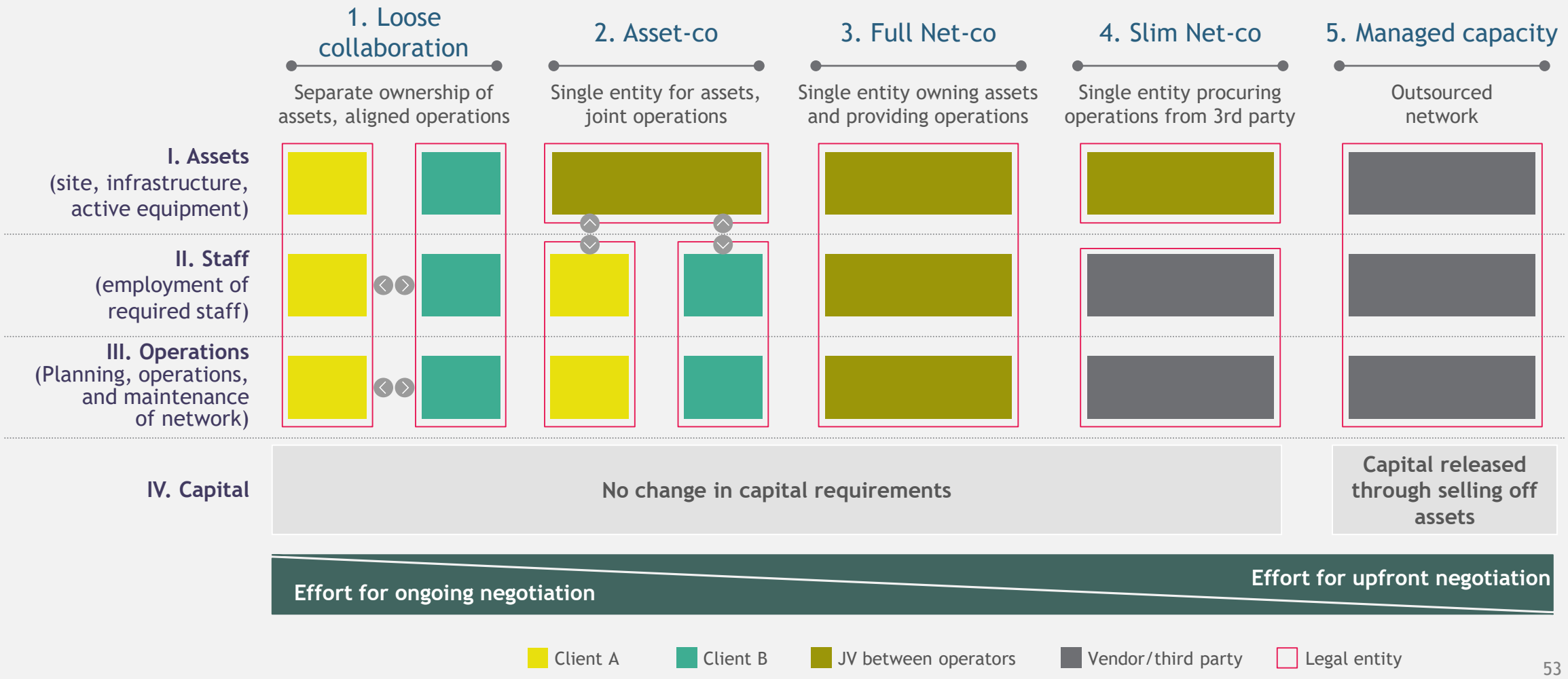
1. Benefits and downsides partly accumulate from left to right 2. Could also be outsourced to third party
Source: BCG research

Increasing degree of network sharing leads to loss in differentiation possibilities



Source: BCG

Finding the right governance model critical to driving collaboration success

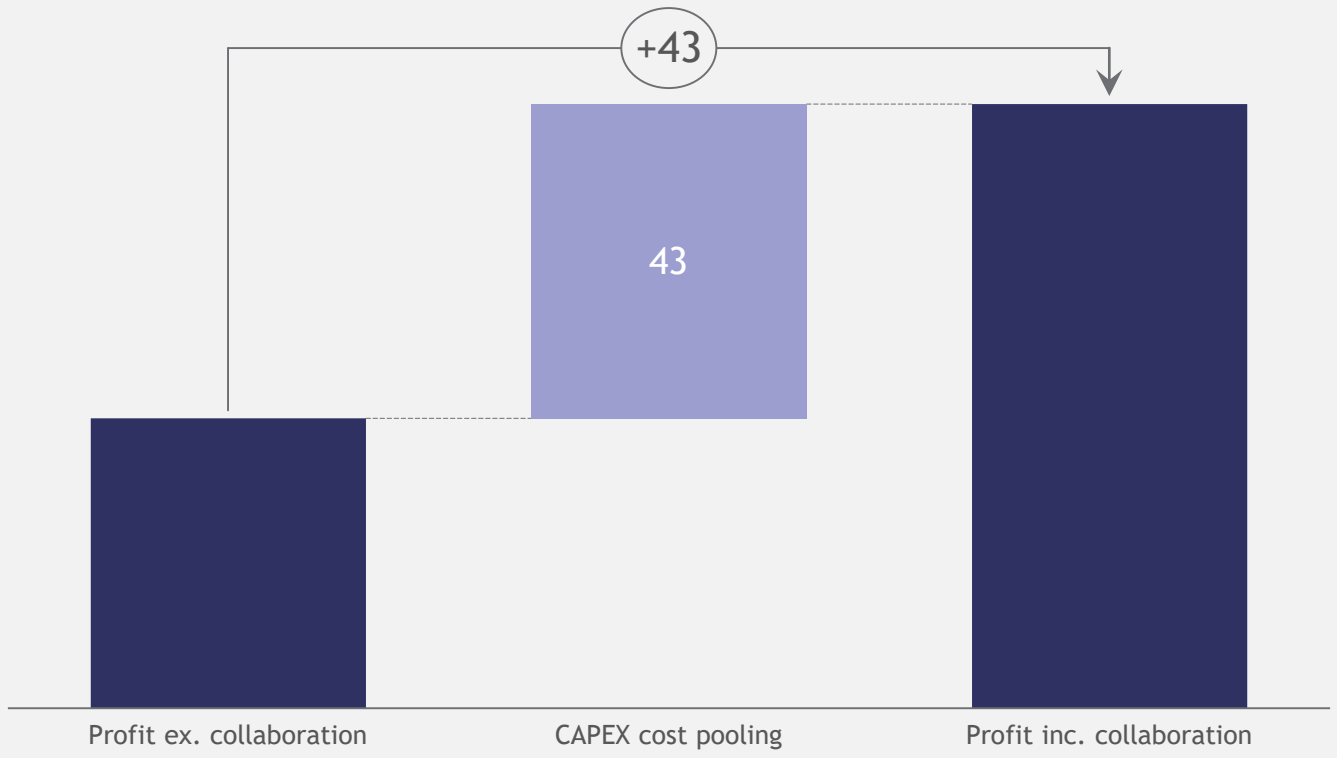


Appendix

Potential to save ~40B SAR over lifetime through collaboration in NEOM infra rollout

Top-down estimate

(B SAR)



Assumes a total capex of 87 B SAR would be required in case all three MNOs invest in infrastructure[1]

Estimated savings of 50% from Capex pooling assumed over initial asset lifetime[2]

Potential to save total costs of 43 B SAR through pooling of telco capex in NEOM

1. Assumes 5G network across 26,500 km2, costs calculated based on a study of rolling out 5G across the UK conducted by ITRC 2. Significant cost saving estimated based on experiences from network collaboration in other countries, e.g. Spain. Theoretical cost saving of 66% by pooling 3 networks discounted slightly to account for certain duplication of costs (e.g. admin, lack of collaboration in certain areas) Sources: ITRC Mistral, Capital IQ

Case study: DNA and Sonera cover rural Finland with active NW sharing

Shared network started operations in Q1 2015. The JV (Suomen Yhteisverkko) between Sonera (TeliaSonera's Finnish arm) and DNA allows for a more efficient build out and operation of radio networks in an area making up 50% of Finland's total territory, in which only approximately 15% of its population live

MNOs

DNA

TeliaSonera

Coverage

Northern Finland

Type

Towerco | Infraco | Netco | **Netco incl. spectrum**

Sonera and DNA utilize shared spectrum capacity in the area of the shared network
- Operators are sharing base stations, sites, transport networks and other infrastructure
- Each operator maintains its core network

Description

Operators will differentiate themselves through service provision
- Sonera owns 51% and DNA 49% of the joint venture

The JV covers 2G, 3G and LTE network equipment and spectrum
- Max. theoretical data rates are 450 Mbps with LTE CAT9 devices
- Network will be maintained and upgraded actively

Project has connected more than 760,000 Finns
- Total of 1,700 base stations have been built so far in the areas of Lapland, Kainuu, Savo, and North and South Karelia

Driver

Driven by cost savings
- Sonera is required to reach 99% population 4G-coverage by the end of 2018

Revenue effective element
- Construction considerably faster than with separate networks

Note: NW = Network
Source: Company websites, web research, BCG

Case study: Telefonica and Vodafone create nationwide shared grid

The shared network started operations in Q2 2012. The 50/50 JV (Cornerstone Telecommunications Infrastructure Ltd (CTIL)) manages, acquires, builds and maintains the shared site portfolio. Costs are shared 50/50

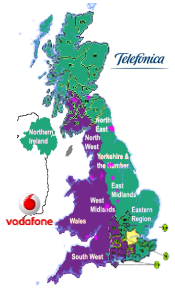
MNOs

Telefónica

vodafone

Coverage

All UK-GEO split



Type

Towerco | Infraco | **Netco** | Netco incl. spectrum

Signals are received by jointly-owned radio equipment & backhauled over shared cables

- Network sharing extends to RAN elements
- MNOs retain control over their spectrum, intelligent core networks and customer data

Description

Operators have access to a grid comprising around 18,500 masts, which represents an increase of more than 40% for each of them

- Each party has sole operational responsibility in one half of country
- Operators specify the networks in their area and produce their own RFQs[1] Procurement is run separately

The network covers 2G, 3G and LTE services

Driver

Driven by cost savings

- Regulatory requirement of 98% population coverage by 2017
- Initial 22,000 sites were consolidated into joint grid of 18,500 sites

1. Request for quotation

Source: Company websites, web research, BCG

Case study: Vimpelcom and MTS cover 36 regions with active MOCN

MTS & VimpelCom share 2,600 MHz frequencies for LTE in Russia across all base stations in 36 regions, to jointly plan, develop & operate LTE networks. Their network started operations in 2014. The successful partnership was extended in Q4 2015 with a 6 year term, which is extendable. The agreement doesn't preclude either company from developing their own networks

MNOs

VimpelCom

MTS

Coverage

Coverage of 36 regions in Russia

- MTS resp. in 19 regions
- VimpelCom resp. in 17 reg.

Type

Towerco | Infraco | Netco | **Netco incl. spectrum**

The companies have agreed on a band & technology specific deal to share spectrum in the 2600 MHz range for LTE

- Operators are sharing base stations, sites, transport networks and other infrastructure
- Each operator maintains its core network

Descrip-tion

The project was actively supported by the Russian Ministry of Communications and Mass Media, which adopted legislation to allow for a rapid implementation

The partnership between VimpelCom and MTS establishes a unique precedent in Russia, paving the way for other companies to actively begin sharing network infrastructure

Driver

Driven by cost savings

- Minimized costs of construction and utilization of the base stations (stated savings of 10-15%)

Revenue effective element

- Construction considerably faster than with separate networks

Source: Company websites, web research, BCG

Case studies

Case study

Bite Latvija and Tele2 have set up a **joint venture to develop** 5G network

According to Nikita Sergienko, CEO Bite Group;

"The major goal of the partnership is (…) to **build 5G infrastructure** in Lithuania and Latvia **faster, less costly and with better coverage than on an individual basis**

Shared radio network will result in **better quality of service, larger coverage and better capacity** than separate networks could provide.

Not to mention that the cooperation also will result in a **more efficient use of resources**, and have a positive environmental impact (e.g. 20% reduction in electricity usage)"

Case study

Orange and SFR have signed a **collaboration agreement** to co-deploy FTTH in large part of AMII area, in other words **medium dense areas** (also known in France as areas where a "Call for Expression of Investment Intention" has been made by the regulator)

Orange and SFR have split their coverage, Orange was in charge of 7.5M households and SFR 2.3M

The remaining areas could be covered by both and they had an engagement to subscribe to any wholesale / co-financing offer from partner in partner area

The financing is shared between private **MNOs and public collectivities**

Sources: Delfi News, TeleGeography, BCG Analysis

Case study: Governance model details other collaborations (I/III)

	3GIS Världens mest kostnadseffektiva nätoperatör 4 Slim NetCo	Net4Mobility 3 Full NetCo
Context and scope	• **Agreement in Sweden to deploy 3G by Hi3G (3 Sweden) and Telenor Sweden** (after acquisition of Vodafone in January 2006)	• Deal comprises joint 2G/LTE roll-out and **spectrum sharing** (900 and 2600 Mhz bands) by **Tele2 Sweden and Telenor Sweden**
1. Assets (site, infrastructure, active equipment)	• **JV "3GIS"** created in April 2001 • **50:50 ownership** • **JV owns the assets**, no transfer due to greenfield	• **JV "Net4Mobility"** created in April 2009 • **50:50 ownership** • **JV** owns newly obtained spectrum
2. Staff (employment of required staff)		
3. Operations (Planning, operations, and maintenance of network)	• JV responsible for **rollout of 3G network: site construction, operations and maintenance** • Network **operations** outsourced to NSN in 2005	• JV to **implement, own, operate and maintain the shared LTE and GSM** networks of its shareholders
4. Capital		
Learnings	• **Managed transition:** JV the basis for moving from Full NetCo to Slim NetCo by outsourcing to NSN • **Changing technology:** Moved to MOCN in 2009	• **Spectrum sharing:** Involving several bands • **Broad scope:** Combining 2G legacy networks and greenfield LTE roll-out

Case study: Governance model details other collaborations (II/III)

	MBNL — 4 Slim NetCo	T-Mobile / orange — 3 Full NetCo
Context and scope	• **RAN sharing** agreement in UK between **3UK and T-Mobile UK** (now merged with Orange) until 2031 • **3G MORAN**, integrated RAN (access and backhaul)	• **RAN sharing** agreement in **Poland** between **Orange Poland** and **T-Mobile Poland** until 2025 • 3G MORAN, integrated RAN (access and backhaul)
1. Assets (site, infrastructure, active equipment)	• **JV** "MBNL" created in 2007 • **50:50 ownership** • Both operators **transferred their assets**	• **JV** "NetWorkS!" created in 2011 • **50:50 ownership** • Both operators **transferred their assets**
2. Staff (employment of required staff)	• 220 **FTEs transferred** from T-Mobile UK to vendor	• Both operators **transferred employees**
3. Operations (Planning, operations, and maintenance of network)	• Ericsson to provide **managed services** • **Consolidation** of 3G infrastructures, **operate and maintain network**, 5-year agreement signed 2009	• JV performs **management, planning, support, development and maintenance** of the joint networks
4. Capital	• **Communication infrastructure provider Arqiva** providing 5,100 sites based on 10-year agreement	
Learnings	• **Stable governance:** Managed change in ownership of parent company due to merger • **Dynamic approach:** Orange entering partnership	• **Deep integration:** JV performing all network related functions

Case study: Governance model details other collaborations (III/III)

Country	Players	Market position	Type of sharing (year launched)	Partnership structure	Benefits/Impact
Spain	vodafone, orange	#2, #3	3G RAN sharing (2007)	• Independent supervision • General SLAs	• Increased coverage by 25% with 40% less base stations • Orange: €200M Capex/Opex savings over five years
UK	T-Mobile, orange, 3	#3, #4, #5	3G integrated RAN sharing (2007, 20092)	• 50:50 JV • Shared service agreements • MBNL mgmt. in place	• Consolication of CapEx with estimated **joint savings of £2B over 10 years** • Increased rural and urban coverage • MBNL HSPA network covers **90%** of UK population
Sweden	TELE2, telenor	#2, #3	Total network Sharing (2009)	• 50:50 JV to build and run an LTE network	• Up to **50% lower price points achieved** on unlimited data plans than top player • **50% less base stations than if standalone**
Australia	Telstra, 3	#1, #4	3G site and RAN sharing (2004)	• 50:50 JV3 • Telstra negotiated $450M for 50% of H3G's 3G assets	• H3G was previously the only 3G player in Australia—allows Telstra to **enter 3G market immediately**
Australia	'yes' OPTUS, vodafone	#2, #3	3G site and RAN sharing (2005)	• 50:50 JV	• Optus expected **AU$100M saving in CapEx** in first three years and **AU $10M** anual **OpEx** savings
Poland	orange, T-Mobile	#1, #3	RAN sharing (2011)	• 50:50 JV (Networks!) • Players keep own network and freqs	• **Saving** up to **29% of long-term RAN cost**

هيئة الاتصالات وتقنية المعلومات
Communications and Information Technology Commission

DATA MONETIZATION

Concept paper | DECEMBER 2019

Data monetization opportunity mostly relevant for all telecom operators

Mobile Network Operators (MNOs)	Mobile Virtual Network Operators (MVNOs)	Fixed Network Operators
STC الاتصالات السعودية	Virgin mobile	الاتصالات المتكاملة INTEGRATED TELECOM
موبايلي mobily	Lebara mobile ليبارا	GO جو اتحاد عذيب للاتصالات
زين ZAIN	axiom telecom	ضوئيات Dawiyat

Three main topics covered in this document

Rationale for collaboration

Scope of collaboration

Collaboration model

Findings validated with panel of BCG experts and industry professionals

BCG's team of topic experts

Rami Mourtada
Partner and Associate Director, Digital Transformation and Big Data

Arnaud Voguet
Senior Knowledge Expert – Telco diversification

Telco professionals

Eric Kuisch
Former CTO at Vodafone Germany, 20+ years of experience

John Foster
Former Data Strategy Director, Telefonica, 17+ years of experience

Ahmed Elnoamany
Former Head of PMO at Egypt Telecom, 22+ years of experience

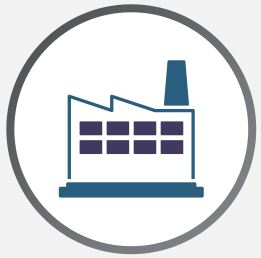
Richard Saggers
Former MD Go-to-market strategy, Vodafone, 18+ years of experience

Lewaa Hamadeh
Head Of Technology at Maddict, 10+ years of experience

Regulatory expert

Michel Combot
Former MD, ARCEP (French Telco Regulator)

Data monetization is about using generated data for internal purposes or selling it externally



Internal monetization

Use generated data to improve internal processes and existing offerings

E.g. Reduce churn by sending targeted marketing offers to specific customer profiles

Focus

External monetization

Sell data[1] to external parties benefiting them or their customers

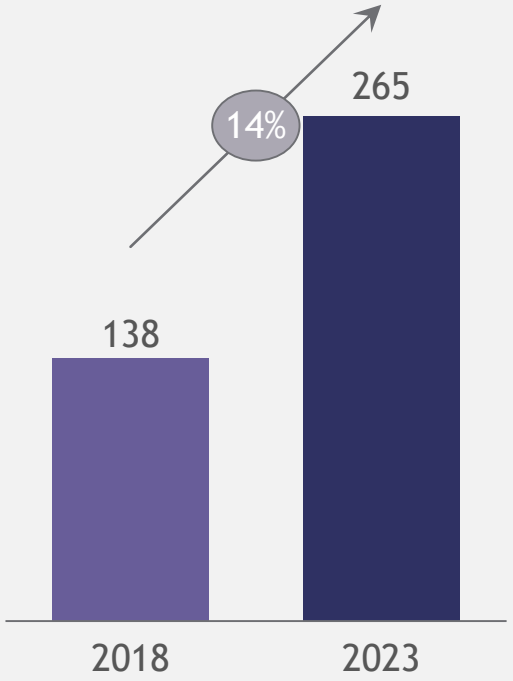
E.g. Sell real time location data to a navigation app developer

1. Raw or processed
Source: BCG analysis

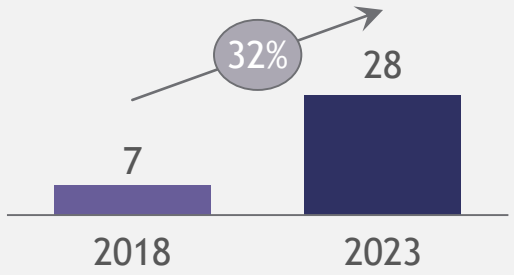
Data monetization market is massive and growing fast, especially in KSA

Data service and solutions market (SAR B)

Global Market



KSA Market[1]



Key growth drivers

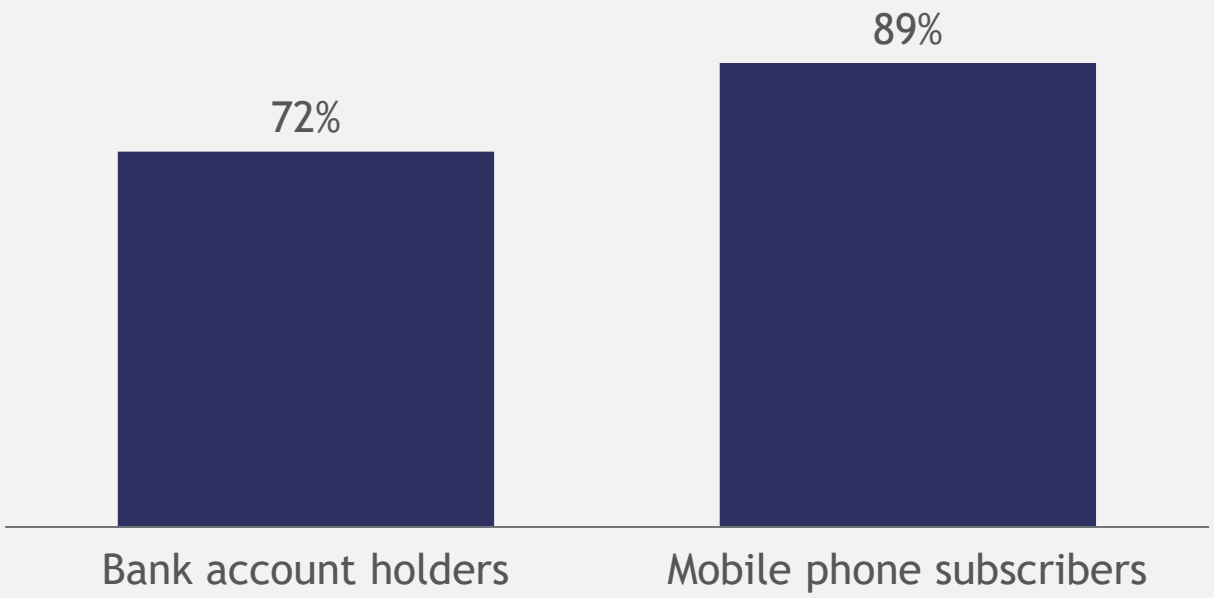
- Explosion of **volume, variety and sources** of data
- Increased **computing power** to process and analyze data
- **Decreased costs** of storing large scale storage
- Expanded **spectrum of use cases** being discovered
- **Richer data sets** as data time series become longer

Note: Data monetization market including Big data analytics, discovery and visualization tools, databases, Hadoop distribution tools and products, and data advisory
1. Assuming historical growth rate 2013-2018 for 2018-2023 / Source: Fortune Business insights, Micromarketmonitor

Telcos are uniquely positioned to monetize data because of their high levels of usage

Most Saudis have a mobile subscription…

Share of population (%, KSA)

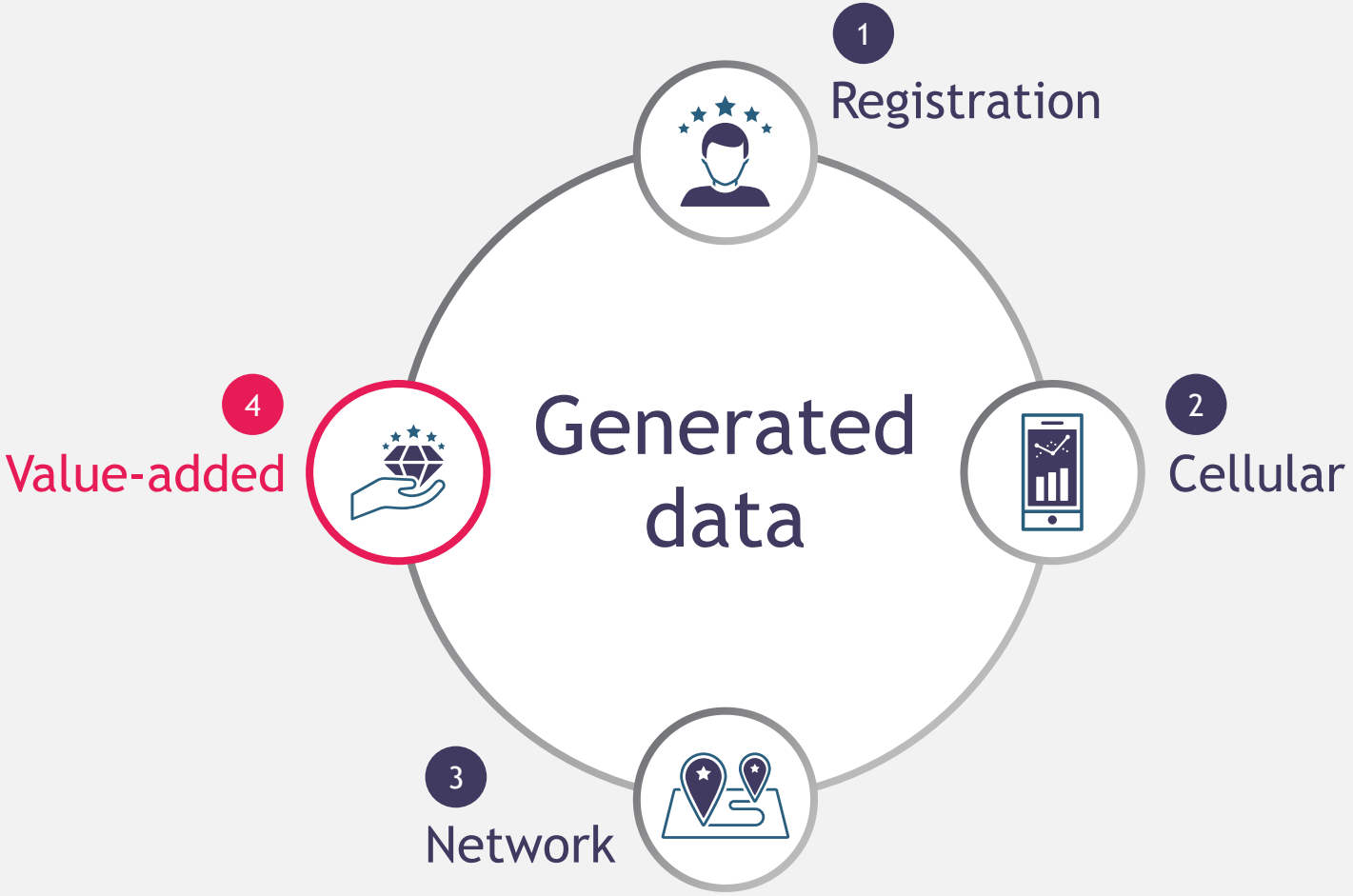


… enabling Telcos to generate datasets covering almost the entire population

Source: Global Fintech Database

Telcos collect four main types of data with the potential to be monetized

Preliminary



1
- Age
- Gender
- Address
- Operator relationship

2
- Voice (duration, recipients …)
- SMS
- Billing data

3
- Connectivity
- Location (incl. movement)

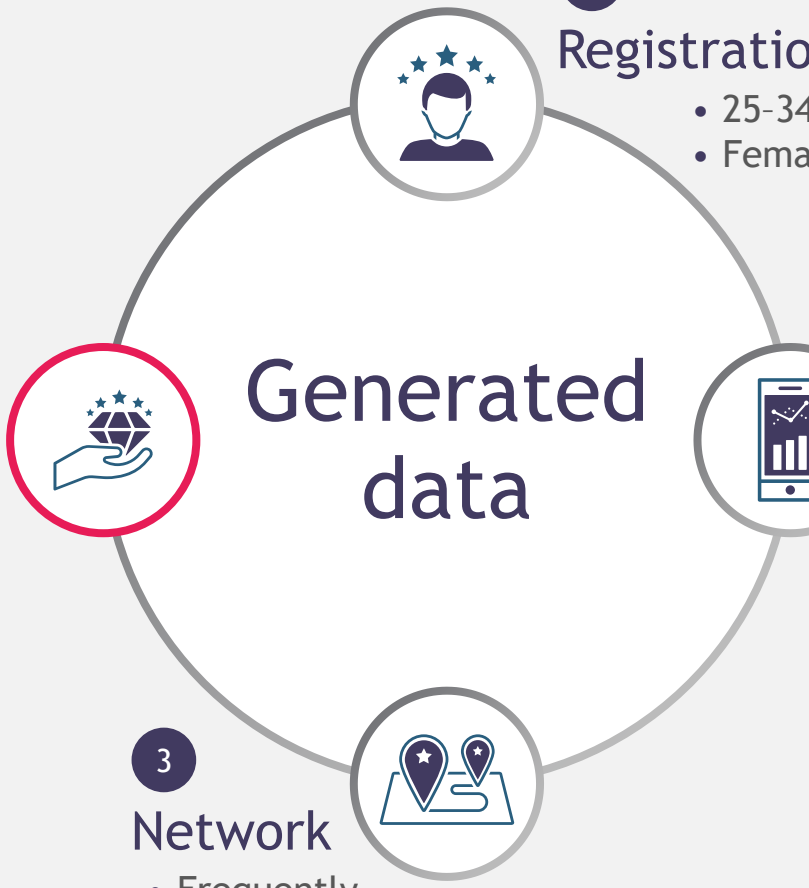
4
- Downloaded apps
- App activity

Source: BCG analysis

Generated by proprietary apps or purchased

The main potential lies in combining data, creating distinct user profiles

Illustrative



1 Registration
- 25–34 yrs old
- Female

2 Cellular
- Excellent credit history

3 Network
- Frequently visits malls

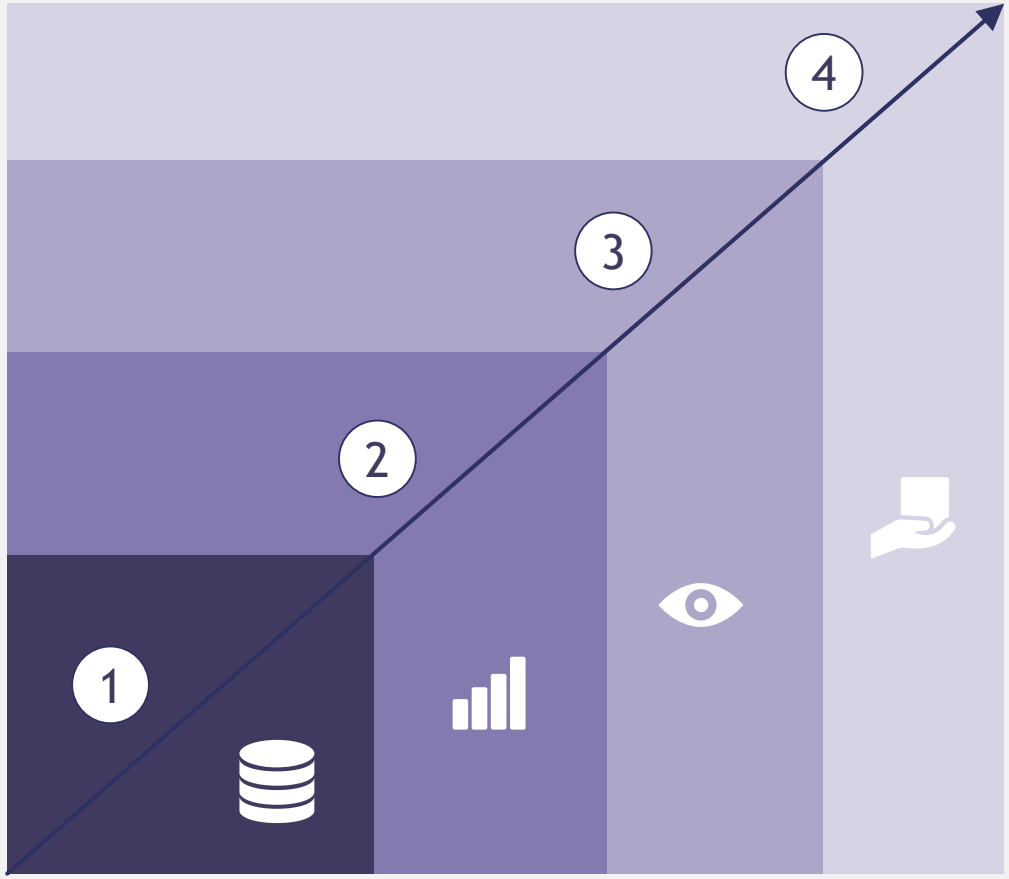
4 Value-added
- Spends time browsing fashion apps

Distinct profile with high potential value for targeted offers through an app; e.g. upscale fashion store

Source: BCG analysis

Generated by proprietary apps or purchased

At each step of the value chain there is potential to monetize data..



Value chain step and potential usage

1. **Data:** Data cleansing and provision of aggregated data sets, e.g. location of all mobile subscribers on a map
2. **Statistics:** Provision of treated data sets (statistics), e.g. number of persons in a city that commute daily by car
3. **Insights:** Delivery of insights based on statistical analysis, e.g. insight on work location by income group
4. **Solutions:** Offering of comprehensive products/ services, e.g. app offering targeted advertisements to customers

Source: BCG analysis

…with complexity and resource intensity increasing along the value chain

Value chain step

	1 Data	2 Statistics	3 Insights	4 Solutions
Description	Data cleansing and provision of aggregated data sets	Provision of treated data sets (statistics)	Delivery of insights based on statistical analysis	Offering of comprehensive products/services, e.g., apps

Characteristics

1. Capital, human resources 2. Know-how, time Source: BCG analysis

By collaborating there is potential to unlock additional value across the value chain

Value chain step

	1 Data	2 Statistics	3 Insights	4 Solutions
Examples of use-cases unlocked by collaboration	National data set with raw location of all subscribers	Statistics on average commute of all KSA workers	Insight into the travel habits of entire KSA population	App to send emergency messages to persons in a certain location

Negligible collaboration value-add

☐ Most feasible collaboration in short-term

Too complex in the short-term

Source: BCG analysis

Telcos already receiving requests for statistics and data insights from KSA government

Example requests received by government

Ministry of Hajj & Umrah
Requiring access to Telco data to track national pilgrims flows

Saudi Commission for Tourism & Heritage
Requiring access to Telco data to track tourists flows and transportation modes

Human Resources Development Fund
Requiring Telco data to track job-seeker proactivity and adjust subsidies

By collaborating, Telcos could **formalize data offering** to government and **monetize their services**

(currently provided for free)

Source: BCG analysis

Without collaboration, Telcos run the risk of forced free pooling of their data for government use

	Telco-driven collaboration	Government initiative
Data pooling	Saudi Telcos create together an entity to pool their data, obtaining thus comprehensive country datasets	Saudi government collects all the Telcos data and a national government body (e.g. NIC) pools the data
Data analysis	Telcos provide valuable and unique insights, that can be used by different government bodies	The national government body in charge leads the data analysis effort and obtains valuable insights
Government data access	Saudi government has a single point of contact and benefits from an easier access to the data	Saudi government has a single point of contact and benefits from an easier access to the data

Recommended option for Telcos to maximize the value from government data requests

Source: BCG analysis

Source: BCG analysis

Collaboration also has benefits beyond additional use cases

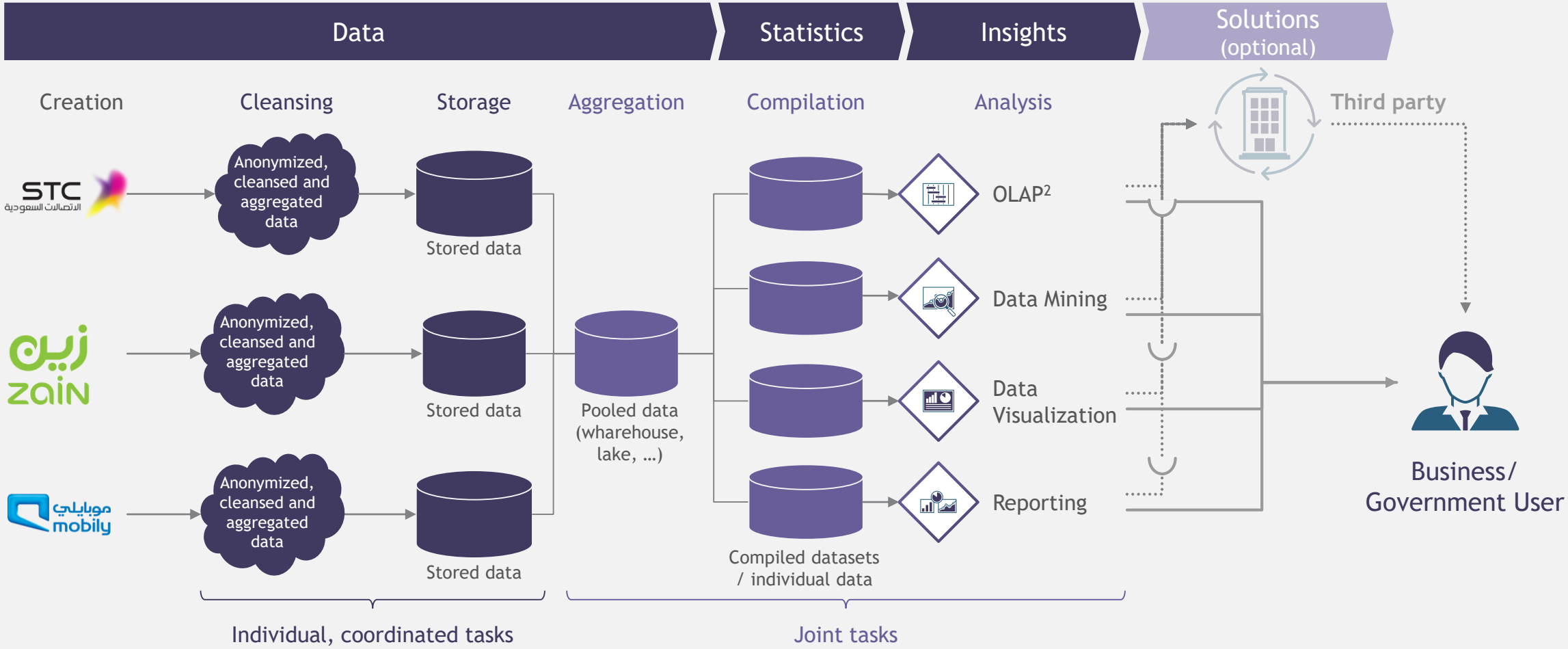
Reduced costs through pooling of cleansing, storage and capex to develop common platform

Increased ownership of data (& monetization potential) through less reliance on third parties

Improved security through additional checks and balances

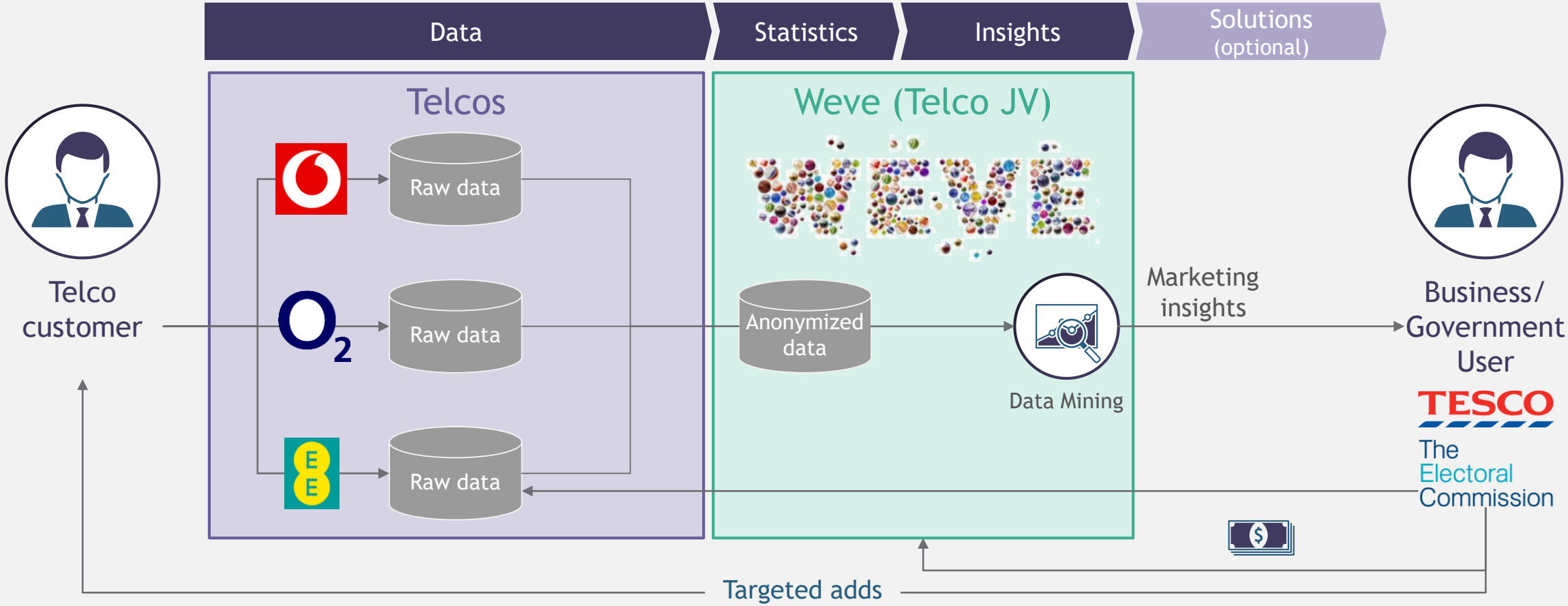
Source: BCG analysis

Illustration: what could collaboration look like



1.Relational Database Management Systems 2. Online analytical processing
Source: BCG Analysis

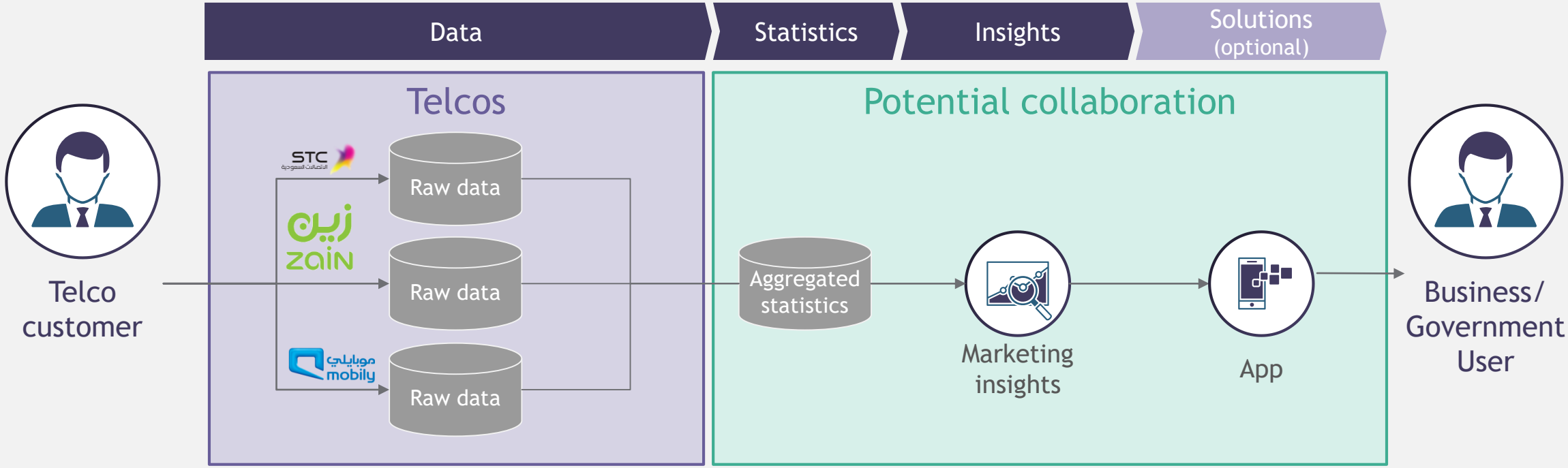
Case study: Weve offers targeted advertising for UK vendors



Comment		
	Manages combined subscription base of 22+ M customers in the UK	Aggregates and analyses data—offers externa party possibility to sell targeted adds

Source: WEVE

Case study: Hajj & Umrah pilgrim flows analysis



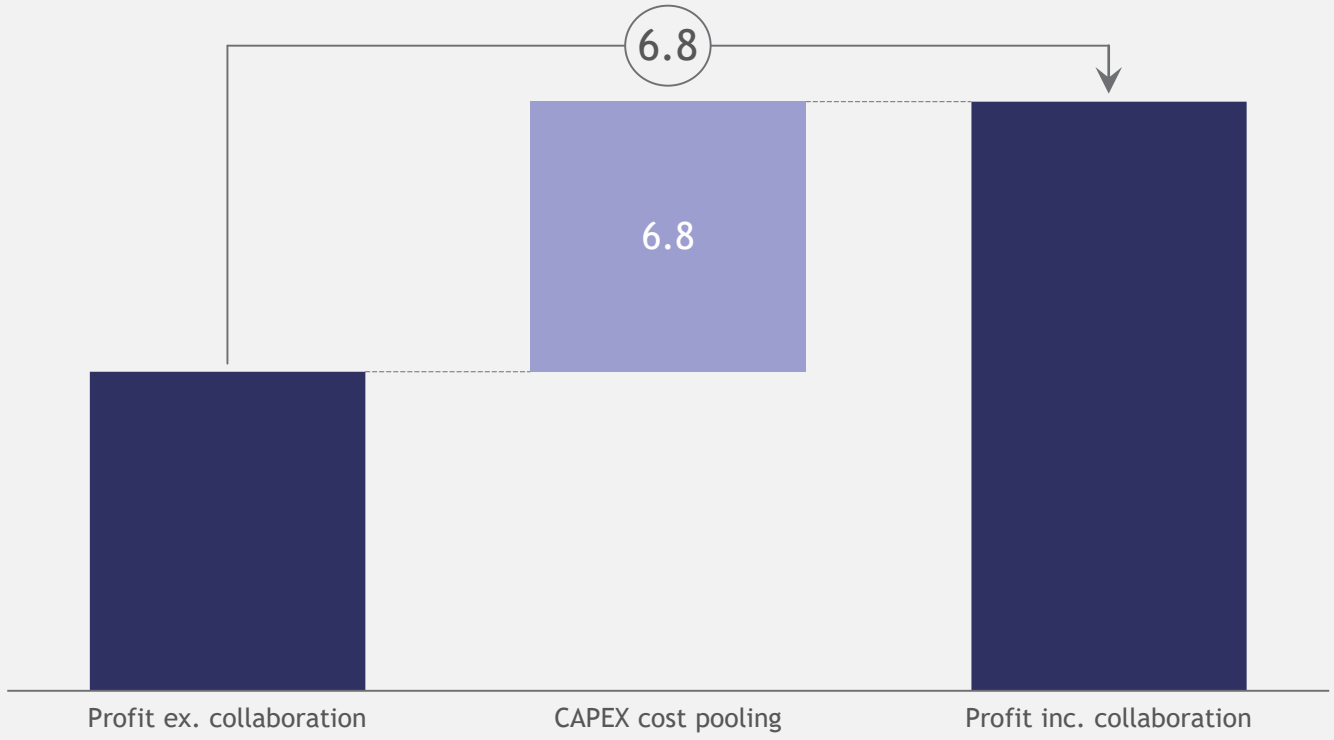
	Data	Statistics	Insights	Solutions (optional)
Example	Data on connections made to telecom masts in Mecca region in 2019	Statistics on number of pilgrims that traveled to Mecca in 2019, including entry point	Insight into length of stays of pilgrims by country, and reasons for length of stay	App predicting number of pilgrims in the next year and factors affecting the numbers
Benefits		Increased situational understanding	Supports decision making	Enables strategic planning and decision making

Source: BCG analysis

Potential impact of full collaboration estimated at 6.8 B SAR through 2023

Top-down estimate

Value creation from collaboration
(B SAR, 2019-2023E)



Assumes a total capex of 13.5 B SAR would be required in case all three MNOs invest in infrastructure[1]..

..of which an estimate 50% could be saved through collaboration[2]

Potential to save therefore 6,8 B SAR across sector through full collaboration

1. Total Capex required excluding collaboration was estimated using the asset base of data monetization companies globally, adjusted for differences in revenues. Assuming an asset lifetime of 5 years, required investments if Telcos invest individually amount to 13.5B SAR for 2019 to 2023 2. Theoretical cost saving of 66% by pooling 3 platforms discounted slightly to account for certain duplication of costs (e.g. admin, lack of collaboration in certain areas) Sources: MarketsandMarkets, Research survey of data customer willingness to leverage telco data, GDL by Singtel financials, NYU stern database, Capital IQ

3 potential collaboration models identified

Collaboration model

	Information sharing	Dedicated unit	Joint venture (JV)
Description	Agreement requiring Telcos to share data between each other	Dedicated (seperated[1]) unit within one Telco selected to be in charge of overall initiative	Stand-alone entity jointly owned by Telcos with equity and dedicated employees
Scope of collaboration	Limited to continuous sharing of data	Data sharing; joint aggregation, compilation and data analysis managed by lead Teleco	Complete collaboration within the JV
Resources deployed	None	Human resources from all Telcos; data structures from lead Telco	Large amounts of capital, time and human resources from all Telcos
Cost of termination	None	Limited cost of terminating collaboration	Substantial costs to dissolve, sell or integrate JV into one of the Telcos

1. Data, knowledge separated from rest of organization through Chines walls Source: BCG Analysis

3 potential collaboration models identified

Collaboration model

	Information sharing	Dedicated unit	Joint venture (JV)
Pros	No commitment from Telcos in terms of required resources No cost to dissolve collaboration	Efficiently uses resources by leveraging current data structures Enables the most suitable Telco to lead the initiative	Ensures full commitment and limits conflicts of interest between Telcos
Cons	Limited added value-add Challenging to align on commercial and technical details of collaboration	Challenging to agree on profit sharing model (due to differences in resources deployed)	Requires creation of dedicated systems at great cost

Source: BCG analysis

Profits from collaboration can be shared based on financial or data contribution

Profit sharing model

	Data usage	Market share	Share of investment
Description	Profits are shared based on actual usage of the data Telcos contribute	Profits are shared based on market share/ amount of data Telcos provide	Profits are shared based on investment to set up the collaboration
Pros	Fairly compensates Telcos based on their contribution to the success of the collaboration	Straight-forward to determine contribution of each party	Straight-forward to determine contribution of each party Encourages Telcos to invest initially into the collaboration
Cons	Challenging to measure, especially since end products/ services leverage data from multiple data sets	Quality/ actual usefulness of data is not taken into account	Ongoing contribution into the collaboration not accounted for Profits are distributed based on historical situation

Appendix
Data monetization case Studies

Case studies

Case study

WEVE is a data monetization company specialized in targeted advertising

WEVE was formed as joint-venture **between O2, Vodafone and EE** (combined 22+m customers)

The company has previously been part of campaigns for clients including Tesco and the Electoral Commission in the United Kingdom. Tracking locations of customers and having data of high quality enables WEVE to create **highly targeted offers for customers**

Case study

Instarea is a **big data monetization company** that provides data from telecom operators for their internal marketing as well as for third party businesses and for the public sector

Instarea architecture focuses on **anonymizing and aggregating data** before sharing it

In Slovakia, Instarea has connected all three largest telcos **into one data platform** and has found that there were 50% more inhabitants in Bratislava than the official census showed, aiding thus transport planning in the city

According to Instarea, a proper data monetization approach could potentially **increase a telecom operator's Average Revenue per User (ARPU) by up to 20%**

Sources: Weve website, Interview with Matej Misik, Director Business Development at Instarea, June 2019

Case studies

Case study

Juvo **builds financial profiles for individuals** who have no previous credit history. They do so using a cloud-based platform, leveraging data collected by operators, including mechanisms to encourage end users to share additional data with the operators

Data is processed using **advanced data science and machine learning technologies** in order to create financial profiles

Main customers are financial institutions (for whom this information is critical), but also other merchants and the operators themselves can benefit from this information

Collaborators around the world include **Deutsche Telecom, Movistar, and Celcom**

Case study

Mobile Connect is a program under GSMA[1], the trade body representing over 750 mobile operators worldwide. The core of the idea is to **provide identity services for digital service providers**, offering for mobile phone users a solution to share sensitive data and make transactions

Four main products are offered to business customers;

- **Authentication:** verification of end used identity through phone number
- **Authorization:** verification of actions (e.g. a purchase) through sharing end user consent
- **Identity:** secure sharing of citizen attributes (age, gender..) to verify identify
- **Attributes:** advanced ID verification and fraud prevention through sharing of e.g. location data

2. GSM Association Sources: Juvo website, Bloomberg, GSMA website, Mobile connect website

Case studies

Case study

Zeotap is a German company that develops **targeting mobile ads** leveraging data from MNOs

The company started tying up with MNOs across Europe and Asia to **access their customer data** for developing targeting mobile ads

Zeotap has developed **a leak-proof system** to protect the privacy of consumers. This system has been certified for the EU General Data Protection Regulation (GDPR) and has been patented in the United States

ZEOTAP

Case study

European Telecommunications Network Operators (ETNO) Association is the **principal policy group** for European electronic communications network operators

ETNO contributes to **shaping the best regulatory and commercial environment** for its members to continue providing high quality services

Telecom operators have worked together to assess the impact of the development of IoT on MNOs in the GDPR context

etno

Sources: Tech in Asia, Zeotap, ETNO websites

Case studies

Case study

Zenkey is a collaboration initiative lunched in late 2018 between the four big US carriers; **AT&T, Sprint, T-Mobile, and Verizon**

The aim is to create a **joint identity authentication platform** with an adjoining app, targeting end customers of all four operators

Using the Zenkey app, customers will **share information such as their phone number, account tenure, phone account type**, and SIM card details. This information will then be shared with other apps or websites (that have partnered with Zenkey) in order to verify customers identify

ZENKEY AT&T Sprint T··Mobile· verizon

Sources: Zenkey website

هيئة الاتصالات وتقنية المعلومات
Communications and Information Technology Commission

FINTECH

Concept paper | DECEMBER 2019

Fintech opportunity mostly relevant for mobile operators

Mobile Network Operators (MNOs)

Mobile Virtual Network Operators (MVNOs)

Fixed Network Operators

Three main topics covered in this document

Rationale for collaboration

Scope of collaboration

Collaboration model

Findings validated with panel of BCG experts and industry professionals

BCG's team of experts — **Telco professionals** — **Regulatory expert**

Ugo Cotroneo
Partner and Managing Director, core member of BCG Digital Banking Initiative

Arnaud Voguet
Senior Knowledge Analyst, Telco Diversification

Eric Kuisch
Former CTO at Vodafone Germany, 20+ years of experience

Ahmed Elnoamany
Former Head of PMO at Egypt Telecom, 22+ years of experience

Michel Combot
Former MD, ARCEP (French Telco Regulator)

What is Fintech?

Business models

Disruptors

Enablers

Product verticals

	Retail banking	Wealth management	SME banking	Corporate banking	Capital markets	Insurance
Lending	P2P lending, crowdfunding, digital mortgages, SME lending, …					
Payments	Digital wallet, contactless payments, P2P payments, crypto-currency, …					
Accounts	Mobile/ application-based account services (current, savings), …					
Investments	Digital-only Robo-advisory, micro-investment trading platforms, …					
Insurance	Insurtech (healthcare, life, auto, life, personal line, SME/ commercial, …)					

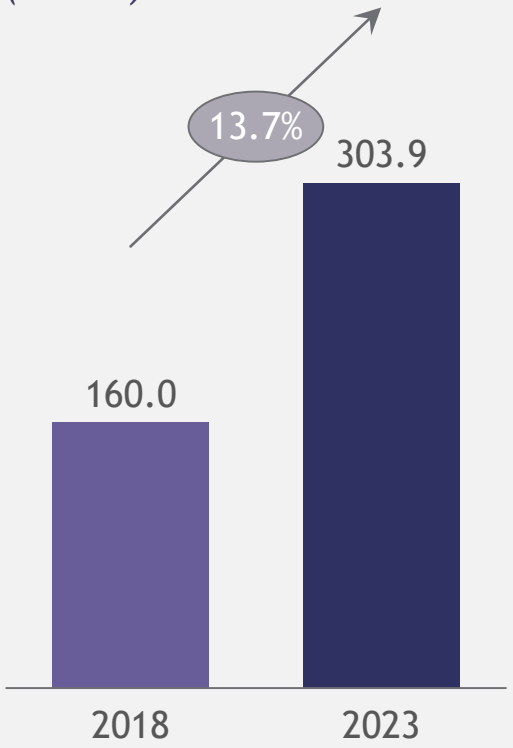
Services

Technology development and infrastructure	Data and analytics	Infrastructure and hardware	Security	Digital identity	Distributed ledger tech	Other
Support services	Compliance	Risk	Finance	Sales tools and CRM	Supply chain management	Process optimization

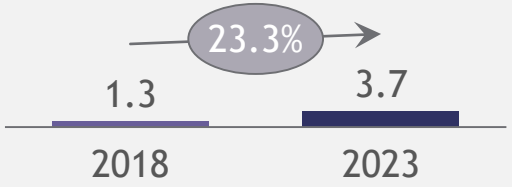
Note: Selected examples of product verticals
Source: BCG analysis

Fintech market is growing fast, especially in KSA

Global Fintech Market size *(SAR B)*



KSA Fintech Market size[1] *(SAR B)*



Key growth drivers

- Growth in smartphone adoption, facilitating access to digital platforms
- Advancement in technology enabling wide range of use-cases
- Decreased trust in traditional banking system
- Increase in mobile-first behaviors and transaction driven by tech-savvy customers
- Weak national banking ecosystem and underserved local population

1. Based on KSA estimated share of global transaction value (*Global Fintech Market Overview*) and global market size CAGR (2018-2023)
Source: Statista, Global Fintech Market Overview, Prnewswire, BCG Analysis

Telcos are well positioned to compete with fintech incumbents

Preliminary

Synergies with existing infrastructure

Complex existing secured and scalable network & systems, able to be leveraged for new platform

Already customer-centric business model

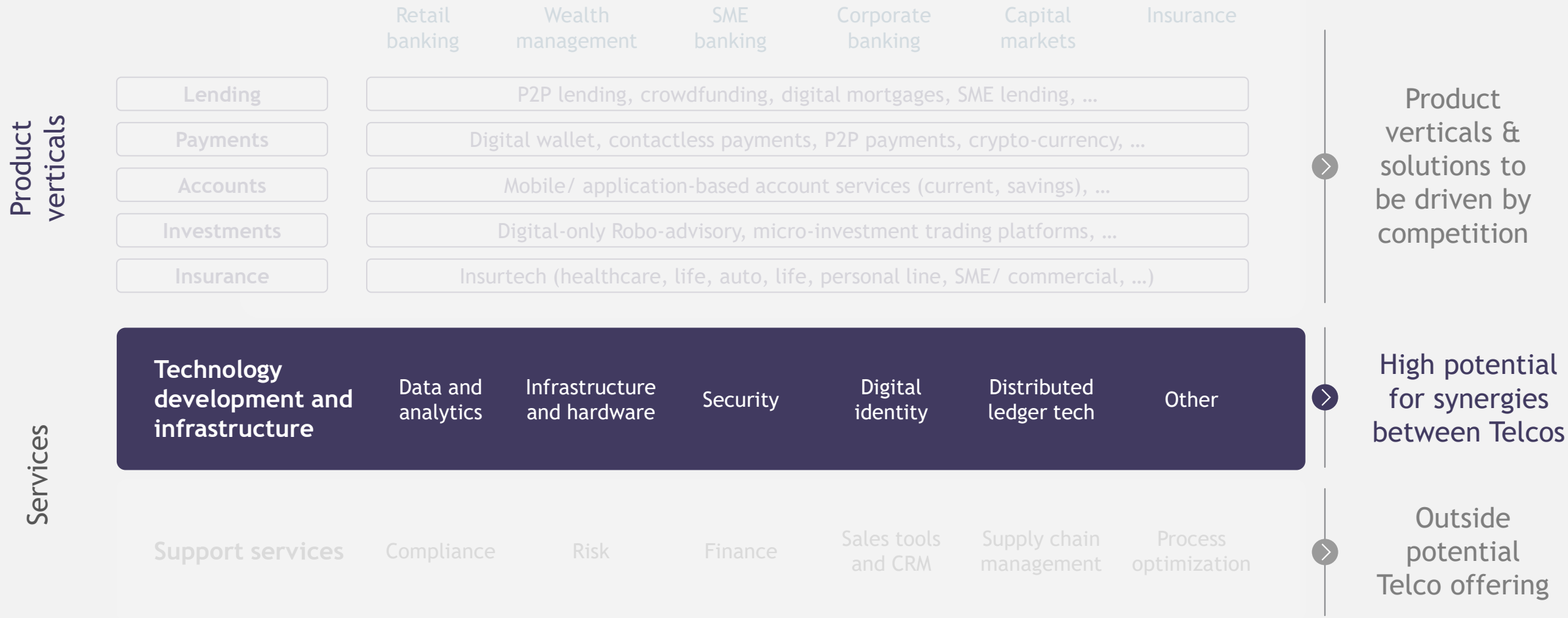
Telcos existing customer relationship know-how can be leveraged for customer-centric Fintech services

Innovation at heart of Telcos

Significant R&D investments and innovative mindset lower barriers to entry for Telcos in Fintech market

Source: BCG analysis

By collaborating in infra layer, Telcos can create synergies while minimizing impact on current products



Note: Selected examples of product verticals
Source: BCG analysis

A common platform would allow multiple value levers to take shape

…for Telecom operators

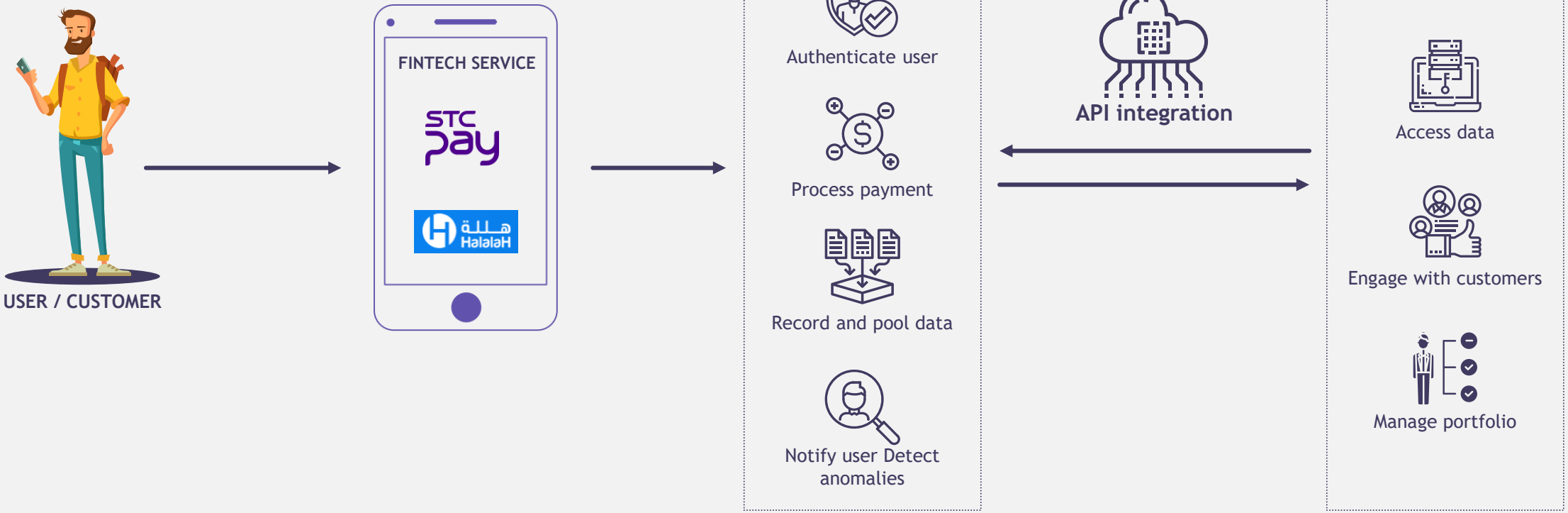
- **Gain scale to compete** with global players in the market (e.g. Apple Pay, …)
- **Reduced cost vs. individual** development of platform by each operator
- **Increased data ownership** (& monetization potential) through less reliance on third parties
- **Increased support from CITC to tackle regulatory barriers with SAMA**

…for service providers

- **Access to battle-tested infrastructure** to deploy highly scalable fintech products / solutions
- **Insurance of safe and secure handling** of financial data through national platform embedding strong checks & balances

Source: BCG analysis

Telcos can collaborate to create a Saudi Fintech Platform for mobile payments



4 potential collaboration models identified

Collaboration model

	Co-investment	Partnership	Joint venture with a 3rd party company	Joint venture between Telcos
Description	Co-investment in a common strategic target in Fintech previously identified	Partnership among Telcos to drive the overall initiative (e.g. through adoption of global solution)	Stand-alone entity jointly owned by Telcos and a 3rd party Fintech company with equity and dedicated teams	Stand-alone entity jointly owned by Telcos with equity and dedicated teams
Resources deployed	Light human deployment during due diligence High capital intensity through acquisition	Light human and capital engagement across telcos	Capital and human intense for 3rd party, with moderate telco investment	Large amounts of capital and human resources from all Telcos (building platform from scratch)
Profit-sharing	Shared based on equity share	N/A - Based on market captured at service level	Shared based on equity share	Shared based on equity share
Time to-market	Shorter			Longer

1. Data, knowledge separated from rest of organization through Chines walls Source: BCG Analysis

Appendix
Fintech case Studies

Deep-dive: Mobile Connect solution developed by GSMA

Description

- Mobile Connect turn MNOs into **trusted identity service providers**
- Digital identity solution that offers a **safe consumer experience** and **low barriers to entry** across the digital ecosystem
- Mobile Connect can provide **different levels of security**, from low-level website access to highly-secure bank-grade authentication
- Facilitates the **management of consumers' digital identities** across multiple online services, leveraging Telcos assets (e.g. SIM)

Technology used

- Utilizes **OpenID[1] connect protocol**, offering broad interoperability across mobile operators and digital service providers
- By matching users to their mobile phones, Mobile Connect **allows them to log-in quickly,** leading to **fewer abandoned transactions**
- To use the service, individuals subscribing to a participating operator simply need to click on a specific button

Case study

- To ensure broad service provider adoption, Korean MNOs offer a **single identity solution with full market coverage**
- The collaboration effort led to a **broad adoption** - 99% of Korean websites – and the resulting cross-operator solution drives revenue for operators of **US$40 million annually**
- It has also enabled MNOs to open up **new revenue channels** by offering innovative services based on the existence of **a robust recognized identity**

1. OpenID Connect has been adopted as the base protocol and framework because of its openness and robustness. It works on almost any device that has a web browser with access to the Internet; It is not specific to any operating system; There is a set of specifications that many developers are already familiar with. The specification is not proprietary and is currently publicly available; It is designed to be easy to use, reliable and secure

Source: GSMA website

Fintech – Case studies

Fintech

Case study

Juvo **builds financial profiles for individuals** who have no previous credit history. They do so using a cloud-based platform, leveraging data collected by operators, including mechanisms to encourage end users to share additional data with the operators

Data is processed using **advanced data science and machine learning technologies** in order to create financial profiles

Main customers are financial institutions (for whom this information is critical), but also other merchants and the operators themselves can benefit from this information

Collaborators around the world include **Deutsche Telecom, Movistar, and Celcom**

Case study

Mobile Connect is a program under GSMA[1], the trade body representing over 750 mobile operators worldwide. The core of the idea is to **provide identity services for digital service providers**, offering for mobile phone users a solution to share sensitive data and make transactions

Four main products are offered to business customers;

- **Authentication:** verification of end used identity through phone number
- **Authorization:** verification of actions (e.g. a purchase) through sharing end user consent
- **Identity:** secure sharing of citizen attributes (age, gender..) to verify identify
- **Attributes:** advanced ID verification and fraud prevention through sharing of e.g. location data

mobile connect GSMA

2. GSM Association Sources: Juvo website, Bloomberg, GSMA website, Mobile connect website

Fintech – Case studies

Case study

AT&T, Sprint, T-Mobile and Verizon have created a joint venture **to develop a cutting-edge Rich Communication Services (RCS) platform**

The Cross-Carriers Messaging Initiative (CCMI) will offer to customers a single **seamless interoperable RCS experience**, regardless of the operator, that could be used both globally and in the United States

Synchronoss Technologies, a global leader and innovator of cloud and IoT products will help the joint venture deliver an advanced mobile messaging experience across all four mobile network

Case study

Jumo is a start up that has developed a **credit scoring tool**

Jumo opens access to credit and savings in real time via smartphones for individuals and small, medium and micro enterprises

All major south African Telcos have partnered with Jumo, which is **leveraging mobile wallet spending behavior to assess credit worthiness of customers**

Sources: Telecoms operators and startups: rethink and reinvent, Globe news wire, GSMA Report, AFD website

Fintech – Case studies

Case study

MTN and Orange entered a JV partnership in Q3 2018 at called Mowali, offering interoperability of mobile payment services across both MNOs markets.

Mowali acts as **a digital infrastructure and platform** where any mobile payment provider can 'plug' its service and be part of an inclusive network, enabling money to circulate freely between mobile money accounts.

The joint-venture officially launched in late 2018 is expected to go-live early 2020 to connect **more than 100 million customers across 22 countries**

Case study

Telenor launched in 2009 its first mobile payment solution in Pakistan, enabling fast and secure money transfers between mobiles.

Since then, Telenor has grown in 14 countries to deploy nation-wide digital infrastructure enabling mobile payments and other financial services.

In 2014, Telenor Group started to develop internal capabilities to **predict credit worthiness** of their mobile payment solutions users using predictive algorithms based on behavior, spend and location patterns.

Sources: Interview with Matej Misik, Director Business Development at Instarea, June 2019

Fintech – Case studies

Case study

Telecom operators Bharti Airtel and Millicom International have combined their operations in Ghana

This resulted to the creation of Ghana's second largest mobile operator with nearly 10 million subscribers and USD 300 million in revenue, covering more than 80% of Ghana's population

Their mobile wallet operations – Airtel and Tigo Cash - have also been integrated, **widening the number of destinations customers can transfer funds to and increasing the range of merchants accepting payments**

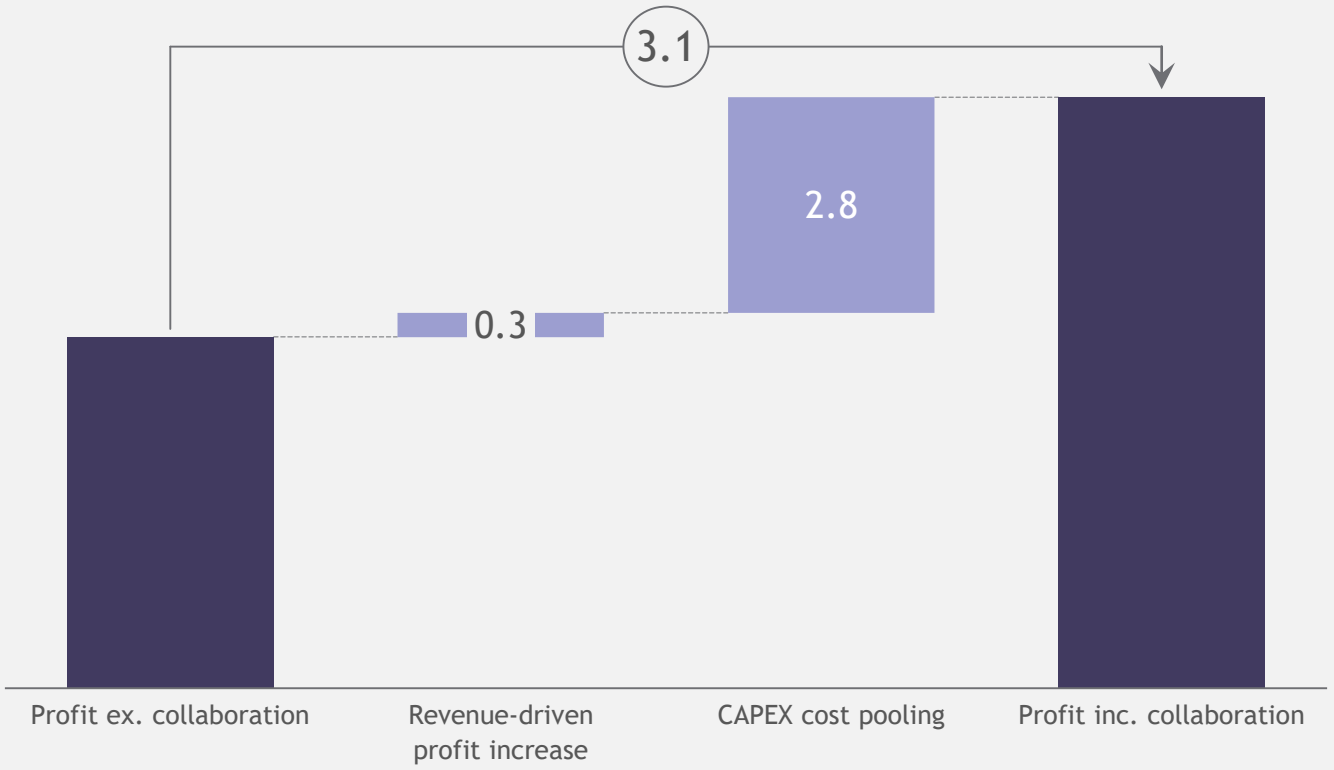
The joint venture also **increases the number of partner banks** from 11 to 20

Sources: Economic Times, Mobile World Live, Mobile operators & fintech, GSMA Report, AFD website

Potential to drive 3.1 B SAR in value through deployment of national fintech platform

Top-down estimate

(B SAR, 2019-2023E)



Potential to drive an estimated 3,1 B SAR in added value across sector through collaboration

Assumes Telcos are able to capture 44% of KSA Fintech market by 2023[1]

Assumes Capex total savings of 50% through collaboration[2]

1. Represents % of 27,000 respondents willing to consider using specific FinTech products, if they were offered by telco companies
2. Total Capex required excluding collaboration was estimated using the asset base of fintech companies globally, adjusted for differences in revenues. Assuming an asset lifetime of 5 years, required investments if Telcos invest individually amount to 5.5 B SAR for 2019 to 2023. Theoretical cost saving of 66% by pooling 3 platforms discounted slightly to account for certain duplication of costs (e.g. admin, lack of collaboration in certain areas) Sources: Gartner, Capital IQ

هيئة الإتصالات وتقنية المعلومات
Communications and Information Technology Commission

INTERNET OF THINGS

Concept paper | DECEMBER 2019

IoT collaboration opportunity relevant for MNOs and MVNOs[1]

Mobile Network Operators (MNOs)

STC الاتصالات السعودية

موبايلي mobily

زين ZAIN

Mobile Virtual Network Operators (MVNOs)

Virgin mobile

Lebara ليبارا mobile

axiom telecom

Fixed Network Operators

الاتصالات المتكاملة INTEGRATED TELECOM

GO جو اتحاد مذيب للاتصالات

Dawiyat ذويات

1. Mentioned as Telcos in the next slides

Three main topics covered in this document

Rationale for collaboration

Scope of collaboration

Collaboration model

Findings validated with panel of BCG experts and industry professionals

BCG's team of experts — **Telco professionals** — **Regulatory expert**

Nicolas Hunke
Global Leader of Digital in TMT, strong expertise in IoT platforms

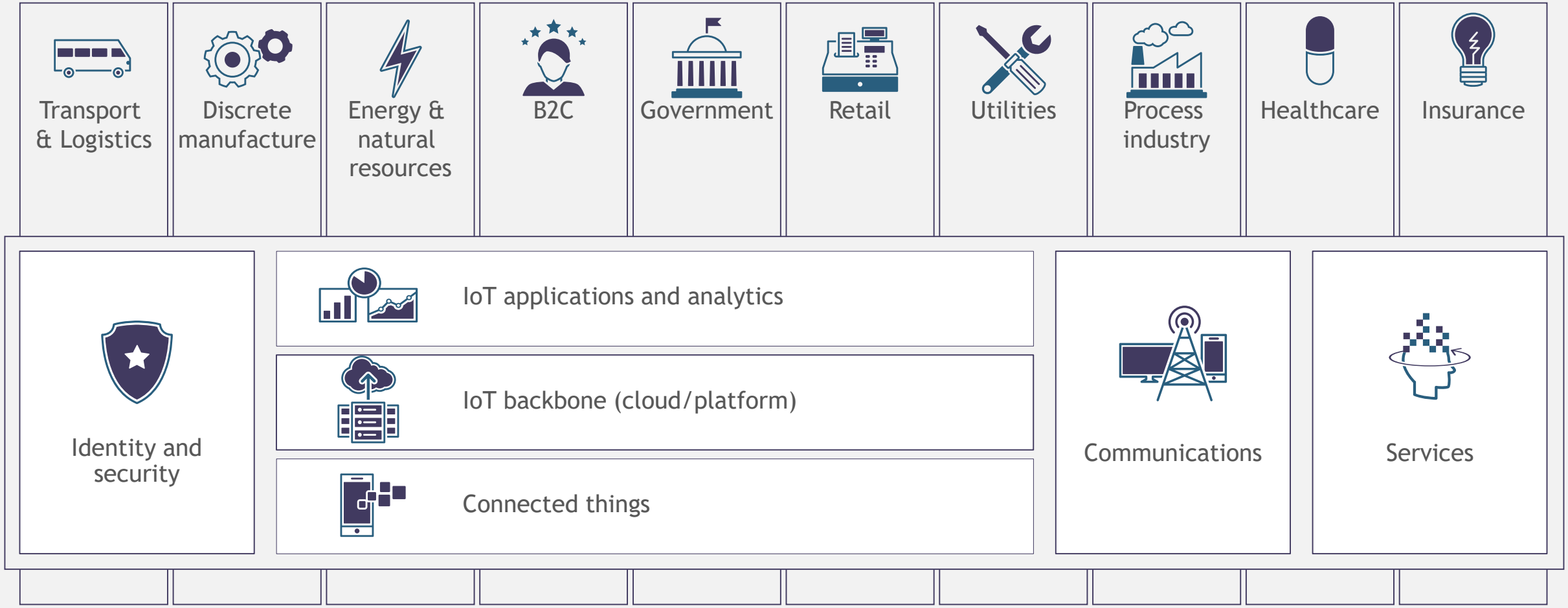
Arnaud Voguet
Senior Knowledge Analyst, Telco Diversification

Eric Kuisch
Former CTO at Vodafone Germany, 20+ years of experience

Ahmed Elnoamany
Former Head of PMO at Egypt Telecom, 22+ years of experience

Michel Combot
Former MD, ARCEP (French Telco Regulator)

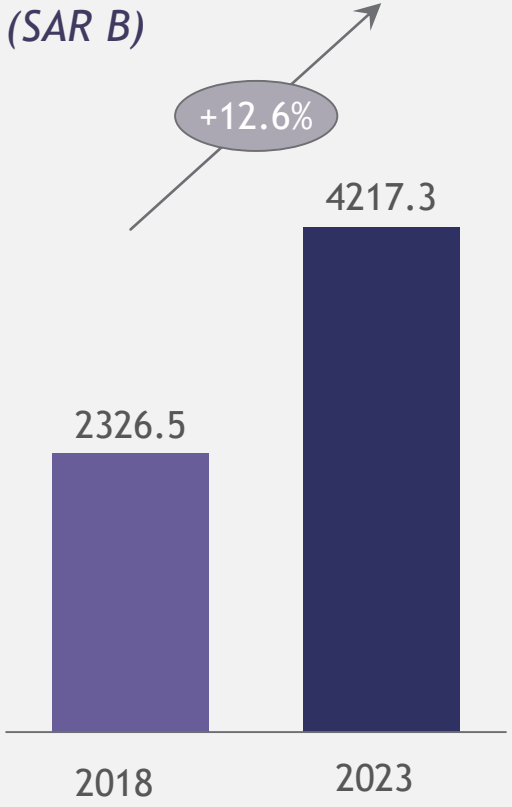
IoT technology stack consists of six major layers, cutting across multiple verticals



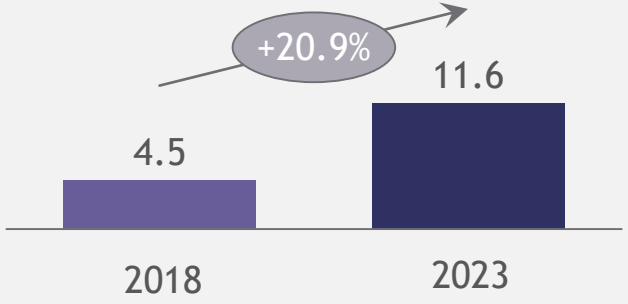
Source: BCG Analysis

IoT market is booming globally, with faster pace in KSA

Global IoT Market size *(SAR B)*



KSA IoT Market size *(SAR B)*



Key growth drivers

- Decreased **costs of connectivity and IoT sensors**
- Increased **computing power**
- **Decreased costs** of Infrastructures as a Service (IaaS) (e.g. cloud)
- Development of **digital business models**
- Advancements in **connectivity technologies** (e.g. 5G)
- Development of **government flagship programs** that foster the use of IoT (e.g. smart cities)

Source: Worldwide Internet of Things Forecast, IDC, September 2019, Saudi Arabia Internet of Things Market Forecast and Analysis, IDC, June 2019, Future of IoT

Telcos are well positioned to seize significant shares of the IoT market

Preliminary

Connectivity is at the core of their business

Telcos ensure network coverage, enabling IoT deployment along a diverse range of technologies and protocols

Systems integration is part of their expertise

Telcos have unique knowledge on how to connect devices and systems between them, with business partners and end-users

Lifecycle management is encoded in their DNA

Telcos are the only players with experience managing life cycles of millions of devices

Source: BCG Analysis

Telecom providers could potentially play in all levels of the IoT stack…

Identity and security

IoT applications and analytics

IoT backbone (Cloud/Platform)

Connected things

Communications

Services

Source: BCG Analysis

… provided a solid & standardized communication foundation

Interoperability
- Adhesion to common protocol standards
- Creation of gateways able to translate different protocols

Resilience
- Constant delivery of high levels of service
- Ability to adapt quickly to adverse occurrence

Security
- Full protection of all the collected data
- Strong prevention of malicious attacks

Source: BCG Analysis

IoT communication layer based on enablement of several network technologies…

Communications

	LPWAN[1]		Short-range networks	
Category	**Licensed IoT (LTE-M, NB - IoT)**	**Unlicensed protocols**	**LAN**	**PAN**
Underlying Technology	LTE-M, Nb-IoT	Sigfox, LoRAWAN	Wireless local area networks (WiFi), Zigbee, Z-Wave, 6LoWPAN, …	Very short-range networks (RFID, NFC, Bluetooth, …)
Use cases	IoT applications that are low cost, use low data rates, require long battery lives and often operate in remote areas	Low-cost LPWAN applications operating on unlicensed spectrum	Provide connectivity to devices through a central hub using wireless communications at local level (e.g. IoT for smart homes)	Used to connect and lnk personal devices with each other to exchange information (e.g. payment)
Key Players	vodafone, 中国移动 China Mobile, AT&T	sigfox, LoRa	Wi Fi	®

1. Low Power Wide Area Networks
Source: BCG Analysis, GSMA

IoT communication layer based on enablement of several network technologies…

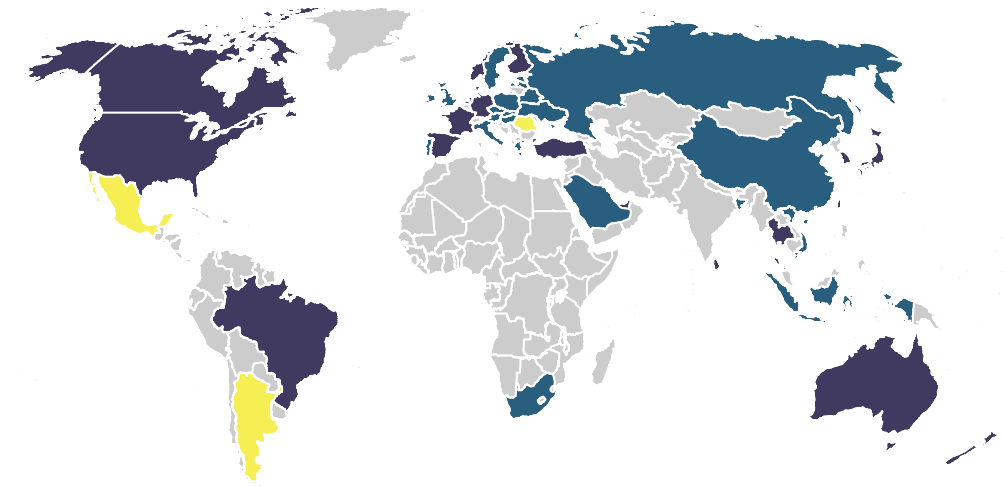
Communications

	LPWAN[1]		Short-range networks	
	Collaboration play			
Category	**Licensed IoT (LTE-M, NB - IoT)**	**Unlicensed protocols**	**LAN**	**PAN**
Underlying Technology	LTE-M, Nb-IoT	Sigfox, LoRAWAN	Wireless local area networks (WiFi), Zigbee, Z-Wave, 6LoWPAN, …	Very short-range networks (RFID, NFC, Bluetooth, …)
Use cases	IoT applications that are low cost, use low data rates, require long battery lives and often operate in remote areas	Low-cost LPWAN applications operating on unlicensed spectrum	Provide connectivity to devices through a central hub using wireless communications at local level (e.g. IoT for smart homes)	Used to connect and lnk personal devices with each other to exchange information (e.g. payment)
Key Players	vodafone, 中国移动 China Mobile, AT&T	sigfox, LoRa	Wi Fi	®

1. Low Power Wide Area Networks
Source: BCG Analysis, GSMA

Globally, Telcos are increasingly rolling-out their own IoT networks on licensed spectrum

Licensed IoT protocols deployment map



NB-IoT advantages

Coverage over large areas
Narrow band frequencies allow devices to work when deep underground or within buildings

Can travel through up to 3m of concrete

Power efficiency
Devices can run on batteries for 10 years without a charge, or even longer depending on frequency of communication

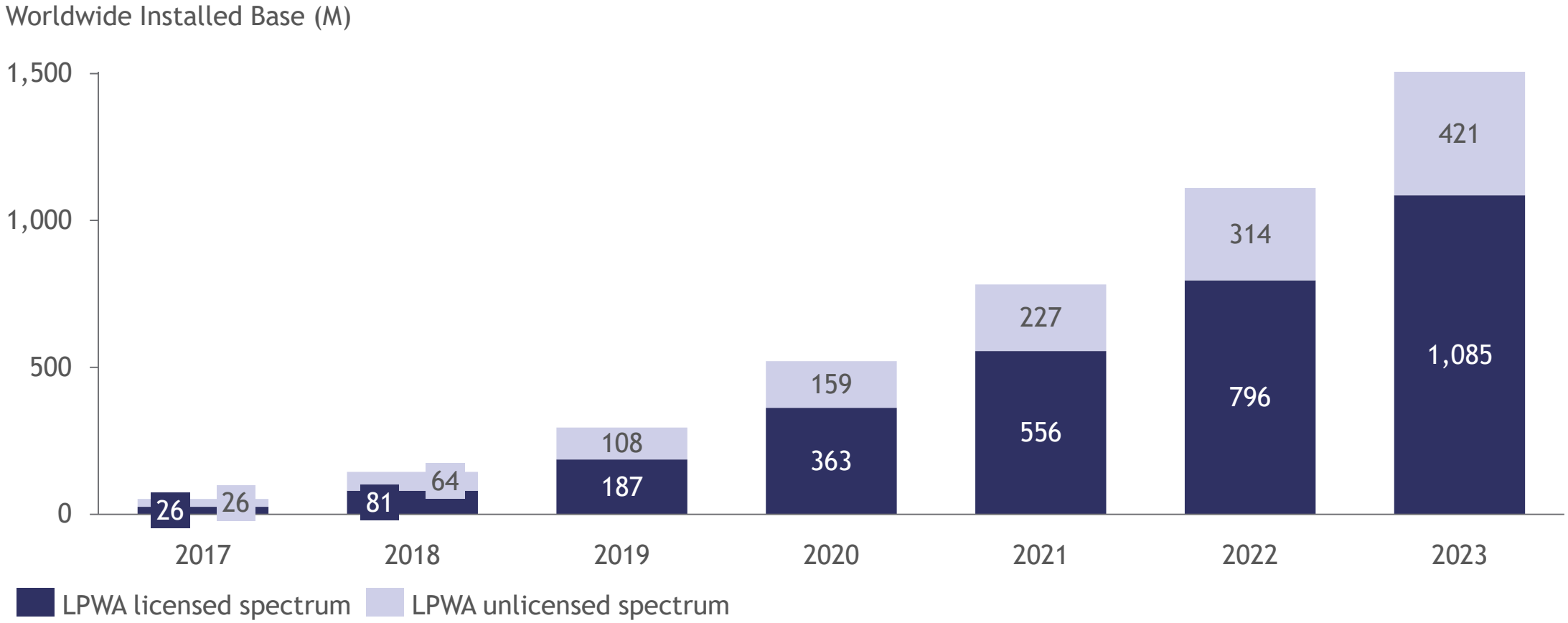
Scale
Ability to connect millions of devices over significant distances

Cost
Data collection devices can be built for less than $10

Low bandwidth
Devices use just a few bytes of data per day to relay data

Source: BCG Analysis, GSMA

LPWA networks on licensed spectrum to concentrate over 72% of total installed base by 2023



Notes: LPWA licensed spectrum technologies include LTE-M and NB-IoT, and LPWA unlicensed spectrum technologies include LoRA, Sigfox and Others
Source: Ovum

Telco-ran IoT networks allows significant numbers of devices to operate via carrier networks

Pros and Cons of collaborating on mobile licensed IoT protocols

- Mobile licensed IoT devices rely on 4G coverage, so they would work well indoors and in dense urban areas
- It has faster response times and can guarantee a better quality of service than Long Range IoT (LoRa-Iot)
- Mobile licensed IoT protocols platforms are secured
- International standards have already been defined, which makes it easier for Telcos to find a common approach towards mobile licensed IoT protocols
- Sending larger amounts of data down to a device is hard
- Best suited for primarily static assets, like meters and sensors in a fixed location, rather than roaming assets

Source: BCG Analysis

Case study: Vodafone is working with clients around the world to develop its NB-IoT capabilities

Track and Go

A project developed by Vodafone, Samsonite, In the Pocket, and Accent systems

A device designed to be put into your travel or business bag, with the objective of having our assets always located in real time.

- **Proximity alerts** that allows you to receive a smartphone notification when your bag gets out of your range.
- **Geolocation** make sit possible to track your valuables, anytime. Always able to see its current location

Aguas de Valencia

Aguas de Valencia is multinational water provider. Proprietary data used to manage more than 600,000 automated meter reading devices.

AdV trailed with Vodafone, testing NB-IoT's ability to provide coverage in hard-to-reach meter locations.

"So far the results have been very promising as the signal has been able to reach its destination without any issues in all of the [difficult to reach] locations tested"

South East Water

In Australia, South East Water is using NB-IoT to monitor rainwater tanks and pipe flow, as well as to guard against unauthorised entry to sewers, car parks and other sites.

Aim is to analyse in real time: performance, asset condition

and fault management across its networks in real time.

NB-IoT chosen as sensors are be installed under manhole covers and underground

Source: Vodafone report; LinkLabs; electronicsnotes; BCG Research

By collaborating in connectivity, Telcos could unlock strong value for the overall IoT ecosystem

…for IoT service providers

- Benefit from **lower power consumption** from the devices
- **Reduced costs** thanks to simpler and cheaper chips
- **Faster time-to-market** enabled by an easy access to national spectrums
- **Eased scalability** by leveraging national and international coverage

…for IoT users

- **Enhanced user experience** through more reliable network and wider coverage
- **Switching costs** from an operator to another are reduced thanks to standardization

Source: BCG Analysis

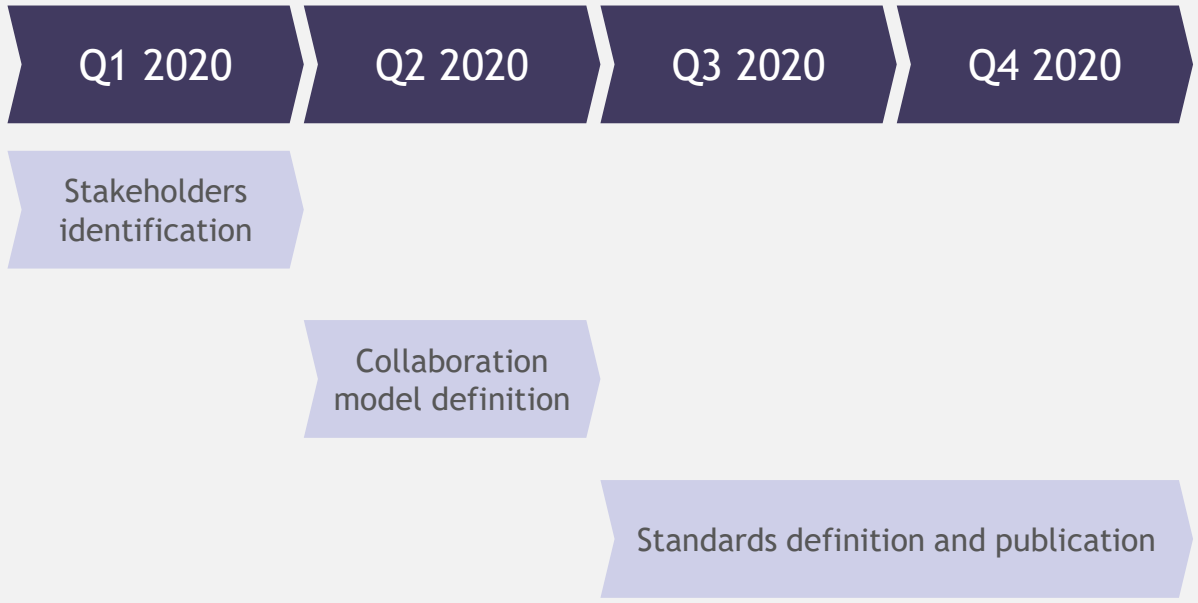
Following guiding principles and a clear strategic roadmap are key success factors for collaboration

Preliminary

Collaboration guiding principles

1. Include relevant and knowledgeable stakeholders in the IoT ecosystem
2. Drive collaboration alongside with all CITC teams that are involved
3. Ensure that standards are aligned with all the stakeholders' business requirements
4. Stabilize the stakeholders' levels of engagement throughout the process (i.e. from standards definition to implementation)

Strategic roadmap



Source: BCG Analysis

Next steps

Create dedicated working group with Telcos and other stakeholders on mobile-IoT standards

Validate initial findings in workshop with working group

Develop a strategic roadmap to efficiently deploy National IoT Connectivity Platform

Appendix
IoT Case Studies

IoT – Case studies

Case study

All Singapore Telcos, along with device manufacturers, have been involved in **defining interoperability standards for IoT -** defined as Technical References (TR) - as part of the IoT Standards Committee led by IMDA

IMDA developed these TRs to address the absence of coherent sensor networks or IoT standards, with a **focus on interface interoperability**

These TRs will help the development of open standard interfaces between the devices and systems, and should help to **reduce cost of deploying, operating and maintaining sensor applications**

One of the TRs focuses on building a Smart Nation and fosters the development of applications to **achieve seamless data exchange and information use**

SINGAPORE STANDARDS COUNCIL

Case study

AT&T has worked with the city of Los Angeles to forge **a public-private partnership to foster the development of IoT solutions**

AT&T and Los Angeles would work closely together to design **a digital infrastructure** for the city and develop IoT tools that would improve, for instance, traffic and public safety

The partnership would enable AT&T to deploy more rapidly a greater number of small cells, expanding thus its existing network and start developing its 5G network

AT&T

Sources: IMDA website, Los Angeles Biz Journal

IoT – Case studies

Case study

KPN, major operator in the Netherlands, has developed **a startup collaborative environment** that fosters outside-in innovation

The company facilitates contacts and knowledge exchange, joint product development, commercial and strategic cooperation

In particular, KPN collaborates with startups, early-stage companies, universities and government bodies **to develop innovative solutions in the areas of Internet of Things (IoT)**, smart home, digital healthcare, cloud services and cyber security

Case study

AT&T, Sprint, T-Mobile and Verizon have created a joint venture **to develop a cutting-edge Rich Communication Services (RCS) platform**

The Cross-Carriers Messaging Initiative (CCMI) will offer to customers a single **seamless interoperable RCS experience**, regardless of the operator, that could be used both globally and in the United States

Synchronoss Technologies, a global leader and innovator of cloud and IoT products will help the joint venture deliver an advanced mobile messaging experience across all four mobile network

Sources: Telecoms operators and startups: rethink and reinvent, Globe news wire

IoT – Case studies


Case study

Singtel has teamed up with China Mobile International to drive the adoption of their IoT devices amongst their respective enterprise clientele

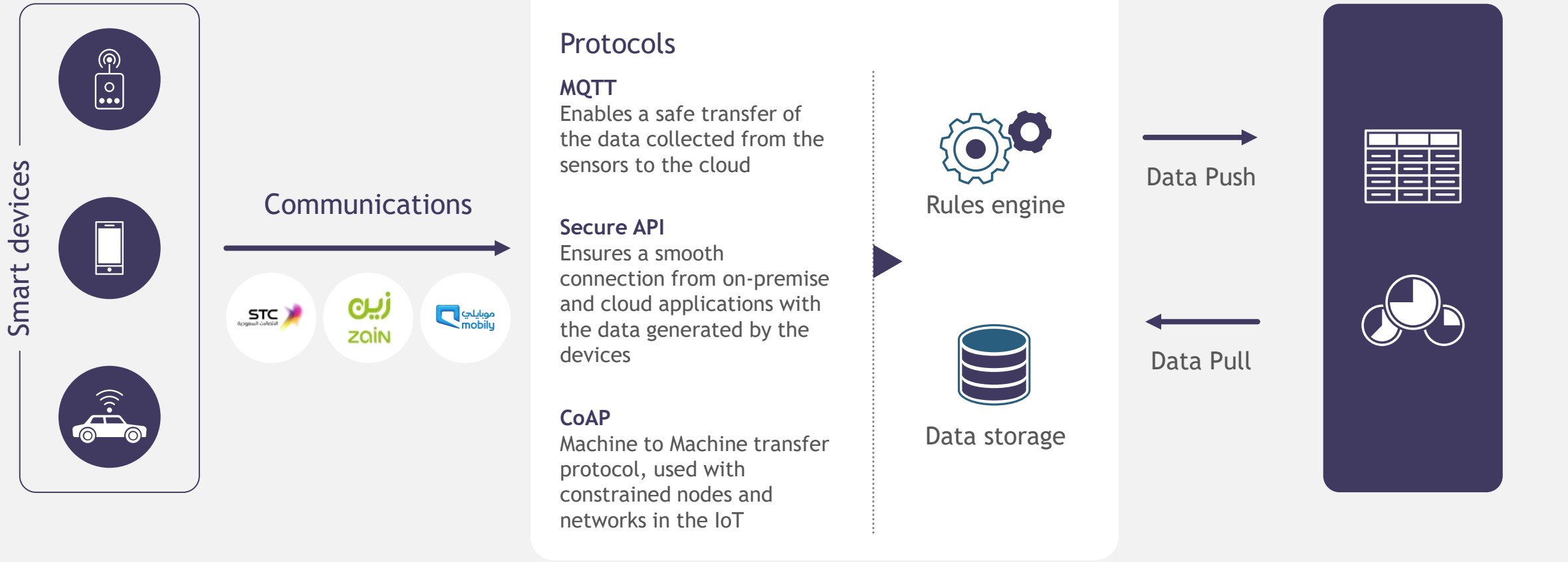
Singtel's Master Services Agreement with the Chinese telco would enable both their business customers to roll out IoT devices installed in consumer electronics, industrial equipment, and cars in China and Singapore

China Mobile also would tap Singtel's network to deploy its narrowband IoT products and services in Singapore

中国移动 China Mobile Singtel

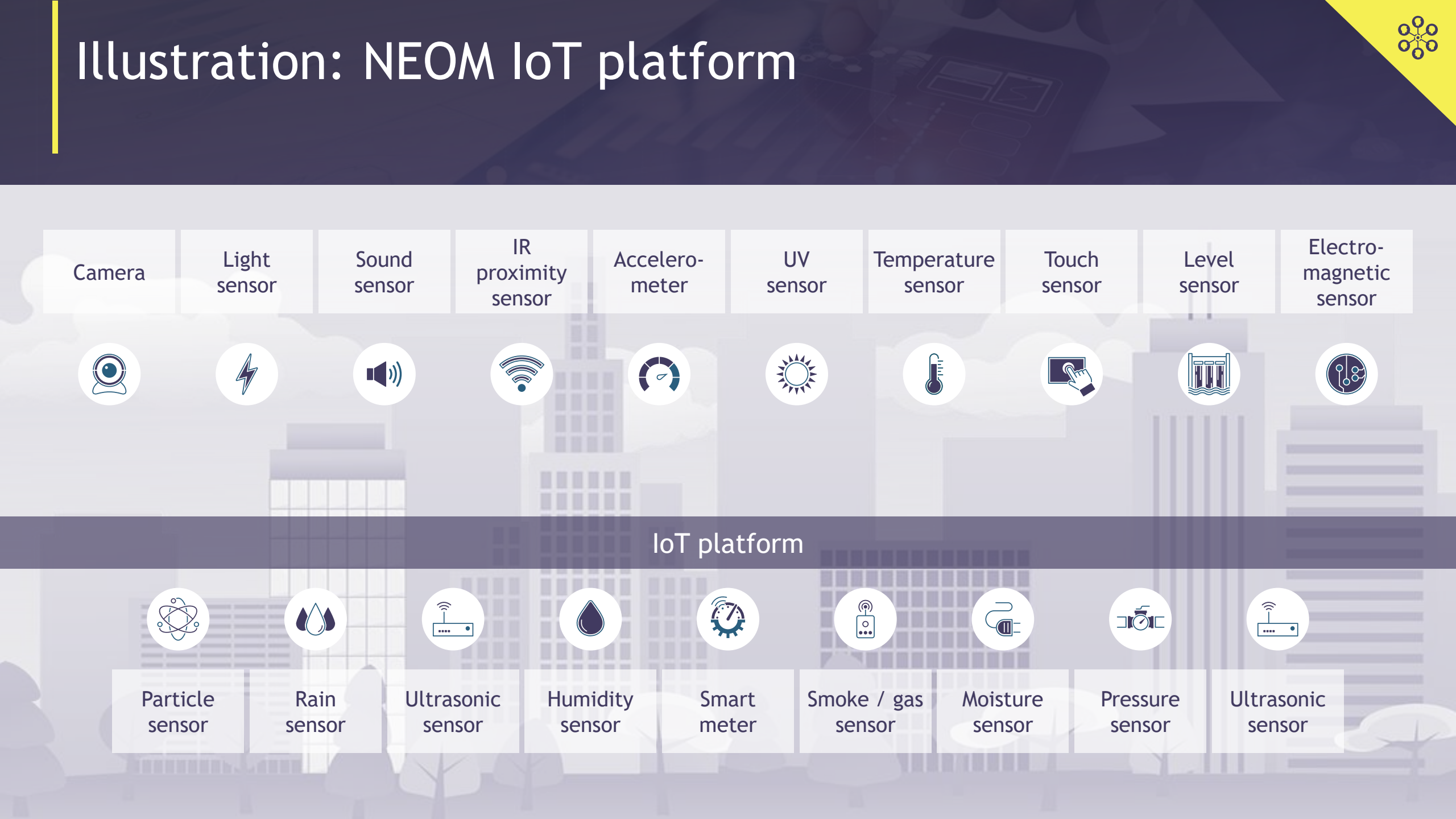
Sources: Zdnet

Illustration: How does an IoT cloud platform work?



Source: BCG analysis

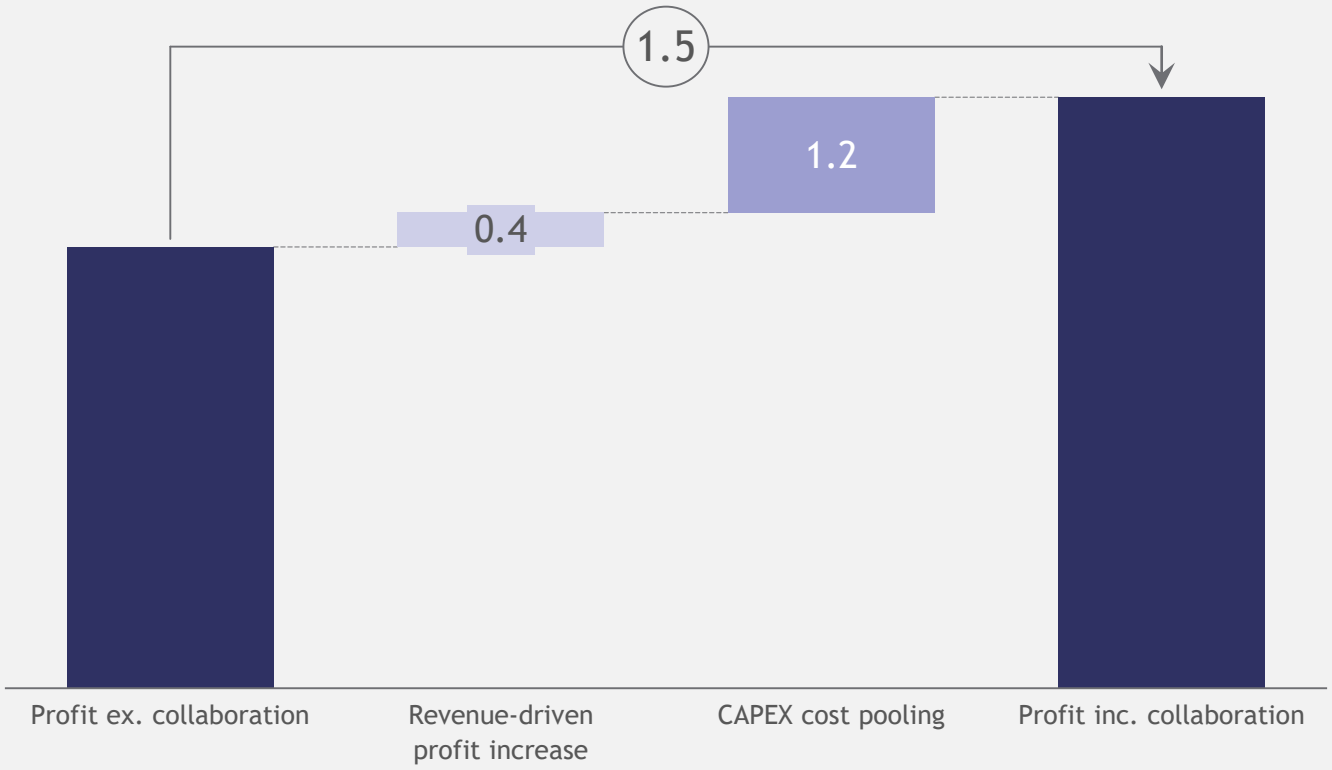
Illustration: NEOM IoT platform



National IoT platform has the potential to drive 1.5 B SAR in value through 2023

Top-down estimate

(B SAR, 2019-2023E)



Potential to drive an estimated total of 1,5 B SAR in added value across sector through collaboration

Assumes Telcos are able to capture up to 18% of the KSA IOT market by 2023[1]

Assumes Capex total savings of 50% through collaboration[2]

1. Based on BCG case experience. This market share has already been reached by a telco A-player. 2 Total Capex required excluding collaboration was estimated using the asset base of IoT companies globally, adjusted for differences in revenues. Assuming an asset lifetime of 5 years, required investments if Telcos invest individually amount to 2.4 B SAR for 2019 to 2023. Theoretical cost saving of 66% by pooling 3 networks discounted slightly to account for duplication of infra costs

Sources: IDC, NYU stern database, Capital IQ

هيئة الاتصالات وتقنية المعلومات

Communications and Information Technology Commission

citc.gov.sa