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The Impact of Digitalisation on Telecommunications and the Economy

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Agenda

1. The dramatic changes in the telecommunications operator industry
2. The digitized and converging World
3. EU digital agenda

The dramatic changes in the telecommunications operator industry

1

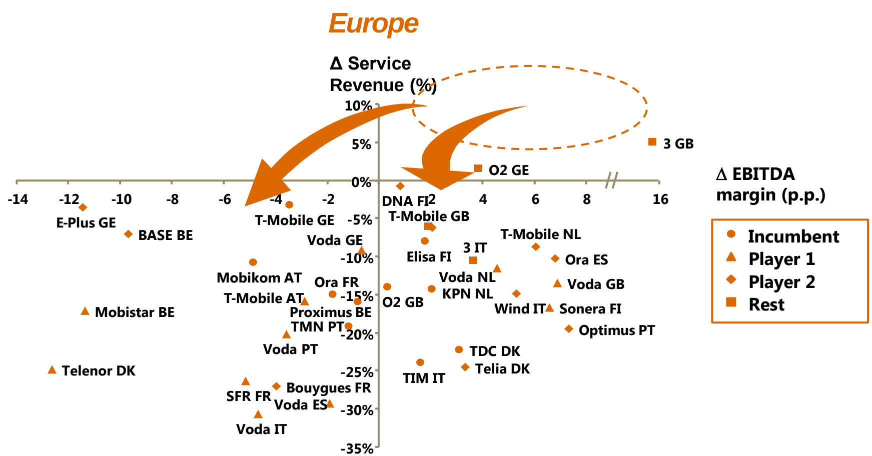
My message today – The telecommunications industry will change fundamentally – Only a "Digital Telco" will survive

- Long period of steady growth for telco operators with subsequent incremental cost reduction behind us
- Legacy structures and telco's culture withstand an adaptation of what the market demands …
    - Telcos challenged by OTTs: lower cost structure and better customer experience
    - Regulators put pressure on retail prices
    - Value of the digital world hardly arrives in telco industry
    - … hence: "business as usual" not sustainable for many telcos
- Few operators embark on a more radical path towards cost restructuring by simplification, digitization and human centered design resulting in a radically lower cost structure
- In parallel, the global telecom sector continues to consolidate – in-country & cross-country with an FMC endgame in every country

Source: PwC's Strategy&

When market growth stagnated, European market witnessed pressure on EBITDA and revenues – Other regions are more healthy

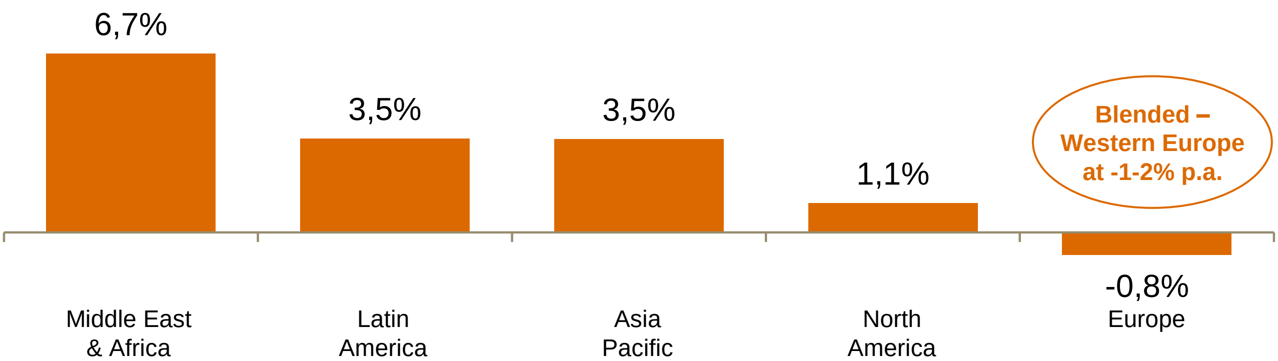
EBITDA and revenues evolution 2011-2013, main mobile operators



Source: BofA ML Wireless Matrix Q1 2014

Europe is the exception – Emerging markets are still growing

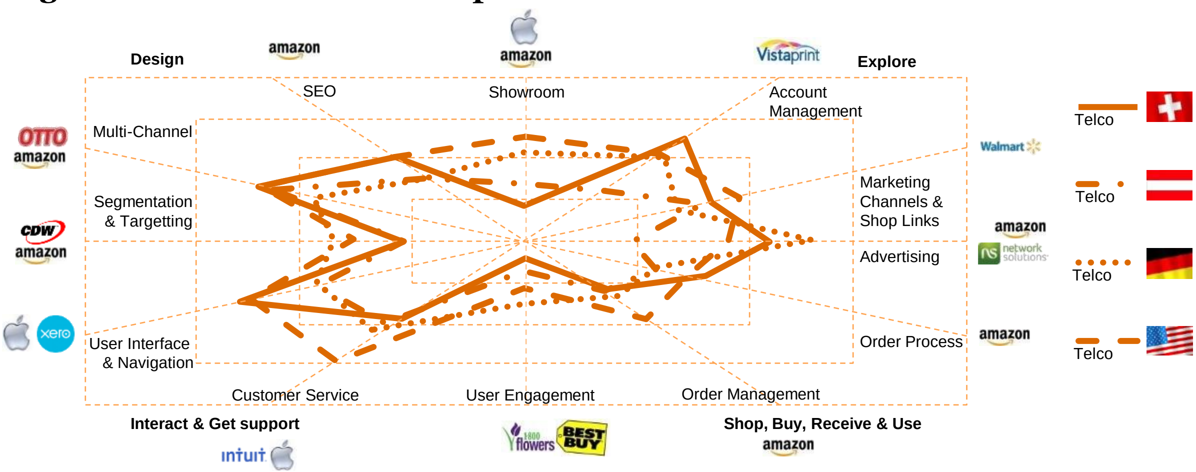
Regional telecom revenue growth
(CAGR 2011–2015) (%)



Source: PwC's Strategy&

In the meantime, non-traditional Telco players developed superior customer experience capabilities – See e. g. digital commerce

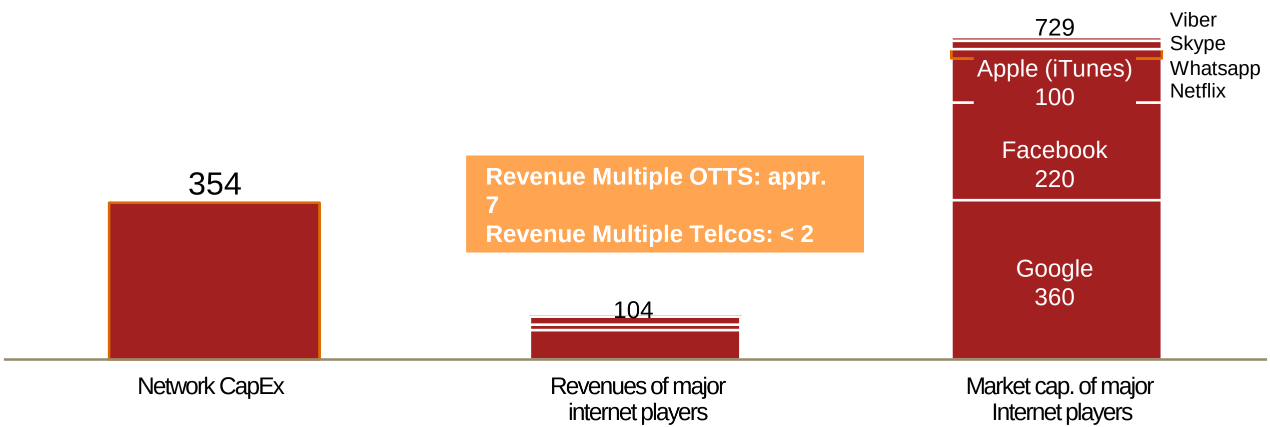
Digital commerce customer experience



Source: PwC's Strategy&

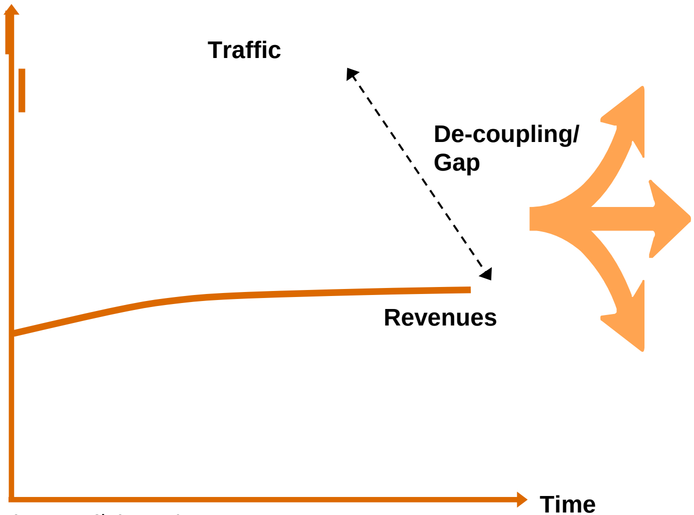
As a consequence – Telcos build networks, OTTs generate value

Worldwide network infrastructure cost vs. Internet players' revenues and value
in bn USD, 2014



Source: OECD, Forbes, Infonetics, Strategy& analysis

The paradox is obvious – Telcos fuel the digital world, but don't get value from it …



Source: PwC's Strategy&

Reduce Network Costs
… via improved Network capacity efficiency

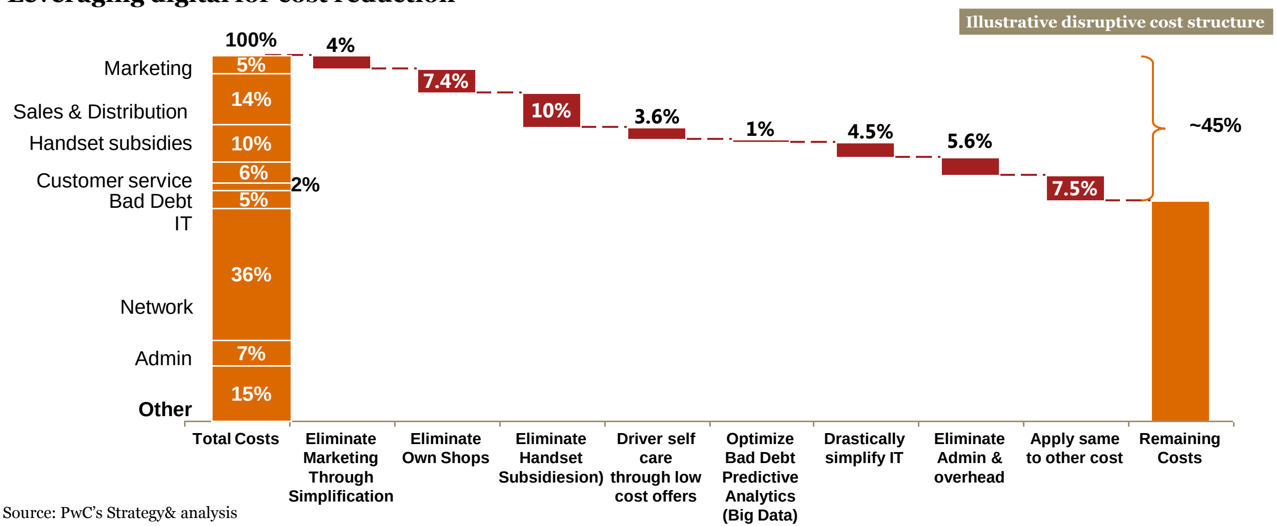
Reduce cost per Mb
… via investments in cost-effective technologies

Optimize Existing Revenues
… via new pricing models

Develop New Revenue Sources
… via expansion in adjacencies

Hence, disruptive "all digital" models with up to 45% lower costs are emerging

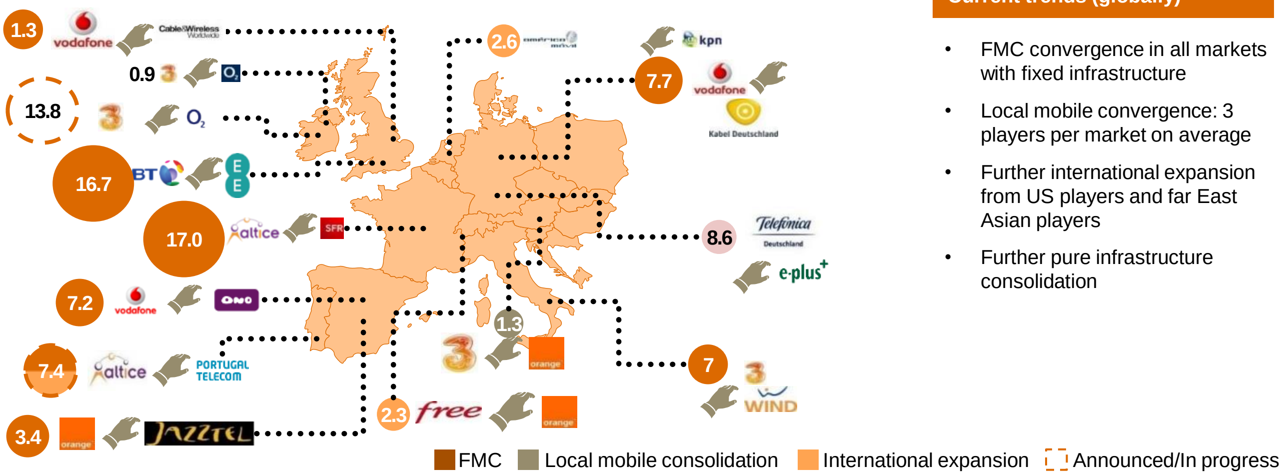
Leveraging digital for cost reduction



Source: PwC's Strategy& analysis

One consequence, consolidation in-/cross-country is continuing with a final FMC market structure when fixed infrastructure exists

Major M&A (Europe) deals from 2011 – 2015, € bn



Source: PwC's Strategy& analysis

Current trends (globally)

- FMC convergence in all markets with fixed infrastructure
- Local mobile convergence: 3 players per market on average
- Further international expansion from US players and far East Asian players
- Further pure infrastructure consolidation

The digitized and converging World

2

The world is digitizing fast! – Creating new growth

Levers of Growth

Faster and higher capacity networks

The transmission speed of a LTE network is 5.000 times the speed of a 2G network

Exorbitant growth of terminals

By 2015, there will be 3,5x internet connected devices for every human on the planet – 22 billion

High digital adoption

In the US and Europe, 60% of children under 2 years play with mobile devices …

… before being able to use the potty or speak a full sentence

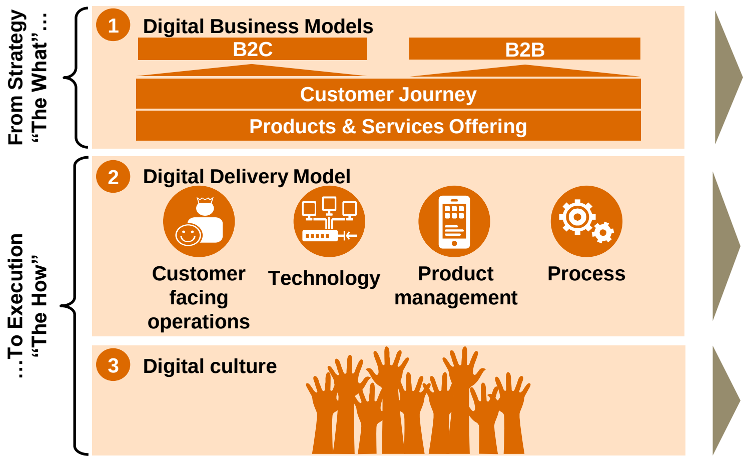
Gigantic data volumes

Volume of data generated in 2014 is greater than all the data in the entire history of humanity until 2013

Source: PwC's Strategy&

…ultimately resulting in a transformed digital Telco

Digital telco transformation framework



- Re-imagine the customer experience
- Rethink new products & services offering with digital
- Define digital business models

- Build customer facing operations
- Simplify products & services
- Set up all IP infrastructure
- Re-imagine lean digital processes

- Change the culture/DNA
- Acquire digital capabilities

Source: PwC's Strategy& analysis

Operators usually have a rather technology driven view

Technological layer	Description
Services & Products (connectivity, media …)	• Develop and provide services requiring fixed and mobile access, generating a clear benefit for the user • Provide an access independent service experience
Devices (phone, pad, router …)	• Seamless usage of all services on all devices (TV, PC, Tablet, mobile, Car, 3rd party devices) • No service interruption • Integrated services (e. g. TV/Tablet advertising)
User Interface (web portal, App store …)	• Common GUI on all devices/access points • Same user experience
BSS (billing, CRM, authent …)	• One ID, one bill, one customer service contact etc.
OSS (network mg, element mg …)	• Provisioning of services on all devices, access channels • Common Service Platform • One NMC
Access (mobile & fixed)	• Automated best access network selection; seamless without service interruption • No differentiation between access networks

Customer Expectations should be in the focus!

Customer Lifecycle

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Customer experience touch points

- **A** Branding/Marketing
- **B** CPE/Service
- **C** Physical Channels (Outlets, Retail Stores etc.)
- **D** Call Center
- **E** Digital Channels (Web Portal, Social Media, Mobile App)
- **F** Field Operations

From a customer perspective, FMC has significant impact on Telcos' offering

Customer experience view – Questions for a telco

How can we leverage FMC experience as main loyalty and retention driver?

Do we include all services in one bill?

Is there one single point of contact across all products and services?
Is the service experience across the service channels the same?

Do we offer our services with the same purchasing experience across all channels?
Do we have the right channel transfer options?

Are services activated automatically on all channels and devices?

Do we have the right services?
Does the customer need to care about connectivity, speed or volume?
Are all services/applications and data always and everywhere available?
Is it convenient?

Recommendations for any Telco operator for the next three years

The PwC Telco CEO agenda

1. **Define your way to play** on the basis of three strategic archetypes: network play, customer play, innovation play
2. **Re-define your operating model** with the objective to simplify and to radically reduce your cost structure – Assess carefully your management capabilities to identify the best transformation path
3. **Understand what digital means** for your specific play – in any case, fundamentally new capabilities will be required in all dimensions: HR, IT, processes
4. **Develop customer centricity** as a key capability for any play beyond the network
5. **Participate in consolidation** with three objectives: (i) gain national market share, (ii) acquire fixed assets in FMC markets, (iii) grow customer base to scale digital innovations

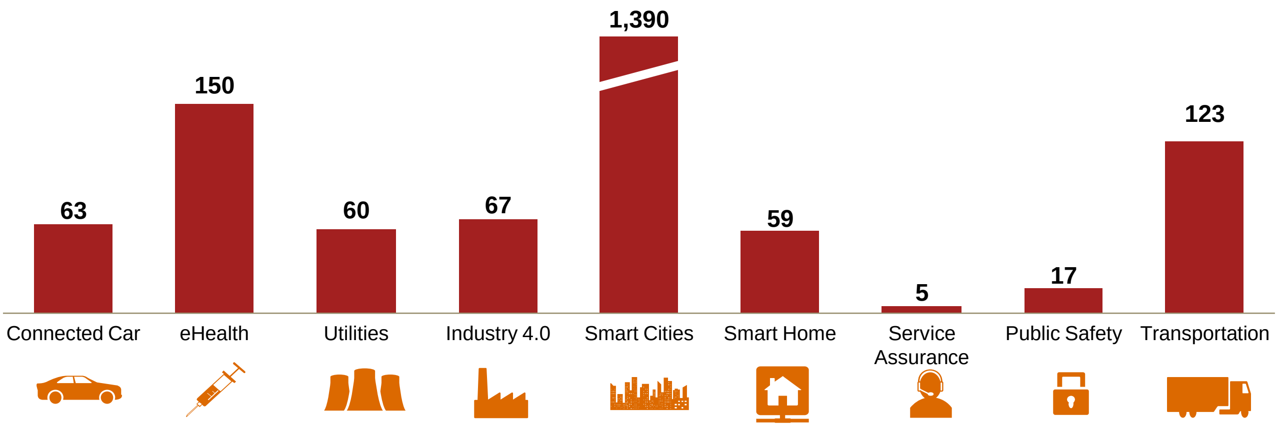
In summary …

S i m p l i f y – D i g i t i z e – C o n s o l i d a t e

Source: PwC's Strategy&

Digitizing other verticals offers enormous market potential – a must move for Telcos

Estimated size of selected growth markets globally (Verticals)
$ bn, 2020



Sources: IDC, Ovum, Technavio, MarketsAndMarkets, GSMA, Grand View Research, Navigant Research, Mind Commerce, PwC's Strategy& analysis

EU digital agenda

3

The Digital Agenda is a key element of the Europe 2020 Strategy

The seven pillars of the Digital Agenda

	Pillar	Description
1	**Digital Single Market**	• Strengthen EU Single Market rules for the digital area • Promote the free flow of online services across boarders in the EU
2	**Interoperability & Standards**	• Improve framework and processes to ensure the seamless interaction of devices and applications
3	**Trust & Security**	• Intensify measures against cyber-attacks and cybercrime
4	**Fast and ultra-fast Internet access**	• Foster broadband investment to reach download rates of at least 30 Mbit/s for every European household by 2020
5	**Research and innovation**	• Increase ICT research and innovation by better coordination and investment-friendly rules
6	**Digital literacy**	• Reduce the digital divide by improving education and digital skills
7	**Benefits for EU society**	• Promoting digital benefits for our everyday lives (e.g. energy efficiency, health services)

Priority of the European Commission

“Digital Agenda” decisions on roaming and net neutrality will have a direct influence on Telcos’ business models

Roaming

- **Roaming charges** for retail customers will end by 15 June 2017
- Rules for **wholesale charges** to be decided in 2016
- Risk/Chance of **arbitrage** by foreign operator (“permanent roaming”)
- Details of **Fair Use Policy** to possibly limit volumes to be negotiated in 2016

Net Neutrality

- **Specialized services** of higher quality will be allowed, if network capacity is sufficient
- **Best effort services** must not be limited, but reasonable traffic management is allowed
- **“Zero rating”** will be permitted
- Critics say, definition of specialized services too vague to assure real net neutrality
- **Compliance** with net neutrality rules will be monitored by national regulatory authorities

Comprehensive review of the telecommunications framework is still ongoing in 2016

Level playing field

- *Response to the convergence of traditional Telcos and over the top companies (Skype, Netflix, …)*
- *How to create a regulatory level playing field for all firms that provide comparable services?*

Access Regulation

- *Promote investments in future-proof infrastructure*
- *Do Telcos need higher incentives for long term broadband investment, e.g. by less regulation?*

Review of Telecoms Rules

Spectrum Management

- *Promote investments in high speed wireless networks*
- *How can the management of radio spectrum be harmonized within the EU?*

Universal Service

- *Assure consistency with technological development*
- *To what extend is broadband an universal service and how could it be financed?*

Thank you!