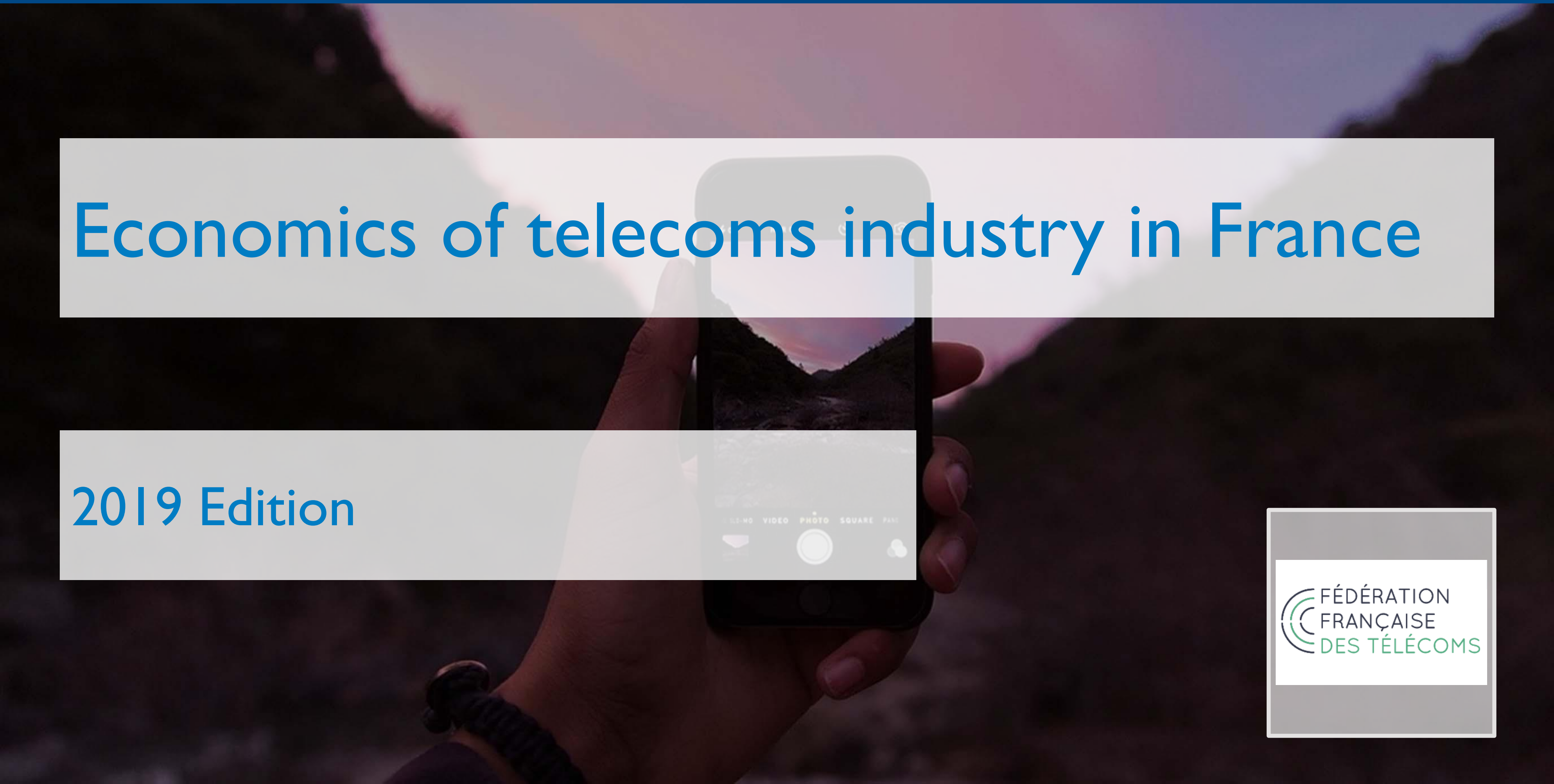
Arthur D Little



Economics of telecoms industry in France

2019 Edition

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

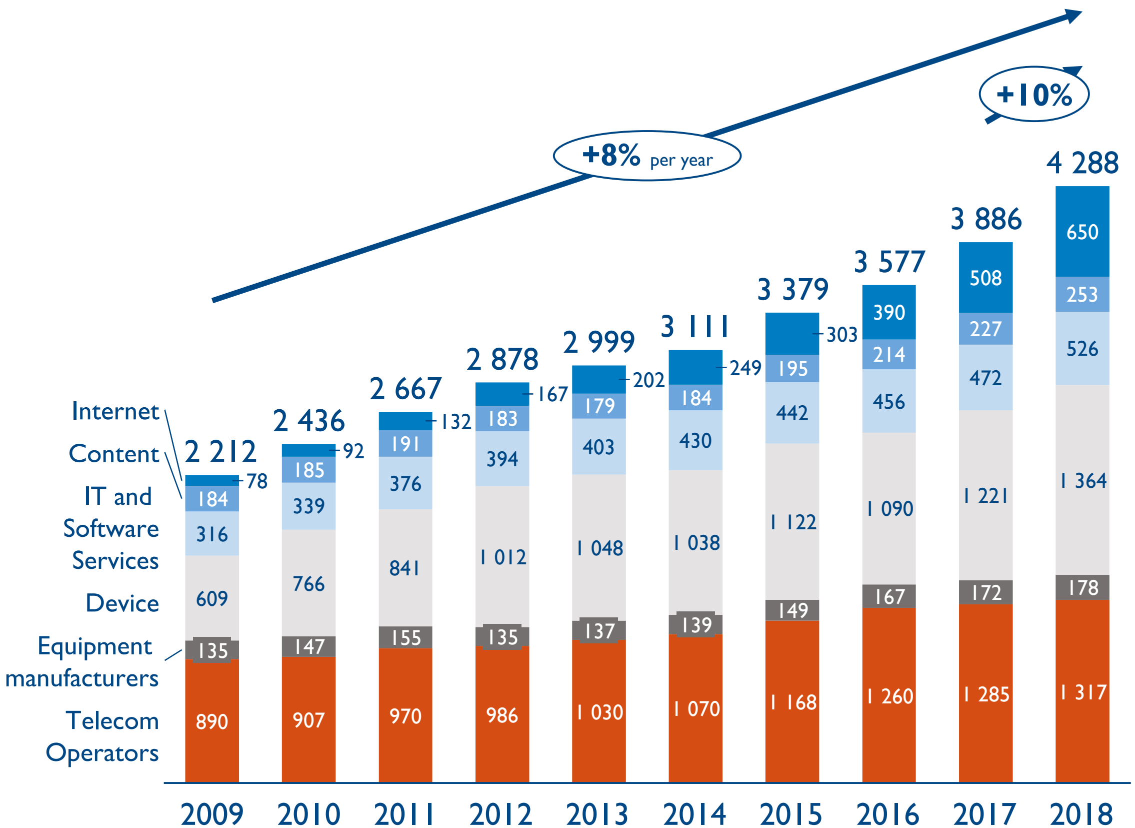
Fédération Française des Télécoms

Agenda

Telecom operators are no longer the main contributor to the digital ecosystem in terms of revenue, by passed by device manufacturers

Revenue of the digital ecosystem[1]

Global, 2009-2018, Billions of euros[2]



Annual Growth	2009-18 (Average)	2017-18
Internet	+27%	+28%
Content	+4%	+11%
IT and Software Services	+6%	+11%
Device	+9%	+12%
Equipment manufacturers	+3%	+3%
Telecom Operators	+4%	+2%

Illustrative companies

- Alphabet, amazon.com, JD.COM
- The Walt Disney Company, BERTELSMANN, vivendi
- IBM, Microsoft, accenture
- Apple, Foxconn, SAMSUNG
- ERICSSON, CISCO, NOKIA
- AT&T, verizon, China Mobile

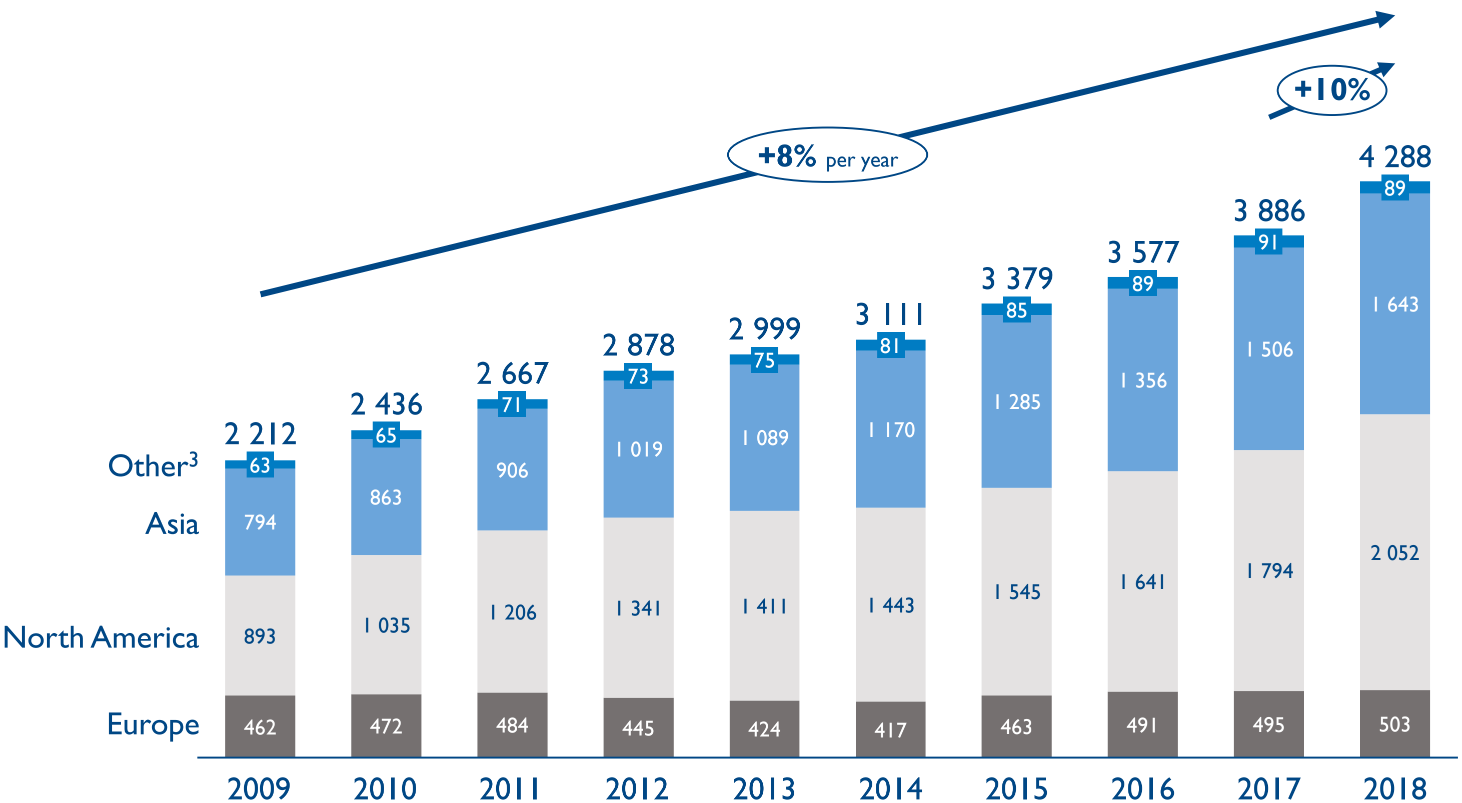
Source Thomson Reuters, Arthur D. Little

Note 1) Panel of 180 companies corresponding to the top 30 by sector in terms of turnover, 2) Constant euro 2018

North America and Asia are driving the digital ecosystem's growth, while the European ecosystem is not taking off

Digital ecosystem revenue[1]

Global, 2009-2018, Billions of euros[2]



Annual Growth	2009-18 (Average)	2017-18
Other	+4%	-2%
Asia	+8%	+9%
North America	+10%	+14%
Europe	+1%	+2%

Source Thomson Reuters, Arthur D. Little

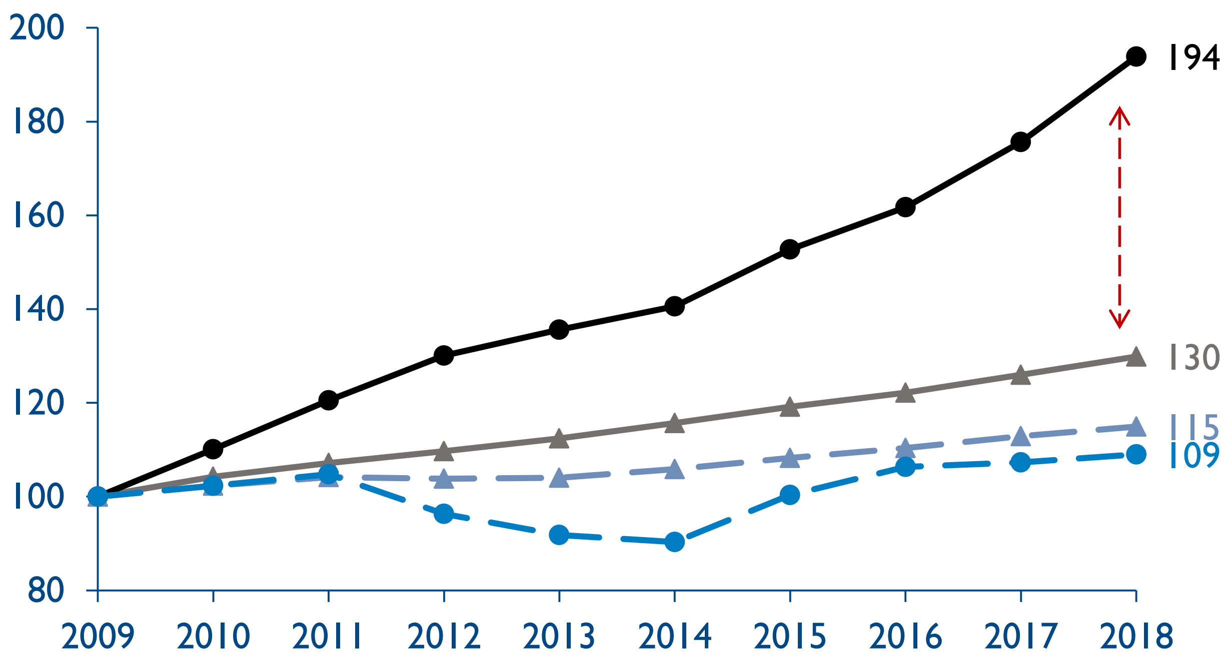
Note Panel of 180 companies corresponding to the top 30 by sector in terms of turnover 2) Constant euro 2018 3) Includes Top30 players (Oceania, Africa, Middle East, South America)

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

Globally the digital ecosystem is growing three times faster than the GDP, excepted in Europe

Digital ecosystem growth[1] vs GDP

Global, 2009-2018, base 100 in 2009



	Annual Growth 2009-18 (Average)	Annual Growth 2017-18
Global digital ecosystem[2]	+8%	+10%
Global GDP[2]	+3%	+3%
European GDP[2]	+2%	+2%
European digital ecosystem[2]	+1%	+2%

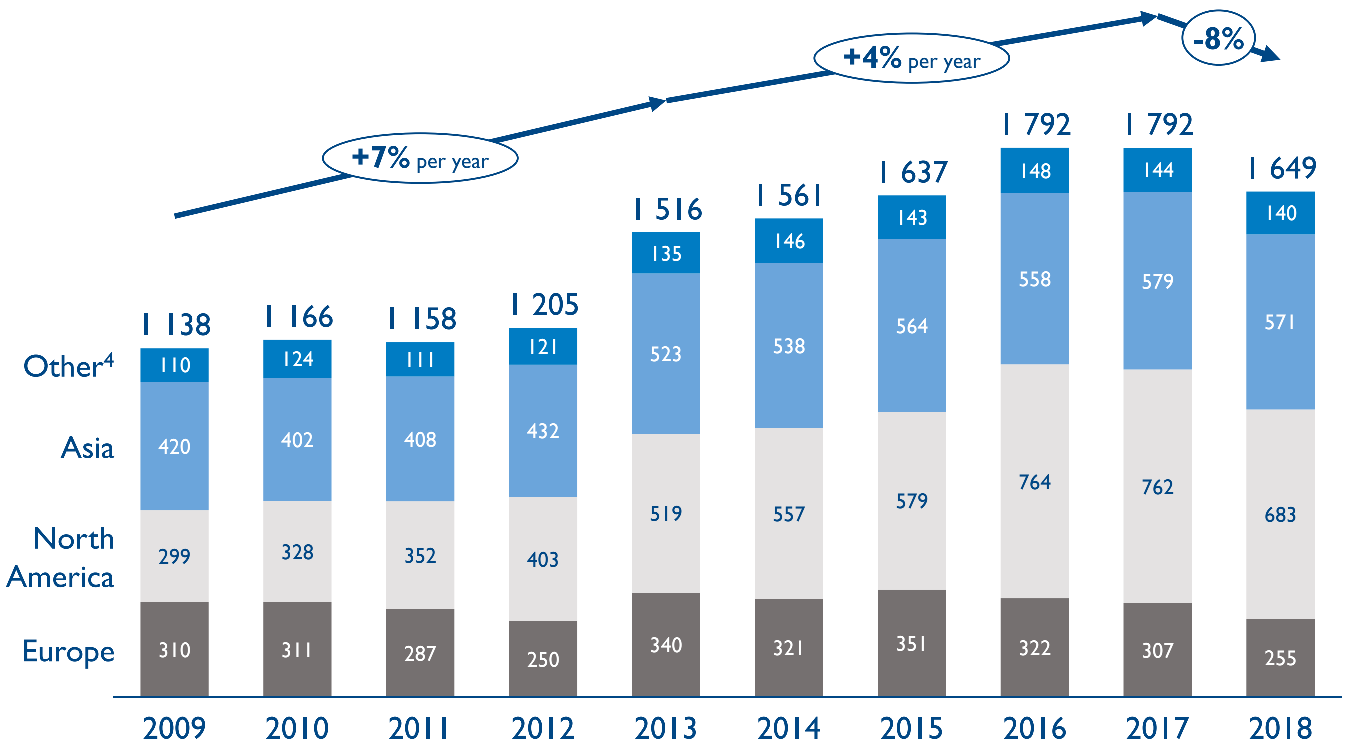
Source Thomson Reuters, World Bank, Arthur D. Little
Note Panel of 180 companies corresponding to the top 30 by sector in terms of turnover, 2) Constant euro 2018 , based on countries included in the digital ecosystem (representing 75 of the world GDP, or 70% of the European GDP)

Arthur D Little

Over the last 10 years, the market capitalization of European Telcos has decreased, while other regions has steadily increased

Telecom operators' market capitalization by region[1,2]

Global, 2009-2018, Billions euro[3]



Annual growth

	2009-13 (Average)	2013-17 (Average)	2017-18
Other	5%	2%	-3%
Asia	6%	3%	-1%
North America	15%	10%	-10%
Europe	2%	-3%	-17%

Market value loss of European telecom operators for 10 years

Source Thomson Reuters, Arthur D. Little

Notes Note 1) Nationality depend on the localization of the head quarter 2) Panel of 180 companies corresponding to the top 30 by sector in terms of turnover, 3) Constant euro 2018 4) Includes Top30 players (Oceania, Africa, Middle East, South America)

Agenda

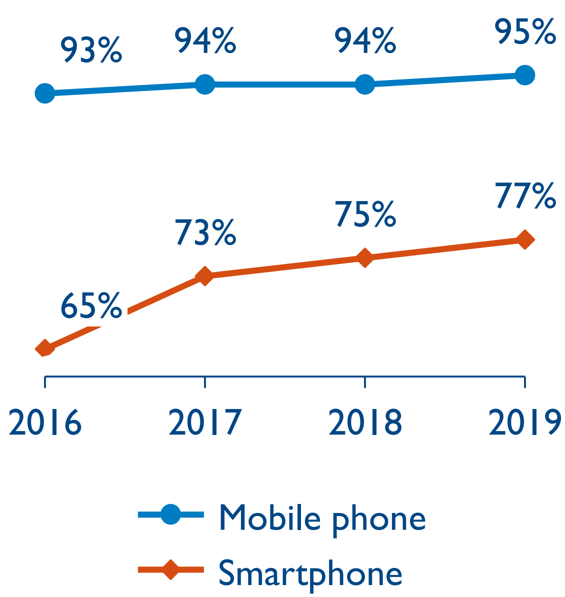
FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

The French mobile market continues its transition to data, with 77% of users with a smartphone and consuming 8+GB per month

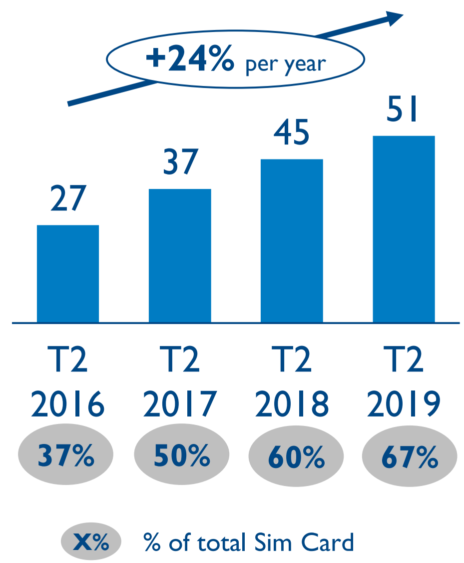
Equipment and connectivity in France – Mobile

France, 2016-2019

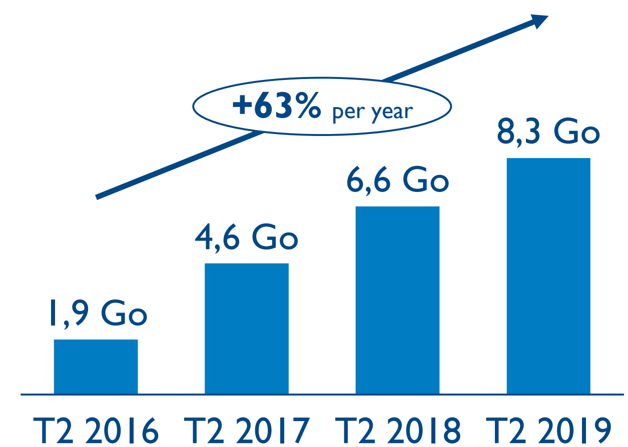
Mobile phone penetration rate[1]



Active 4G Sim Card
(Millions of Sim Card, excluding M2M)



Average monthly 4G data consumption



As illustrative 305h of streaming music or 8h of video streaming

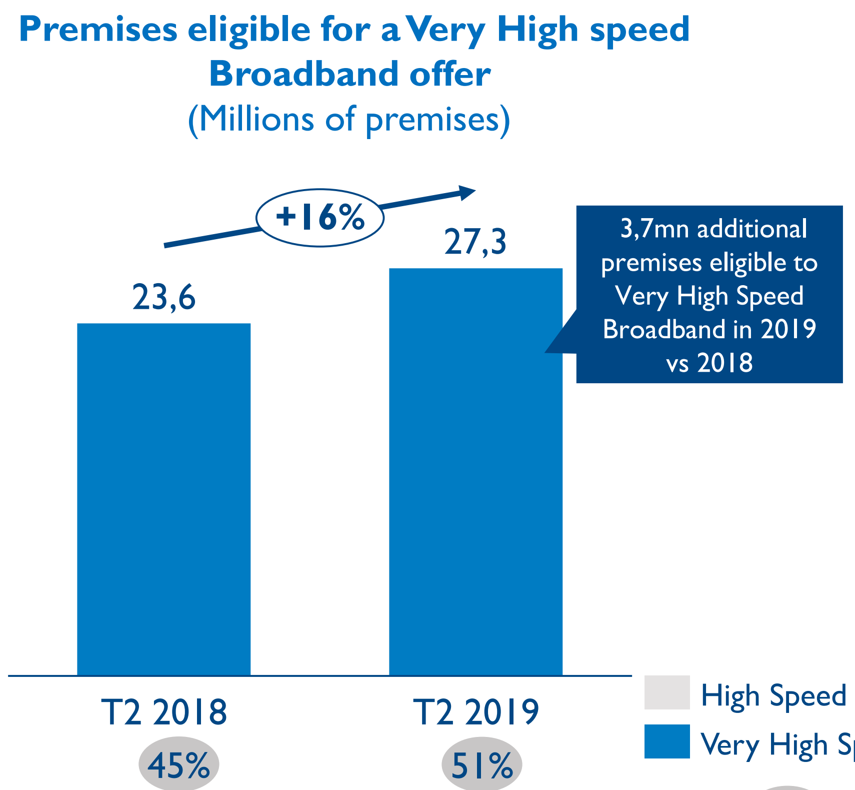
Source ARCEP, Operators, Arthur D. Little
Note 1) Total population aged 12 and over excluding M2M, "Face to face" survey conducted in June 2019 2) Active 3G or 4G internet client

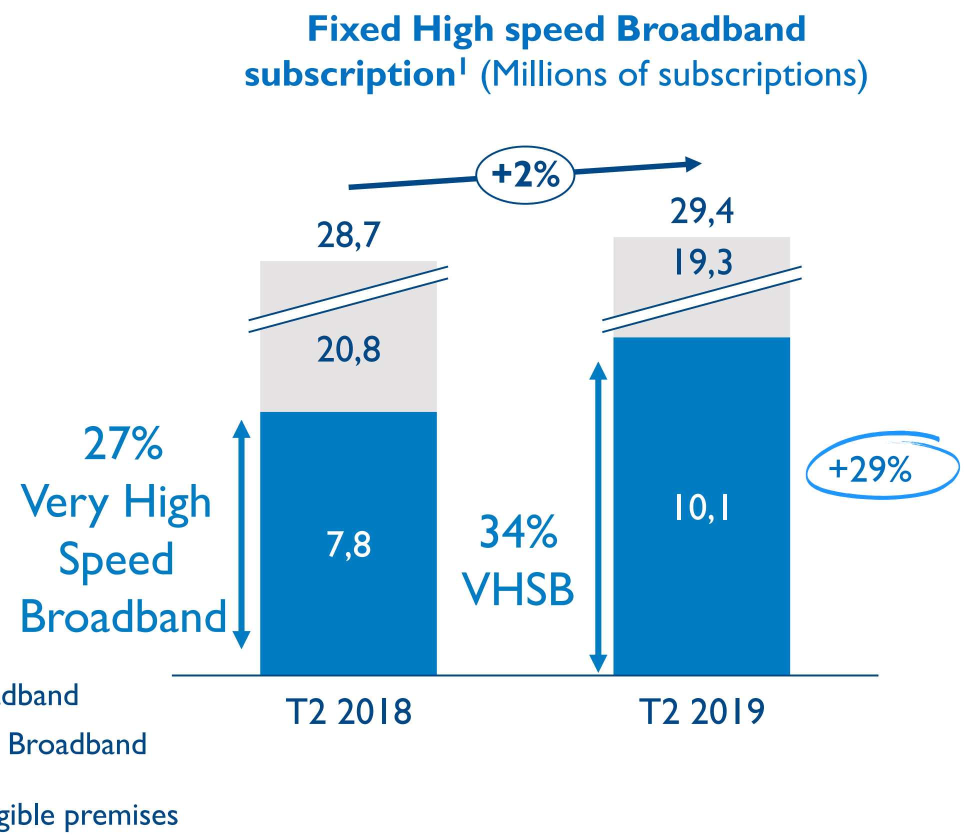
Arthur D Little

More than 50% of the French population has now access to fixed high speed broadband

Equipment and connectivity in France - Fixed

France, 2018-2019





Source ARCEP, Arthur D. Little, data.gouv

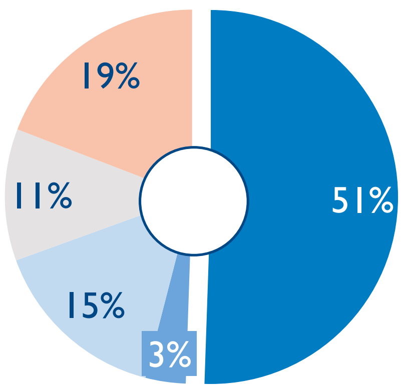
Note 1) Downloading Speed> = 30 Mbps, 2) Subscriptions subscribed as part of a "multiplay" subscription that includes internet access or several services in addition to television are counted 3) HSB High Speed Broadband, VHSB Very high speed Broadband

Telecom operators are essential to the French digital ecosystem

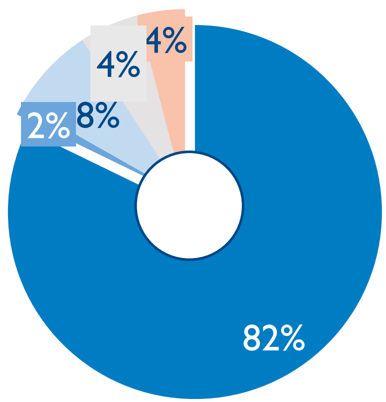
Relative size of players in the digital ecosystem and their evolution 2018-2017

France, 2018 (vs. 2017)

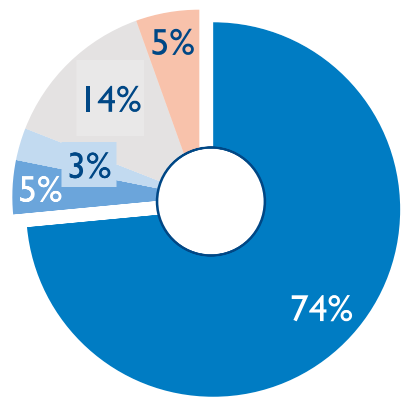
Revenue[1,2]
77 billion€ *(+2,7 Bn€ vs 2017)*



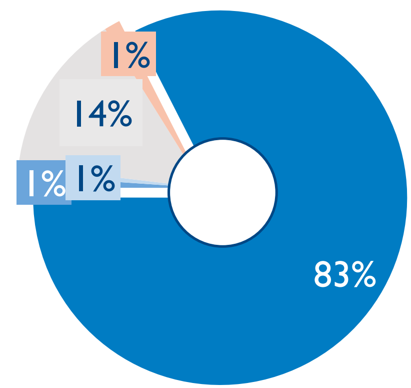
Investments[3]
10 billion€ *(+0,2 Bn€ vs 2017)*



Direct Employment
157 000 *(-5 700 vs 2017)*



Taxes[4]
4 Billion€ *(-0,16 Bn€ vs 2017)*



5 telecom operators

5 Device vendors

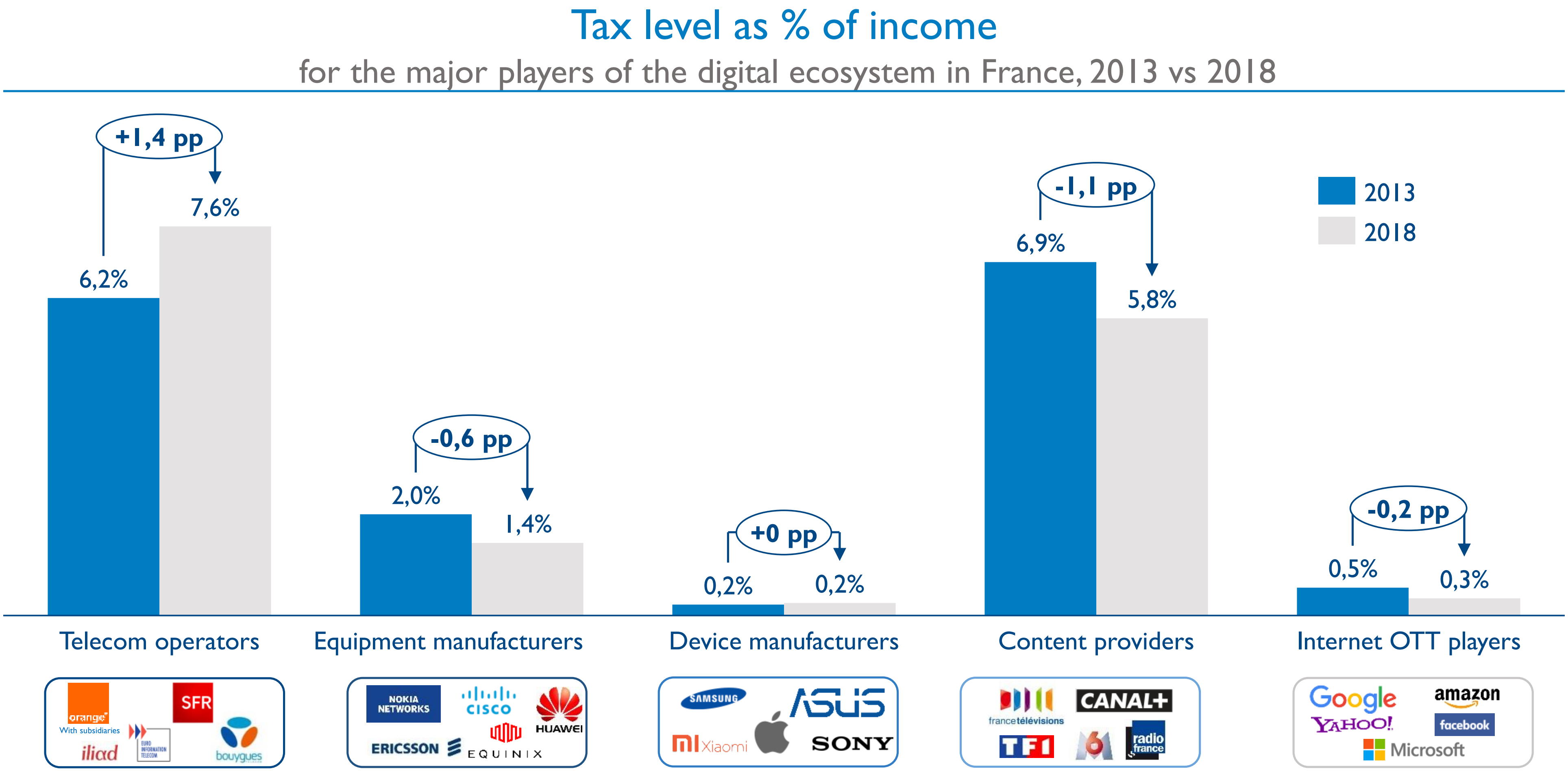
5 Equipment manufacturers

5 content providers

5 Internet OTT players

Source Diane, annual reports, Arthur D. Little
Note 1) Revenue declared in France or from literature search, 2) Data adjusted to take into account the estimated actual turnover of international players in France, 3) Nokia's mobile division investments are integrated into Microsoft following the acquisition of the mobile division in 2014, 4) Corporation tax, taxes and similar disbursements

French telecom operators have faced a sharp increase in their tax rates, as opposed to equipment manufacturers and internet players



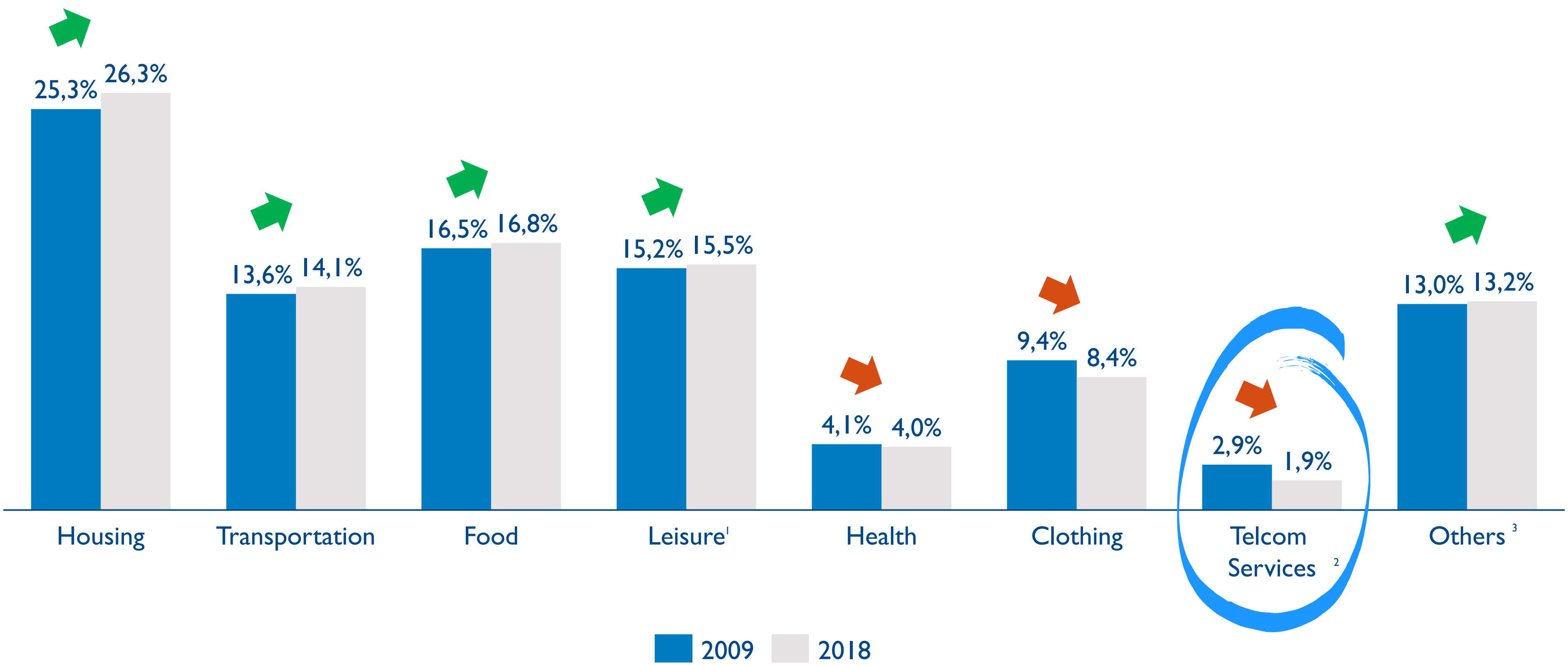
Source Diane, Annual Reports, Arthur D. Little

Note 1) Corporate income tax, taxes and similar payments, 2) Sales reported in France or documentary research, 3) Adjusted data to take into account the estimated effective turnover of international players in France

The share of telecom services in the budget of French household has decreased over the last years, contrary to other expense items

Share of telecom services in French households' total spending

France, 2009-2018, % of total spending



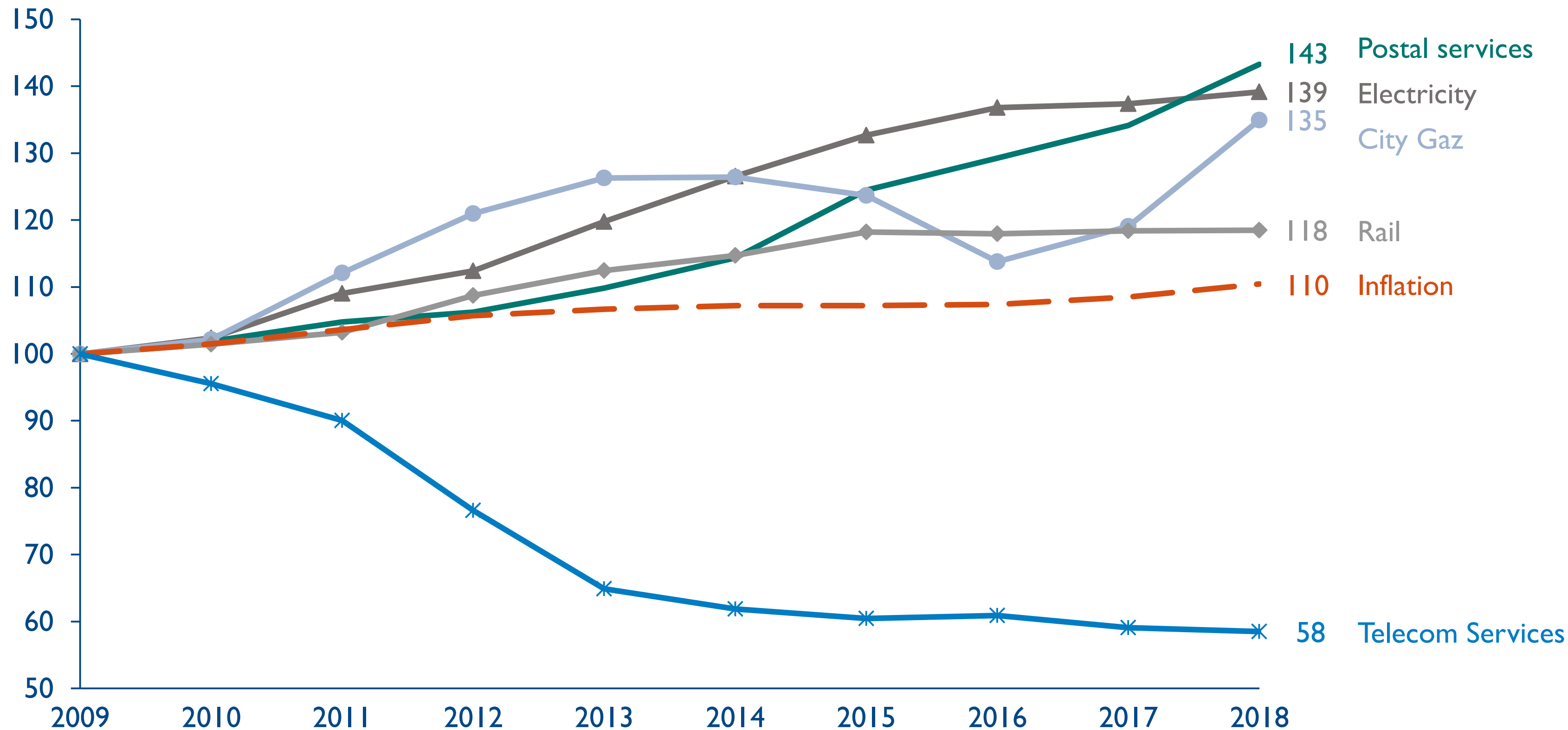
Source INSEE, Arthur D. Little

Note 1) Leisure including digital entertainment 2) Telecommunication Telecommunication services 3) Other Education, miscellaneous goods and services, postal services, telephony equipment and facsimile

Contrary to other regulated sectors in France, telecom services have witnessed a sharp fall in prices over 2009–2018

Consumer price index evolution on selected products

France, 2009–2018, Base 100 in 2009

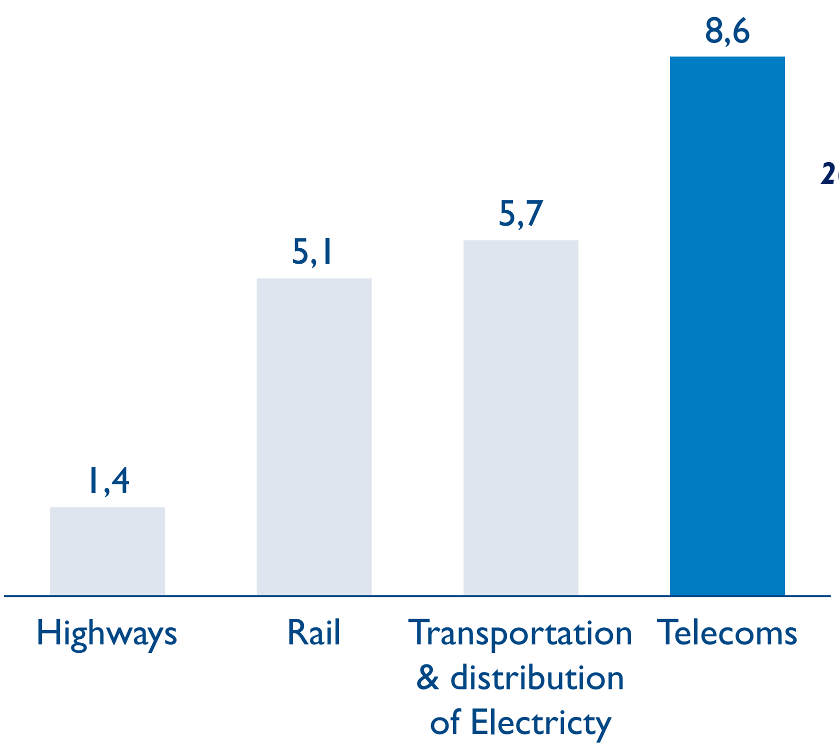


Source INSEE, Arthur D. Little

The telecom sector brings the largest investments in infrastructure in France which gives it a considerable economic weight

Investments of network operators[1] vs. other sectors

France, 2014 – 2018, billions of euros, average over 5 years



2018 investments are equivalent to…

95 Hospitals

ou

577 High Schools

ou

1 969 Wind turbines *x2 vs. today*

ou

86 Airbus A320 Neo

ou

224 TGV trains *(high speed trains)*

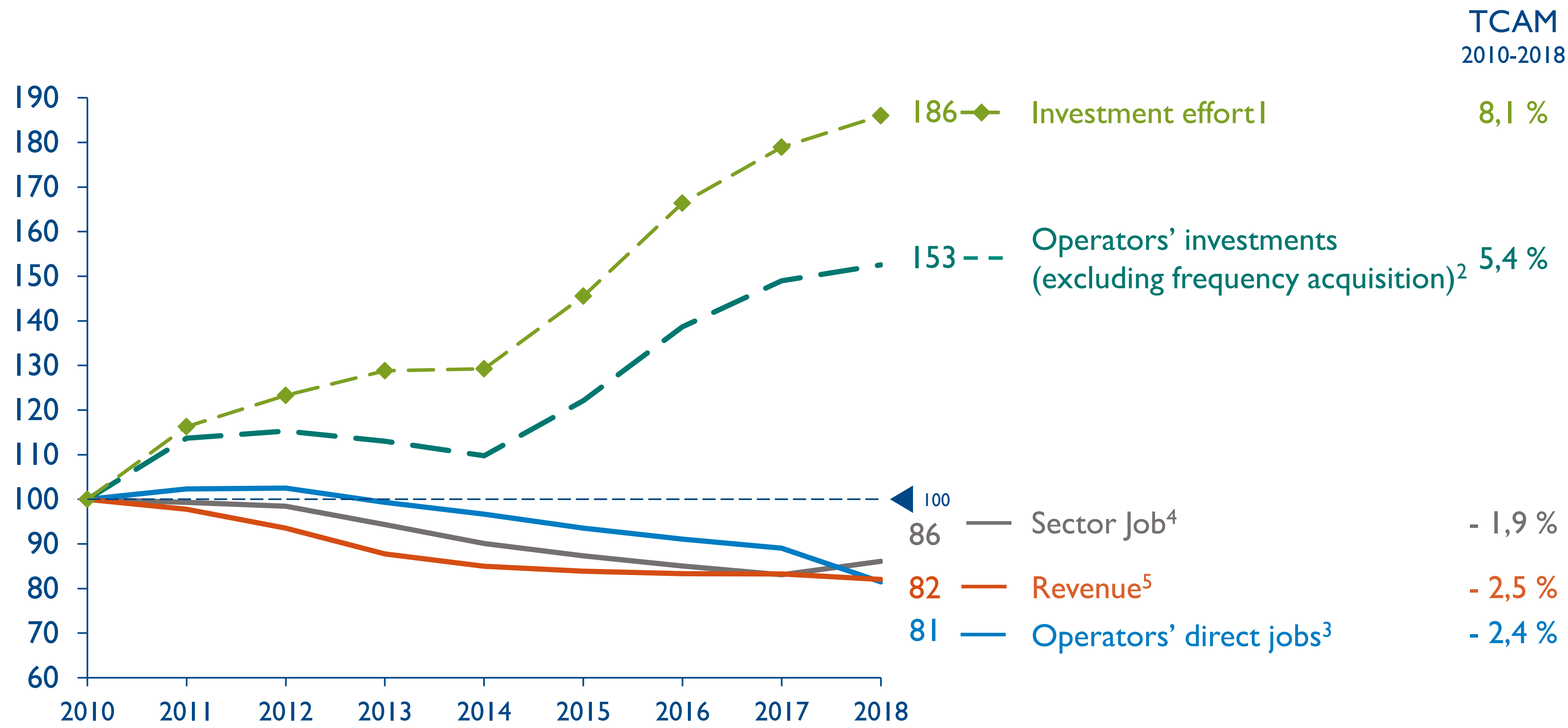
Source Companies, Documentary Research, Arthur D. Little

Note 1) Telecom ARCEP figures (excluding purchase of frequencies); Electricity RTE (2009 to 2018) and ERDF; RFF; Highways ASFA (Sanef, SAPN, ASF ....)

French telecom operators have increased significantly increased their investments despite lower turnover, but could not maintain employment

Employment, revenue and investments of French telecom operators

France, 2010-2018, base 100 in 2010



Source ARCEP, DARES, INSEE, Arthur D. Little

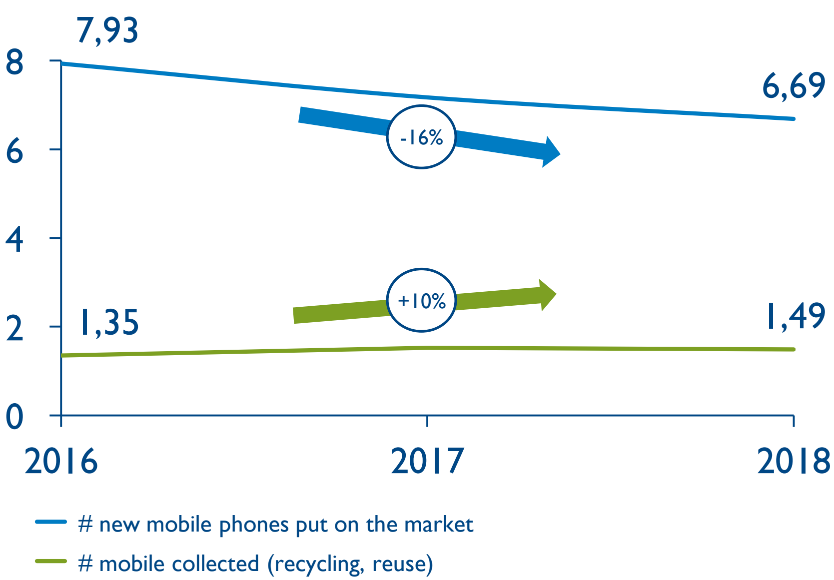
Note 1) Investment effort operator investments (excluding frequency purchases) / operator revenue, 2) Provisional ARCEP figures for 2018

3) ARCEP figure 4) ARCEP figure including part of the indirect jobs, 5) Provisional ARCEP figures for the year 2017 corresponding to the income received from the end customer

Thanks to the new technologies, the telecom sector reduces its energy footprint

New mobile phones put on the market and mobile recycling by FFT operators

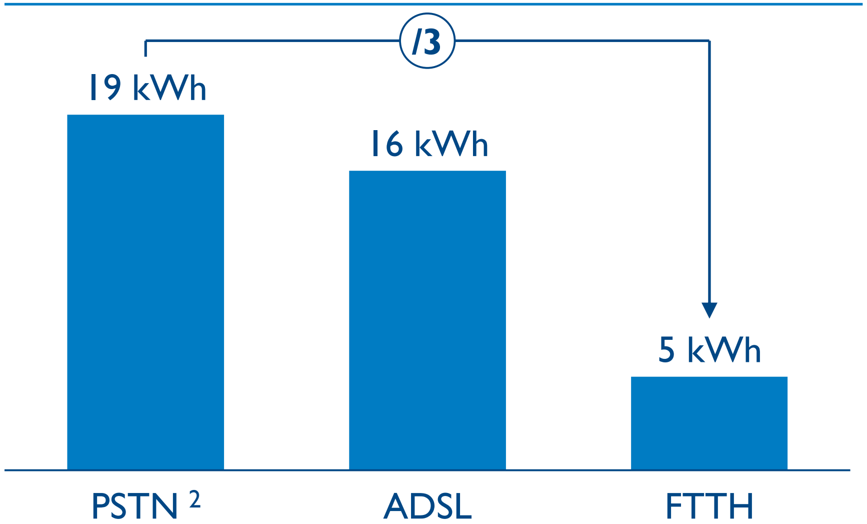
France – 2016 / 2018, in millions



Mobile phone

Annual consumption of a user according to his telecom connection [1]

France



Broadband

Source FFT, ARCEP

Note 1) ARCEP estimate of average consumption over one year based on the observation of consumption operators per GB of their users 2) Public switched telephone network

Agenda

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

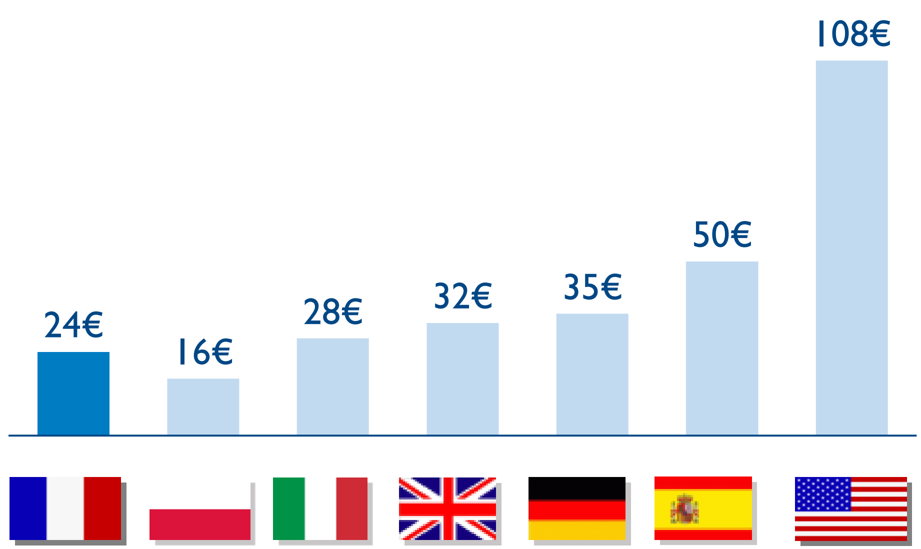
Prices of telecom services in France remain the lowest among large Western countries

Offer benchmark – Main operators

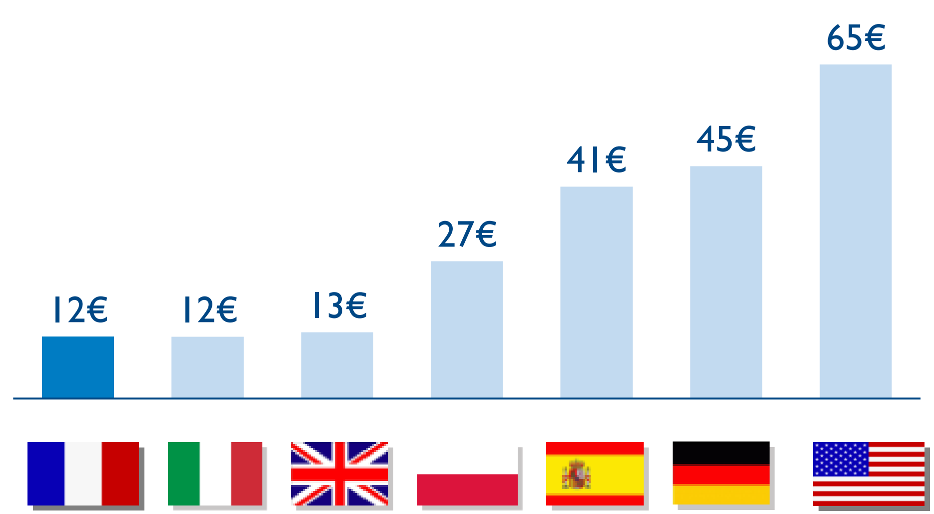
Selection of countries, November 2019, € incl. taxes per month

Benchmark Mobile 50 Go

Fixe (Triple Play)[1]



Mobile[2]



Excluding promotions, excluding connection fees

By country, selection of the most competitive package in terms of price among operators with> 10% of Market share

Source Operators, Arthur D. Little

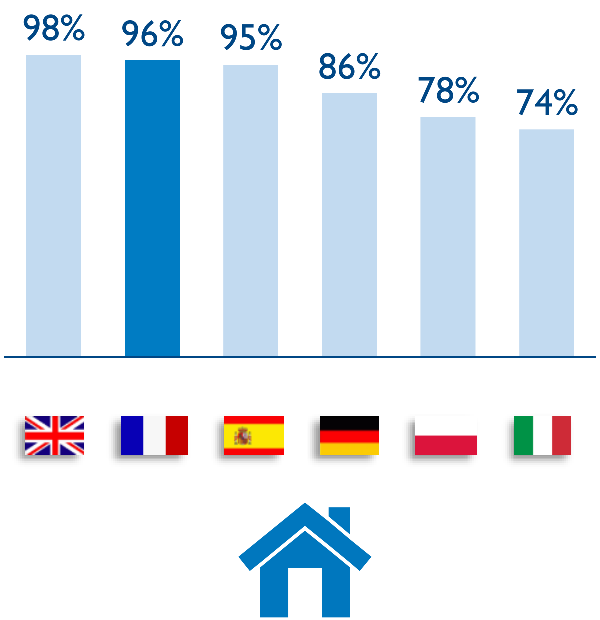
Note 1) Triple play offers only; unlimited calls to landline at least; unlimited broadband internet through xDSL or FTTH; television included, excluding additional packs; operators with market share > 10%, 2) Unlimited calls (whenever possible or else >500 minutes), unlimited SMS/MMS, at least 50 GB Internet; packages without devices, packages without commitment;, without a mobile phone, operators with market share > 10%

Arthur D Little

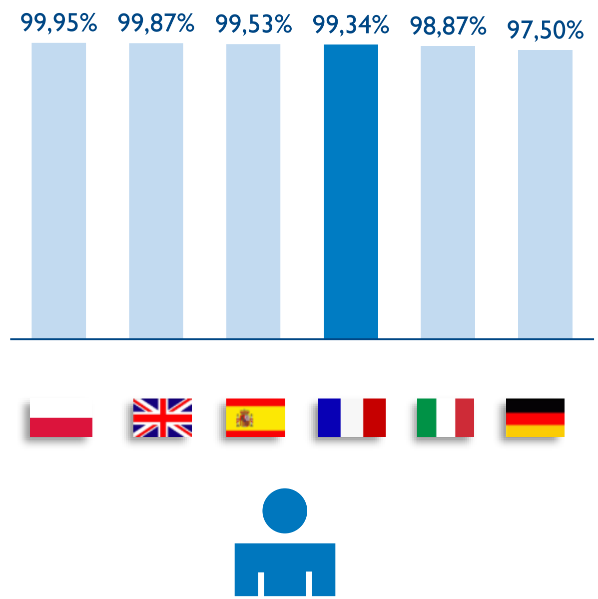
FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

Despite a highly competitive environment, French operators manage to provide an infrastructure that connects homes, people and objects

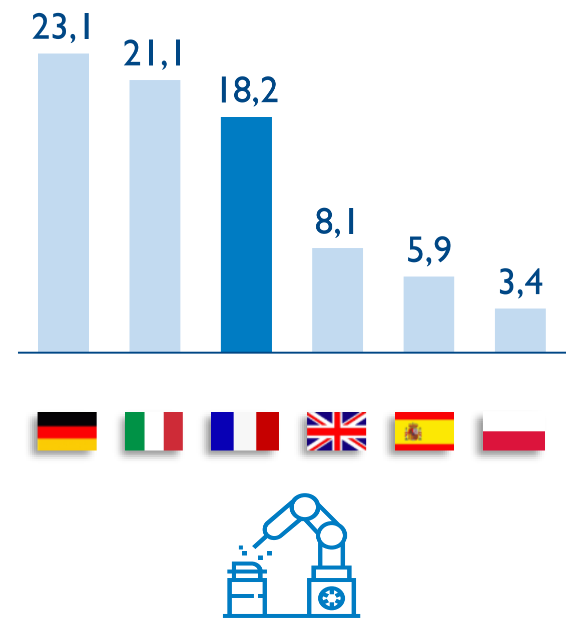
High speed Broadband subscriptions as% of Internet subscriptions
(>10 Mbps) - 2018



4G Coverage
Coverage in terms of % of household
2018



M2M base
(millions of Sim cards) - 2018



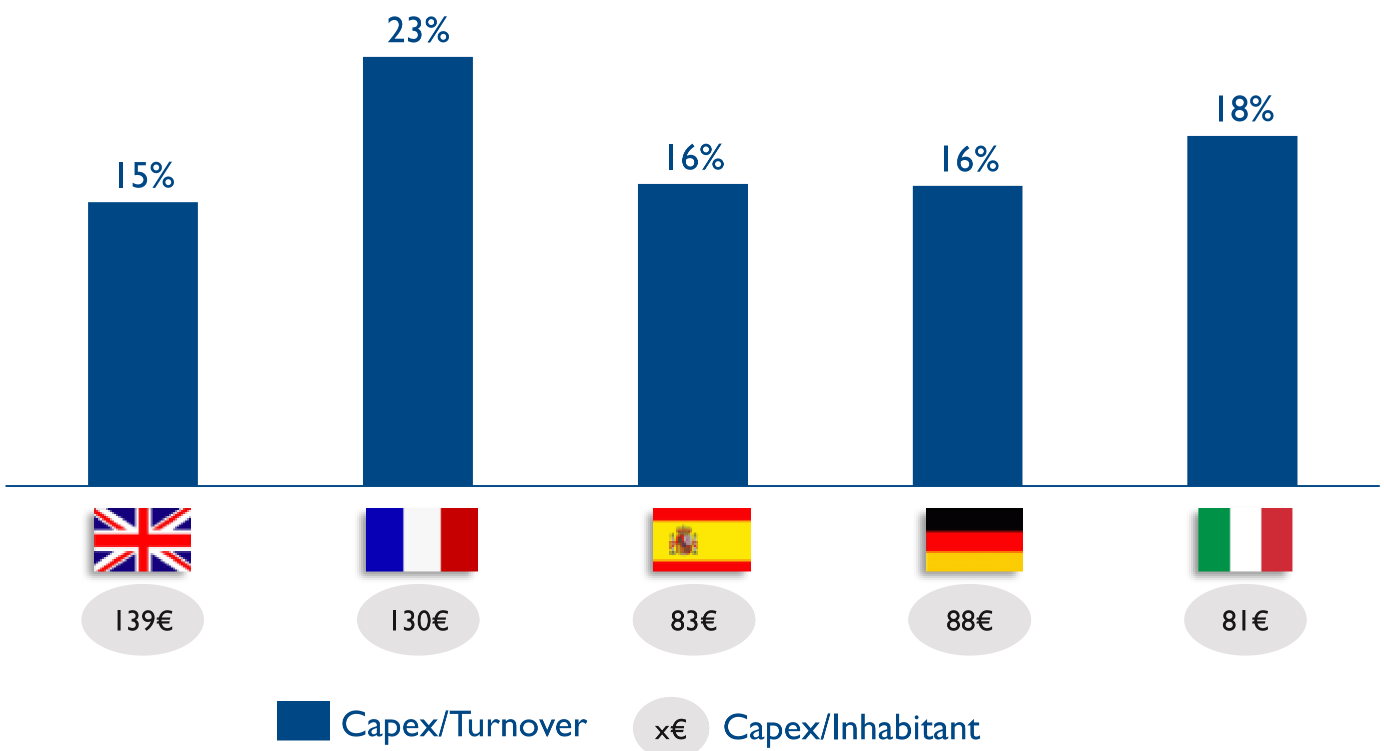
Source Global Data, European Commission, Arthur D. Little

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

The investment effort of French operators is superior to all other major European markets

Investment effort rate by country (CAPEX / Turnover)

United Kingdom, France, Spain, Germany, Italy, 2018



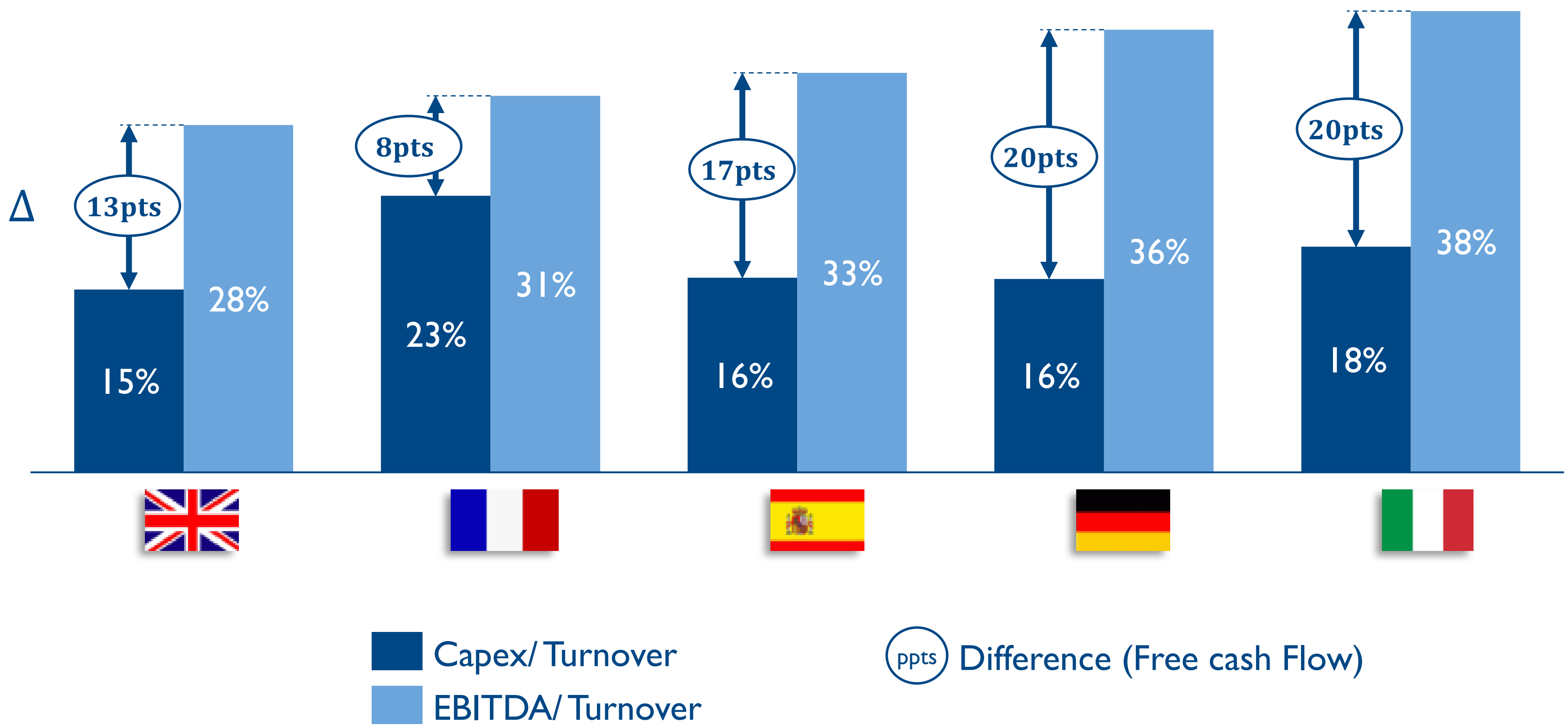
Source Arthur D. Little annual report
Note Turnover, CAPEX and EBITDA of telecom operators with a fixed or mobile market share> 10%

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

The investment effort of French Telcos is especially remarkable as their margin levels are lower than in any other European markets

Investment Effort (CAPEX / Turnover) and Margin Level (EBITDA / Turnover) by Country

United Kingdom, France, Spain, Germany, Italy 2018



Source Arthur D. Little annual report
Note Turnover, CAPEX and EBITDA of telecom operators with a fixed or mobile market share> 10%

Agenda

1 Telecom operators contribution to the digital sector

2 European benchmark

3 The role of telecom operators in the digital economy of 2030

The digital economy is driven by three strong trends

The law of digital

Processing Power

Moore's law

Processing power doubles every 24 months

Connection speed

Nielsen's Law

The average connection speed doubles every 21 months

Data Storage

Kryder's Law

Storage capacity doubles every 18 months

Source Arthur D. Little

The implications for French users : more powerful digital tools allowing massive data consumption

iPhone's example	In 2009		Today		In 2030
					
	iPhone 3GS		iPhone 11 Pro		Next Generation?
Processing Power[1]	1,6 Gflops	x25	40,2 Gflops	x45	1800 Gflops ?
Storage	32 Go	x16	512 Go	x160	>80 To ? *(cloud)*
Connection speed (avg)	1,321 Mbps	x34	45 Mbps	x78	3,5 Gbps ?
Data Monthly data consumption per Sim Card	19 Mo	x368	7 Go	x78	550 Go ?

Source Apple, Akamai, ARCEP, Arthur D. Little analyzes
Notes Some performance and usage data are estimated; (1) expressed in GFlops "billions of floating-point operations per second "

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

The digital ecosystem will be at the heart of the French society by 2030

Industry 4.0

- Smart Glasses for intervention units
- Autonomous machines and smart robots
- Advanced Predictive Maintenance Solutions
- Exoskeletons

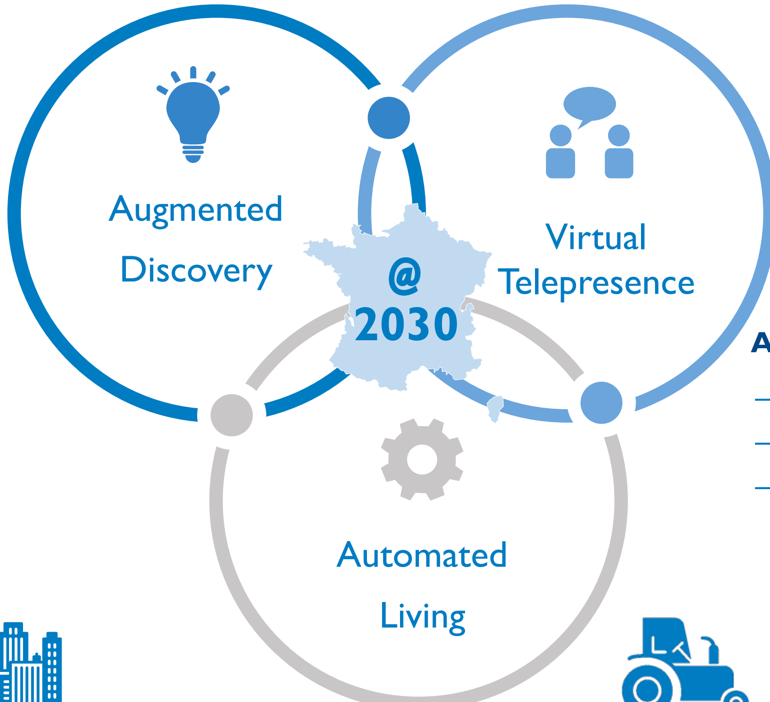
Environmental Care

- Mastery of resource consumption
- Smart power generation systems
- Ocean cleaning drones
- Fire prevention drones

Smart Cities

- Autonomous urban service vehicles
- Smart and automated lighting by IoT
- Advanced urban safety solutions via AI

A throng of digital use cases



Smart Health

- Remote surgery enhanced by robots
- Home hospitalization
- Predictive and personalized medicine

Augmented communication

- Remote enhanced training
- Network coverage handled by Drone
- New Smart Telecommunication Networks (Software Defined Network)

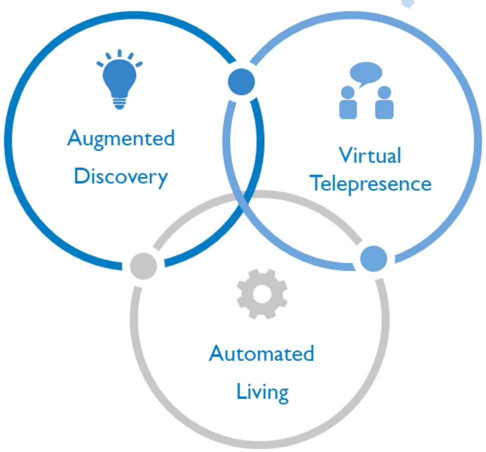
Agriculture 4.0

- Smart Tractors and autonomous agricultural robot thanks to AI
- Drones and IoT sensors to monitor, water and protect crops
- Predictive solutions for seedlings based on Advanced Analytics

Use cases from Arthur D. Little's sector studies, especially the study "Unlocking the GigaWorld innovation"

These future digital use cases will be essential to address the main societal challenges for France over the next 10 years

The digital ecosystem



Demographic and societal challenges	Territorial dynamics	Ecological transition
 **Aging of the population**	 **Urbanization** and urban sprawl	 **Durability** (mobility, consumption, etc.)
 **Individualization**	 **Rural desertification** (attractiveness of territories)	 **New energies** (and impacts on the environment)

Facing this digital transformation, two models are possible for the Telecom sector in France

	Today's model	A shif of paragdim model
Digital environment	■ **High taxation regime** for Telecom Operators compared to GAFA and other digital ecosystem Players ■ **Over regulation** of the Telecom sector ■ **Tax and regulatory unpredictability** ■ **Purely consumer-focused orientation**	■ **Fair taxation** with alignment of the different actors of the ecosystem on the telecom operators regime ■ **Adapted regulation** with no-discrimination between Internet players and telecom operators ■ **Stable and predictable** fiscal and regulatory framework ■ **Industrial ambition**
Operators' Role in 2030	**"Connectors" Operators** ■ **Sector's underperformance (Cash Flow)** ■ **Constrained investment capabilities** ■ **Infrastructure-oriented investments** ■ **Role of telecom services limited to "Commodities"**	**"Mastermind" Operators** ■ **Government support to the industrial vision** ■ **Development of investment capacities in digital services** ■ **Telecom operators are innovations" actors and promote new uses**

Source Arthur D. Little

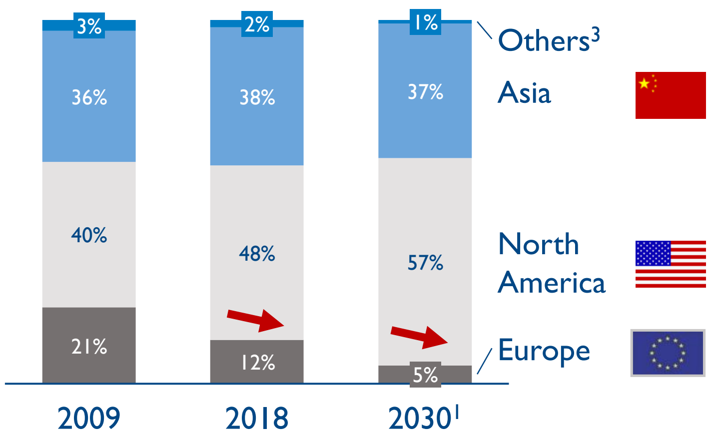
The decision in the industrial model for the next decade is essential to create European champions for the future digital ecosystem

Value distribution of the digital ecosystem

Cruising Model

Revenue of the digital ecosystem

Global, 2009-2030 Market Share



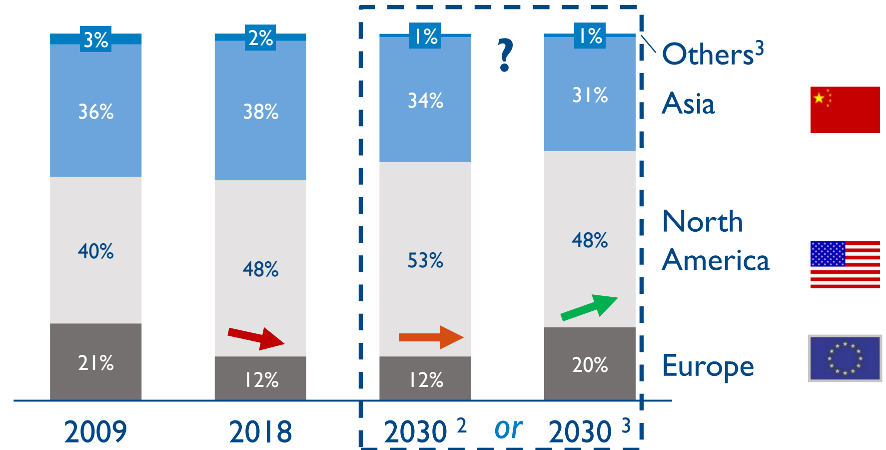
Digital revenue captured by non-european players

- “Outsourced" digital ecosystem to non-europeans champions
- Loss over data control to the detriment of European citizens and Governments

Paradigm shift Model

Revenue of the digital ecosystem

Global, 2009-2030 market share



Digital revenue captured by European champions

- Europe is positioned as a leading region of the digital economy
- The innovation ecosystem is stimulated by telecoms

Source Arthur D. Little

Note 1) Scenario 1 similar 2019-2030 growth rates in different areas to 2009-2018

2) Scenario 2 Europe retains its market share in 2018, and in other regions, distribution according to their growth rates observed over 2009-2018 3) Scenario 3 Europe returns to a level comparable to ecosystem of 2009, other regions splitting remaining value created based on their growth over 2009-2018

Arthur D Little

Arthur D. Little has been at the forefront of innovation since 1886. We are an acknowledged thought leader in linking strategy, innovation and transformation in technology-intensive and converging industries. We navigate our clients through changing business ecosystems to uncover new growth opportunities. We enable our clients to build innovation capabilities and transform their organizations.

Our consultants have strong practical industry experience combined with excellent knowledge of key trends and dynamics. Arthur D. Little is present in the most important business centres around the world. We are proud to serve most of the Fortune 1000 companies, in addition to other leading firms and public sector organizations.

For further information please visit www.adlittle.com.

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

Contact

Ignacio GARCIA ALVES
Global Chief Executive Officer
garciaalves.ignacio@adlittle.com