“The Economics of Telecoms” Report
2012 edition

Fédération Française des Télécoms / Arthur D. Little

November 13, 2012

FÉDÉRATION FRANÇAISE DES TÉLÉCOMS

Arthur D Little

The Economics of Telecoms Report (period 2006 to 2011)

1. **The telecom sector is at the heart of society and economy**
2. Telecoms are a major driver in the development of the digital sector
3. In France, the performance of telecom operators is declining due to regulatory, tax and competition pressure
4. An ambitious and consistent industrial policy is required for telecoms at French and European levels

Telecoms, at the heart of society and economy

Over 3/4 of French people have a mobile phone and Internet access

€39B invested in telecom networks since 2006

Over 300,000 direct and indirect telecom jobs based in France

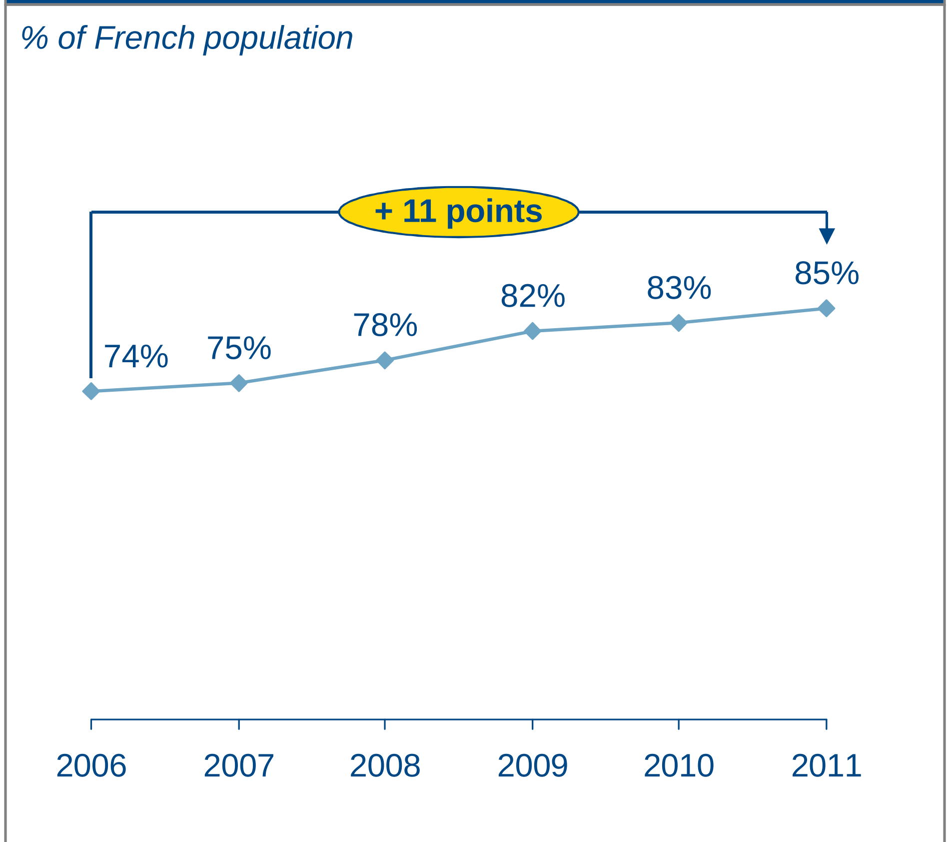
€204B spent by telecom operators since 2006

Less than 3% of French households' spend used for telecom services

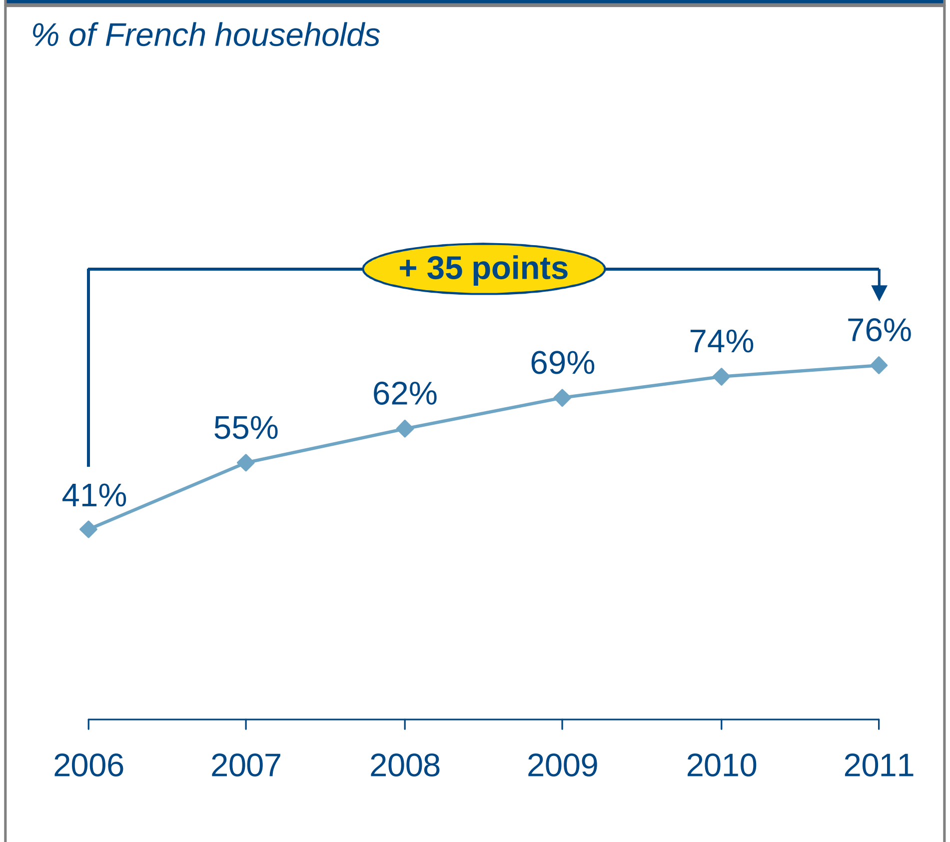
Telecom prices -8% since 2006 vs. inflation of + 10%

Telecom services are now universal in French society, with penetration of 85% for mobile and 76% for Internet access

Penetration of mobile telephony(1)



Penetration of Internet access(2)



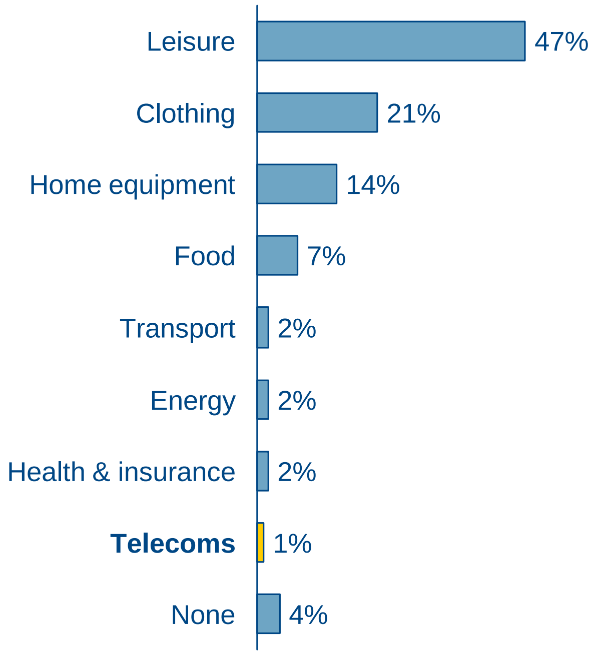
Source: CREDOC, OCDE, Arthur D. Little analysis

(1) French population over-12-year-olds with one mobile phone or more
(2) Fixed and mobile

Telecoms are a priority for the French people, for investors and for public representatives

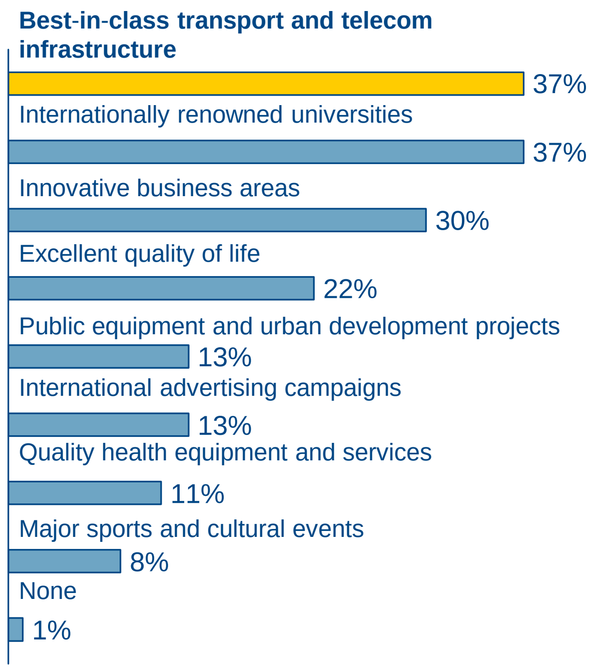
Main areas considered by households for saving

If needed where would you cut spend in priority?



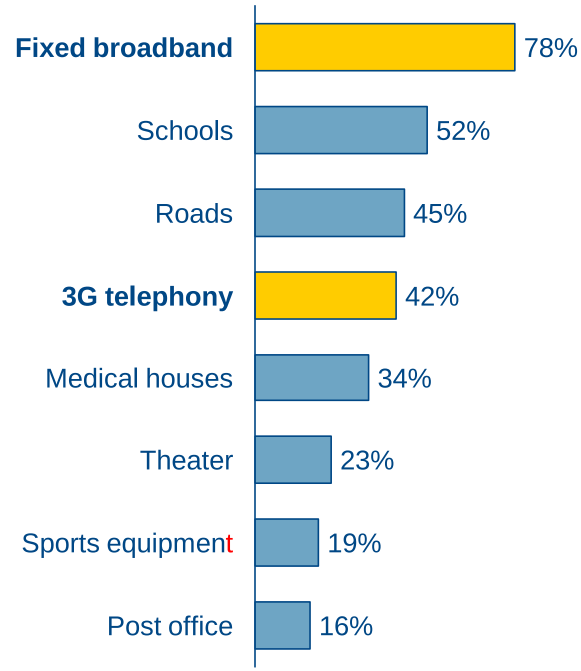
Main levers to improve attractiveness of French cities for foreign investors

What are the key levers that French cities should use to increase their competitiveness in Europe?



Priority equipment for rural towns

% mayors questioned

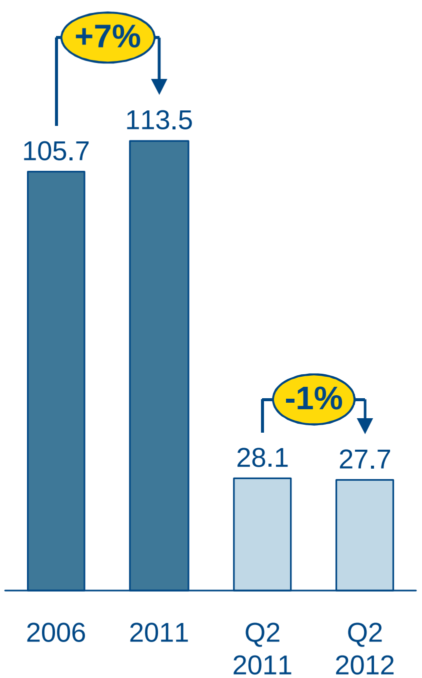


Source: fig. 1: CSA, fig. 2: Baromètre de l'attractivité du site France, fig. 3: Enquête Association Maires Ruraux de France, Arthur D. Little analysis

Telecom usage keeps growing at a very rapid pace: +11% in mobile voice minutes, +69% in data traffic and +10 billion text messages in France over the last year

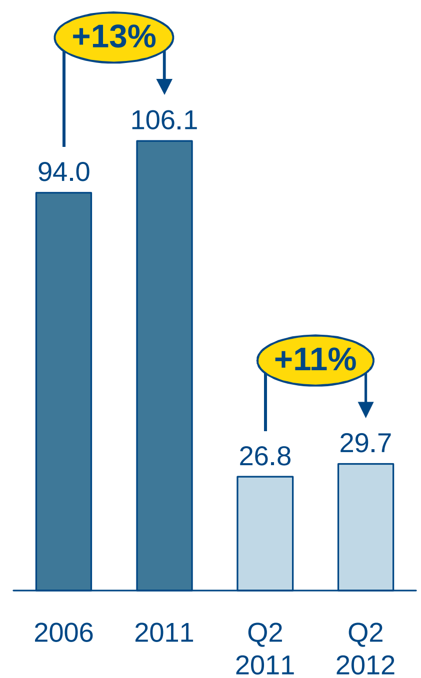
Fixed telephony volumes in France

B minutes



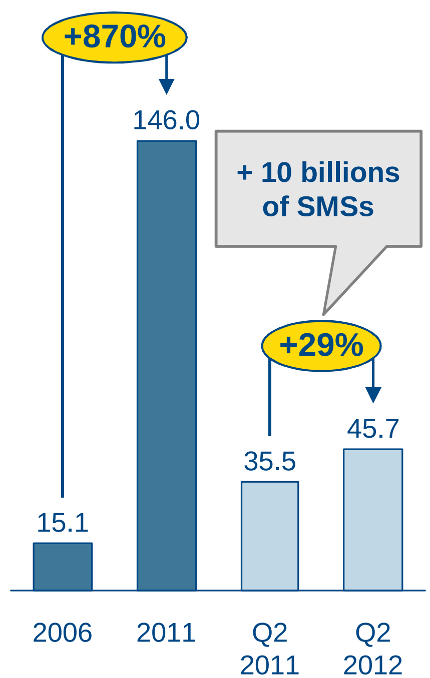
Mobile telephony volumes in France

B minutes



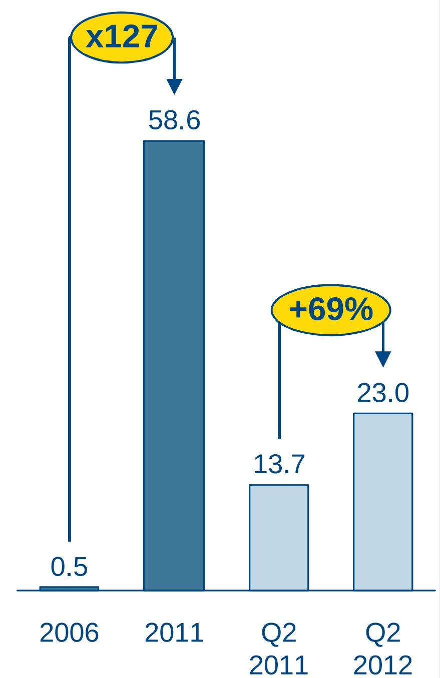
Number of SMSs in France

B SMSs



Mobile data traffic in France

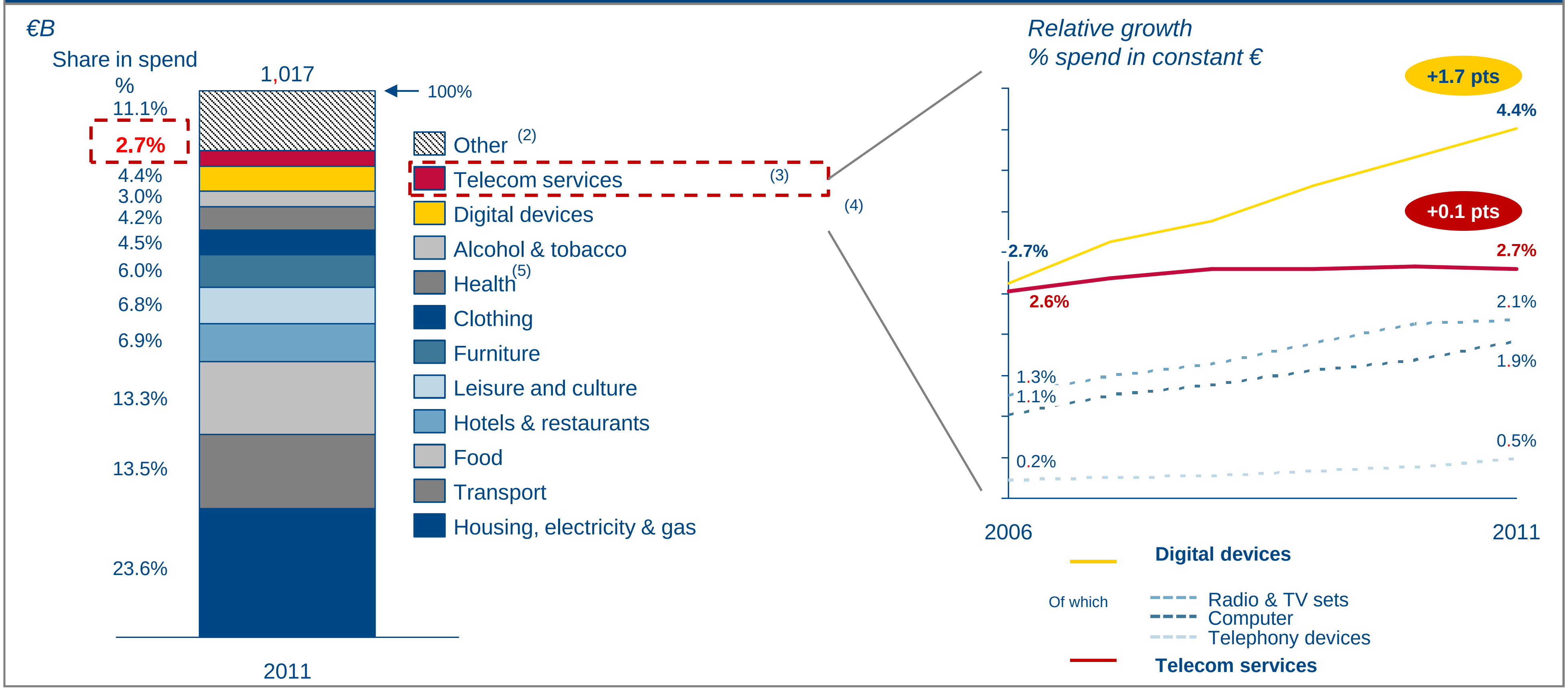
B Mo



Source: ARCEP, Arthur D. Little analysis

Telecom services represented less than 3% of French households' spend and have remained stable since 2006

French households' spend breakdown(1)

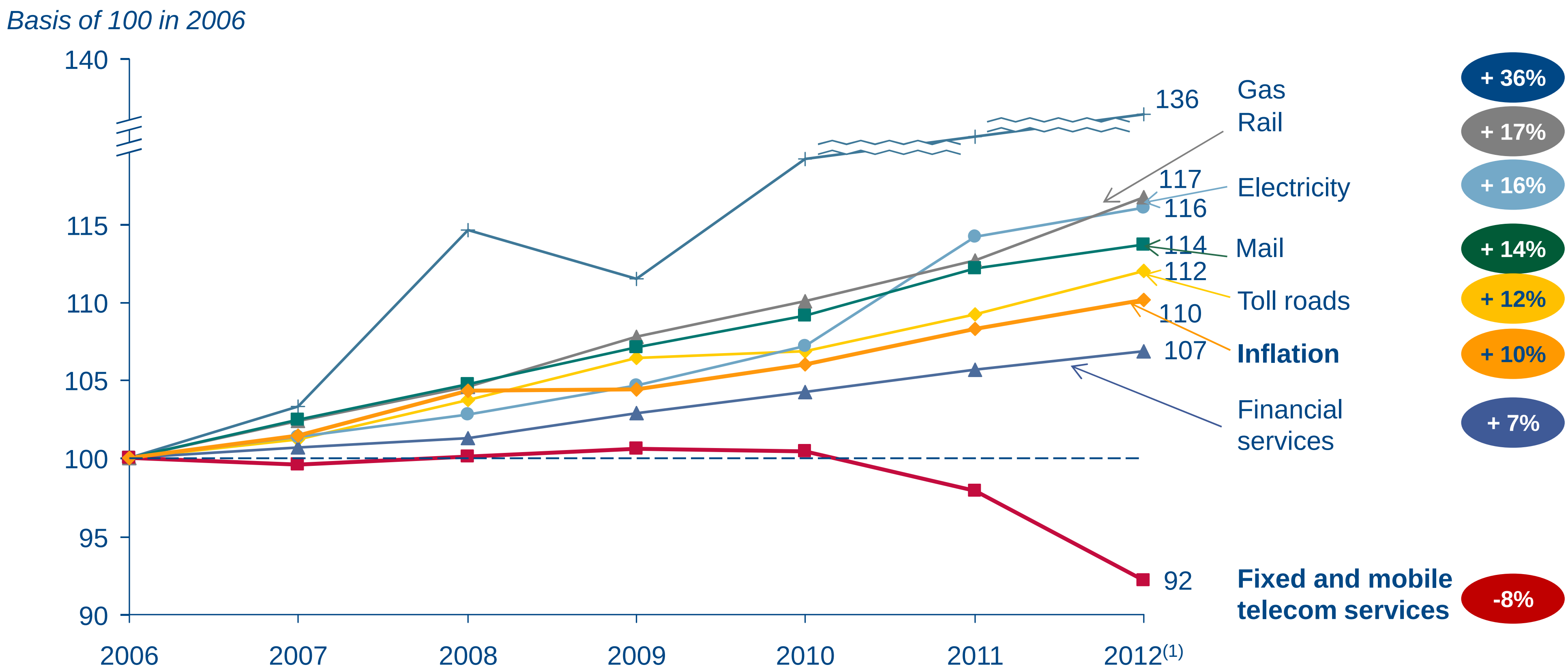


Source: INSEE, Arthur D. Little analysis

(1) Final household spend
(2) Including postal services and education
(3) Excluding telephony devices
(4) Including telephony, fax, TV & radio, computer and photography devices
(5) Excluding social security

The price of telecom services is decreasing, contrary to other major expenditures of French households

Price index of major services in France

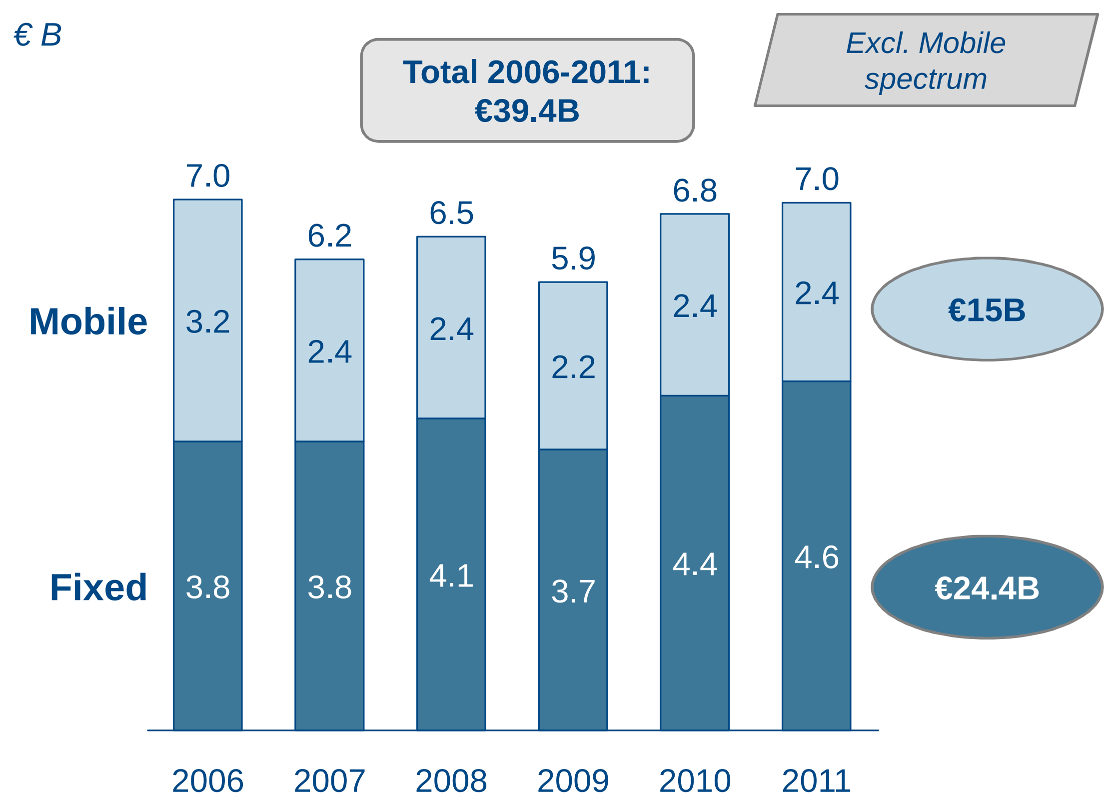


Source: INSEE, Ministère des Transports, Arthur D. Little analysis

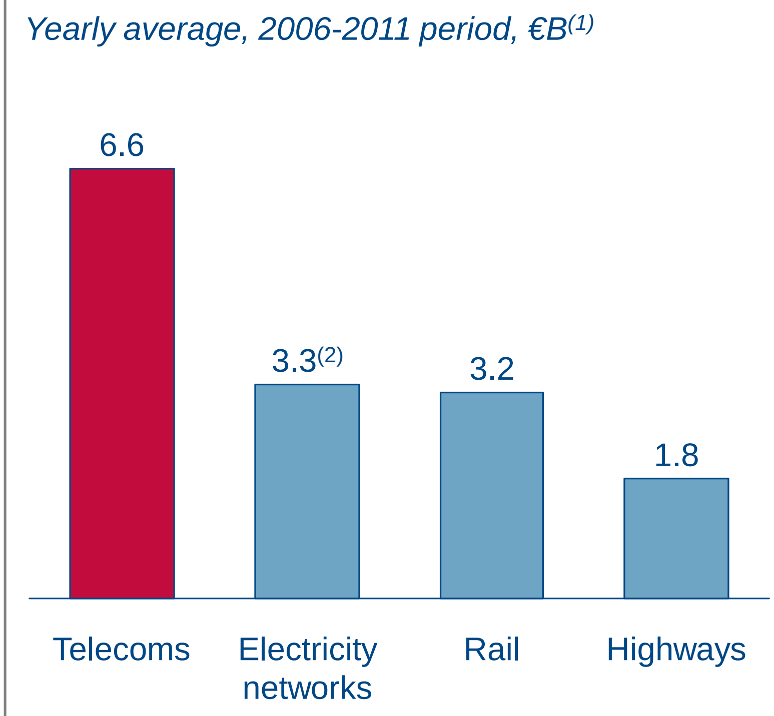
(1) H1 2012 average, excl. for toll roads (increased as from Feb. 1, 2012)

Telecom operators are the main private investors in infrastructure in France, with €39B invested in telecom networks in 6 years

Telcos' investment in France



Investment in infrastructures in France



Telecoms, 1st investor in infrastructures in France

Source : ARCEP, Association des Sociétés Françaises d'Autoroutes (ASFA), RFF, RTE, ERDF, Arthur D. Little analysis

(1) Télécoms: France Télécom, SFR, Bouygues Telecom, Iliad; Electricité: RTE et ERDF; Réseau Ferré de France: statut d'EPIC; Autoroutes: ASFA (Sanef, SAPN, ASF, APRR….)

(2) Over 2007-2011 period

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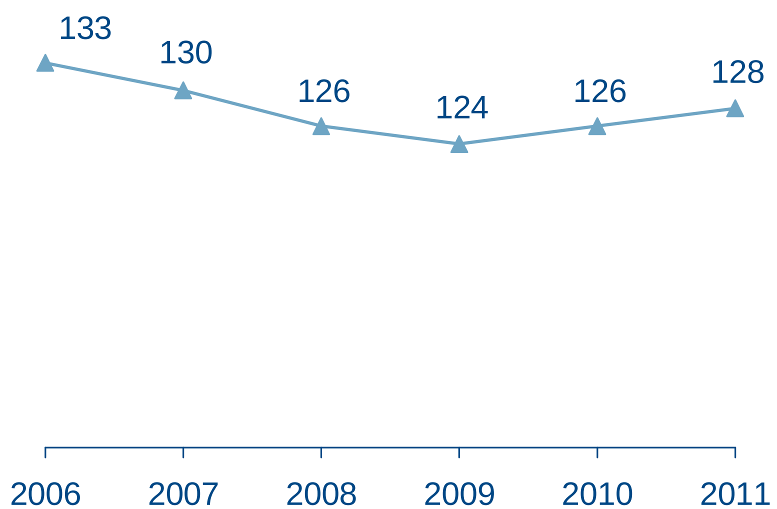
The telecom sector employs 128,000 direct staff based in France

Direct jobs of telecom operators in France

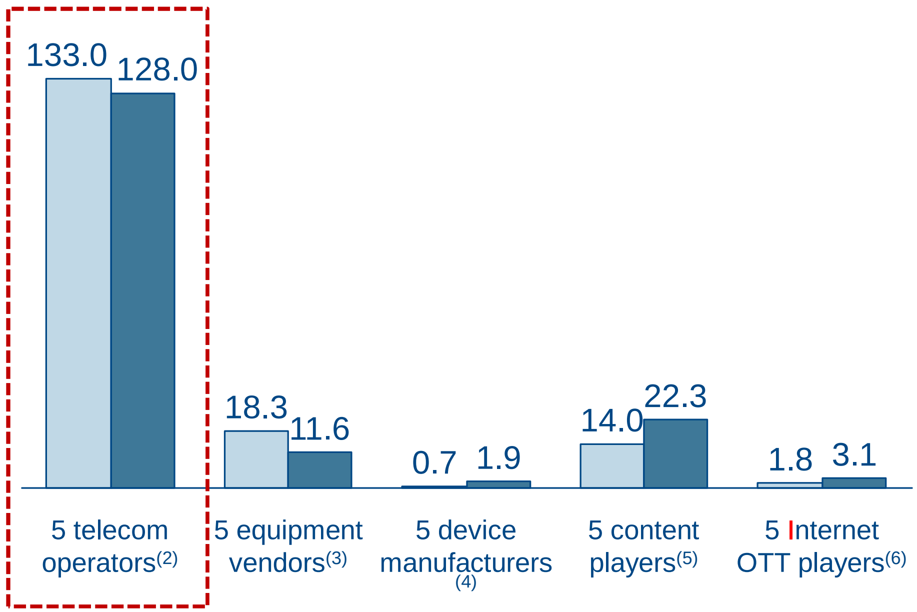
Thousand jobs based in France



Estimate: indirect jobs in the same ballpark as direct jobs

Jobs in the digital ecosystem in France

Thousand jobs based in France(1)



Source: Diane, ARCEP, Arthur D. Little analysis

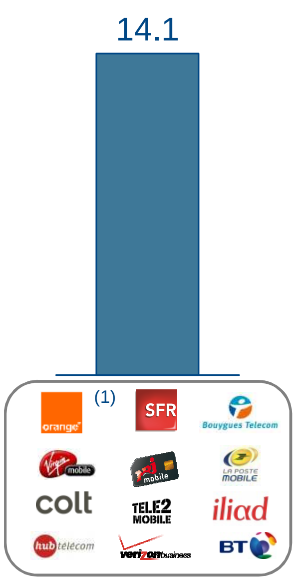
(1) 2010 data if 2011 not available
(2) By revenues in France: France Telecom, SFR, Bouygues Telecom, Iliad, Numericable
(3) By revenues in France: Alcatel-Lucent, Nokia Siemens Networks, Cisco, Ericsson, Huawei
(4) By revenues in France: Samsung, Apple, Nokia, LG and RIM
(5) By revenues in France: France Televisions, Canal +, TF1, M6, Radio France
(6) Google, Facebook, Yahoo, Microsoft and Amazon

Telecom operators have spent €19B in income taxes, licenses and industry-specific taxes between 2006 and 2011

Income tax of French telecom operators

Cumulative 2006-2011, in €B

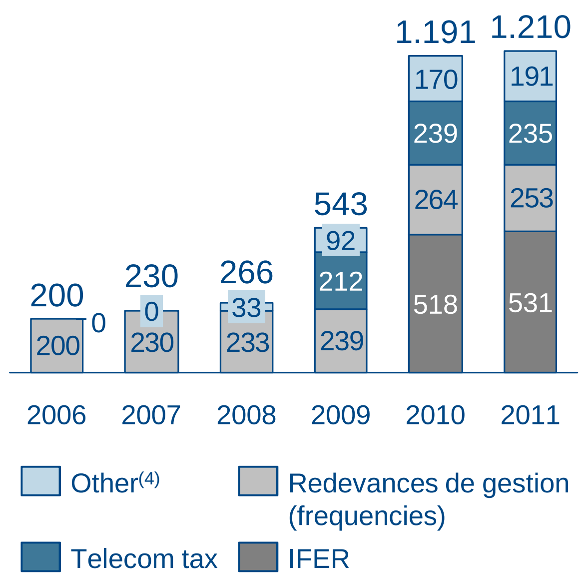
2006-2011 total
€14B



Telecom industry-specific taxes[2]

€B

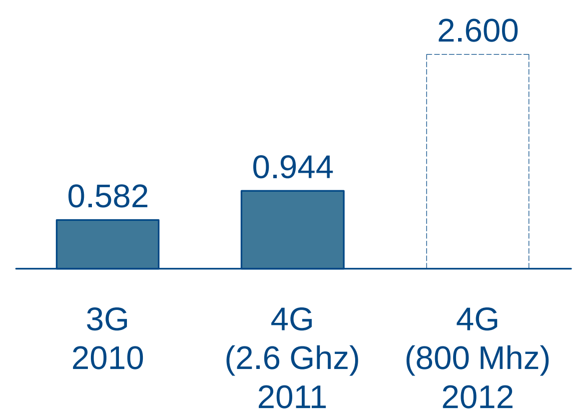
2006-2011 total
€3.6B[3]



Amounts spent in spectrum

€B

2006-2011 total
€1.5B



Source: ARCEP, FFT, rapports annuels, Les Echos, Arthur D. Little analysis

(1) Groupe fiscal France
(2) Groupe fiscal France Orange, SFR and Bouygues Télécom
(3) Assumption: IFER set up in 2010 and telecom tax in 2009
(4) TST / COSIP, copie privée, VOD

In total, telecom operators have injected € 204B into the French economy between 2006 and 2011

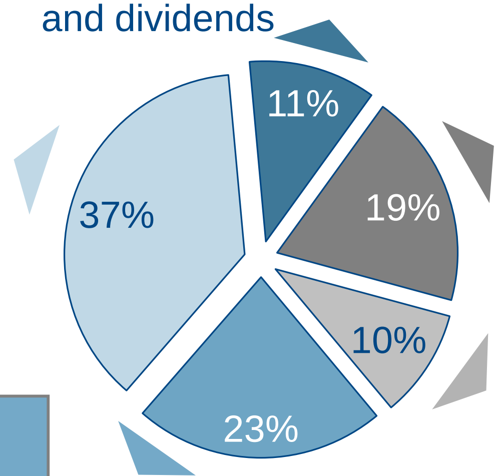
Between 2006 and 2011…

French State

- Telecom operators have spent **€23B** with the State in taxes (excl. VAT), licenses and dividends

Direct and indirect salaries and benefits

- Telecom operators have spent **€76B** in salaries and benefits for direct and indirect jobs(1)



Networks

- Telecom operators have invested **€39B** in the rollout, upgrade and maintenance of telecom networks

Other suppliers

- Telecom operators have spent **€46B** in other expenditures (marketing, distribution, etc.)

Private shareholders

- Telecom operators have contributed **€20B** to their private shareholders

Source: companies, Arthur D. Little analysis

(1) Salaries and social charges

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Telecoms, major driver of digital sector growth

Growth of the digital ecosystem since 2006:

+ 49% globally

vs. +7% in Europe

Share of telecoms in the French digital ecosystem:

77% of jobs

92% of investments

Share of telecoms in the global digital ecosystem:

70% of investments

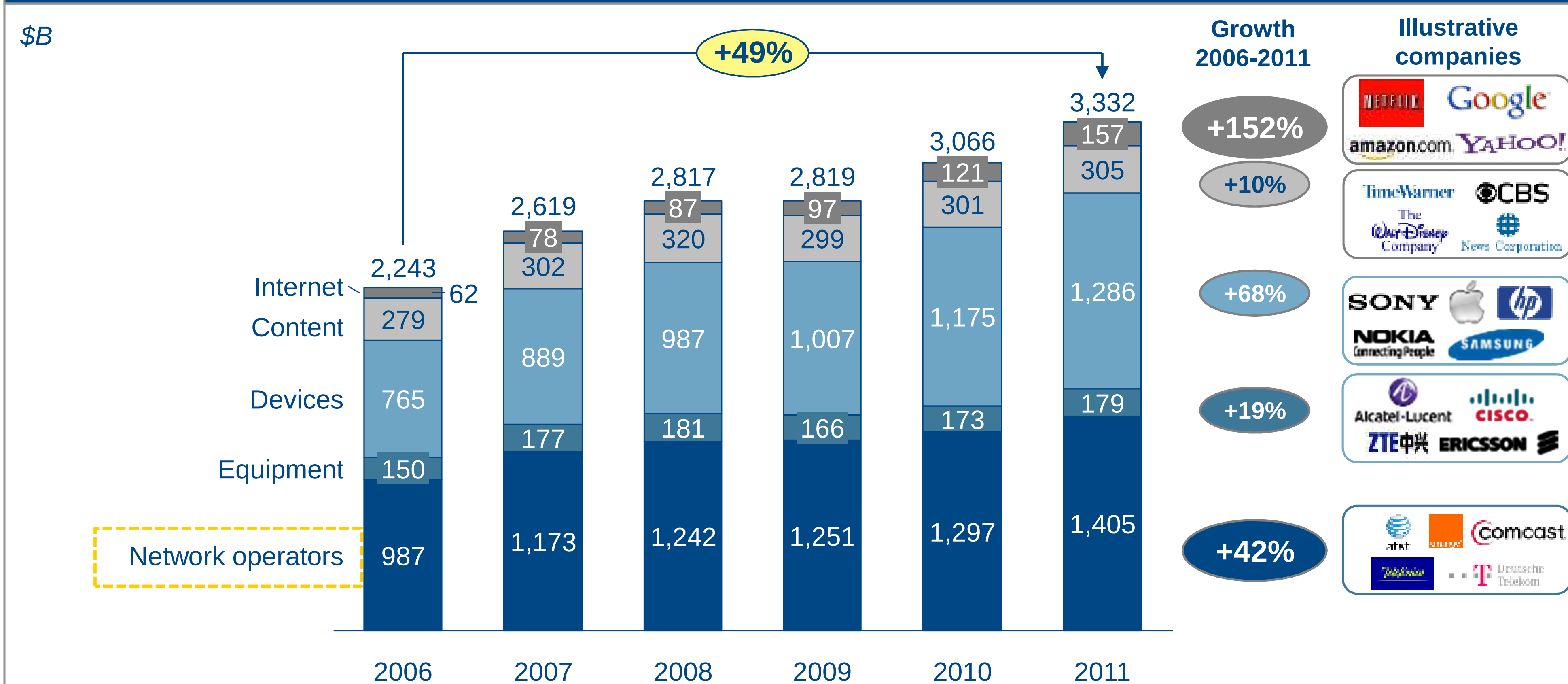
Investment of telecom operators in very high broadband in France:

Over 1 point additional GDP

in the French economy

Globally, the digital sector is enjoying strong growth across all segments

Revenue of the digital ecosystem by sub-sector[(1)]

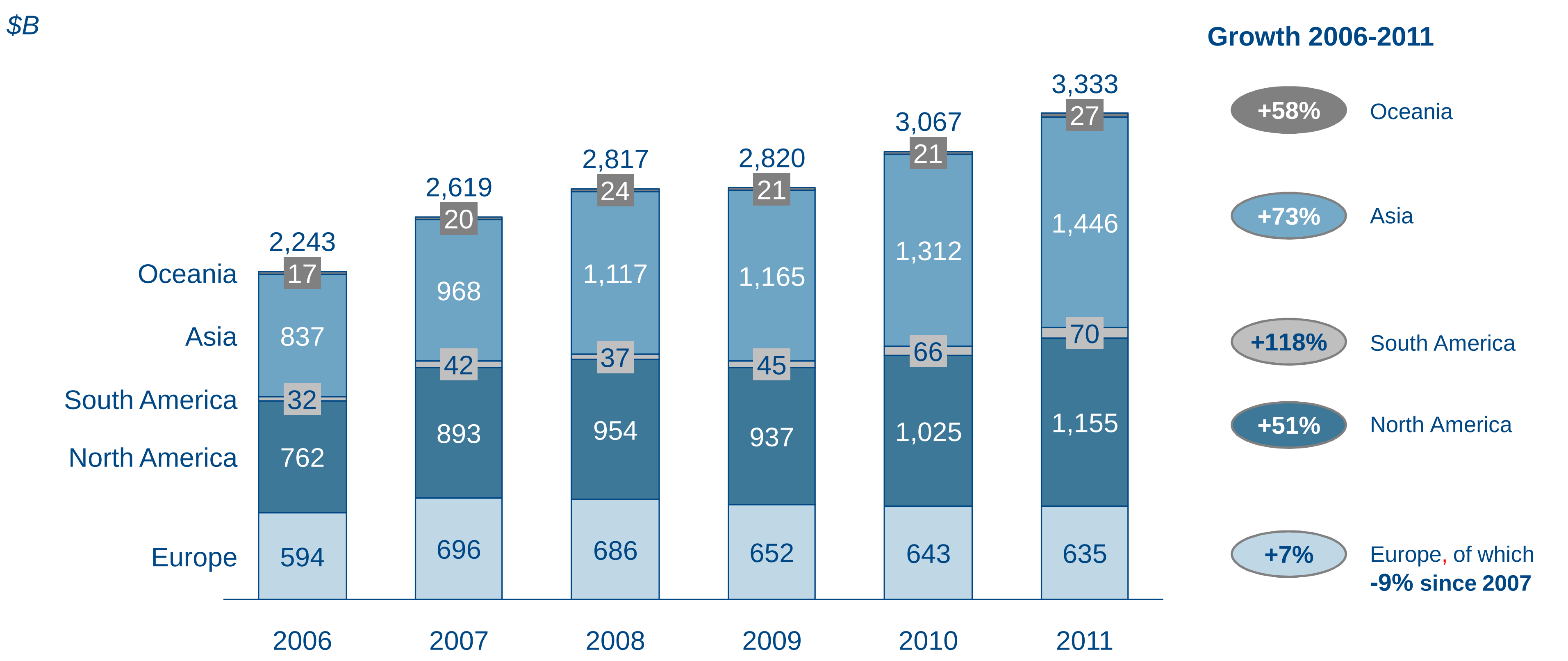


Source: Thomson Reuters, Arthur D. Little analysis

(1) Top 30 per category by 2011 revenue

In Europe, revenue of the digital ecosystem stalls, contrary to that in North America and Asia

Revenue of the digital ecosystem by region(1)(2)



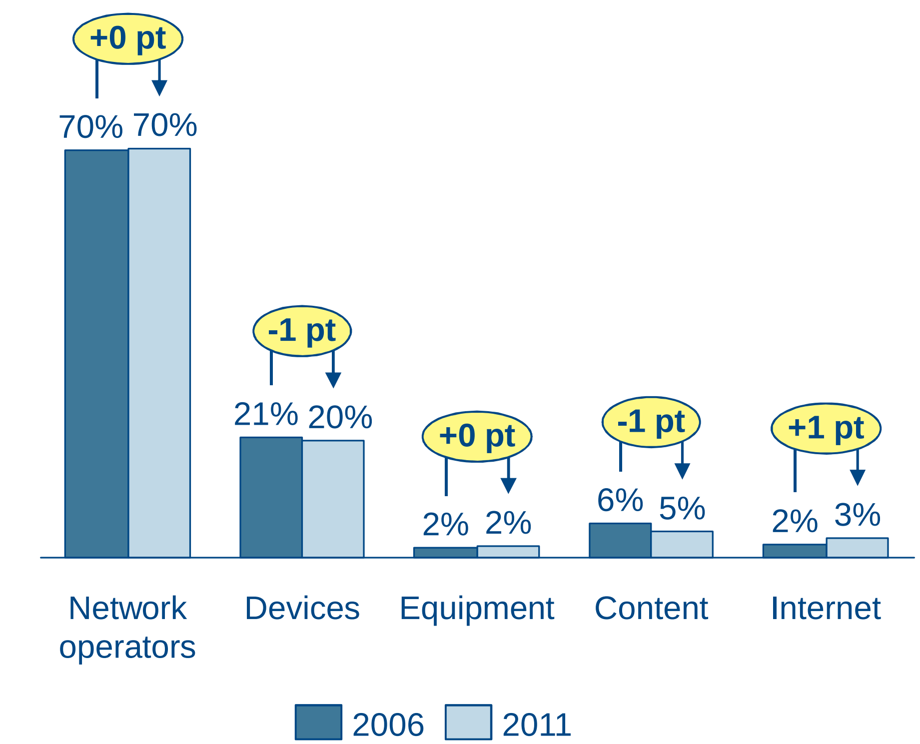
Source: Thomson Reuters, Arthur D. Little analysis

(1) Top 30 per category by 2011 revenue
(2) Nationality according to HQ location

Globally, telecom operators generate the vast majority of investment, while it is the device and Internet players that capture more and more value

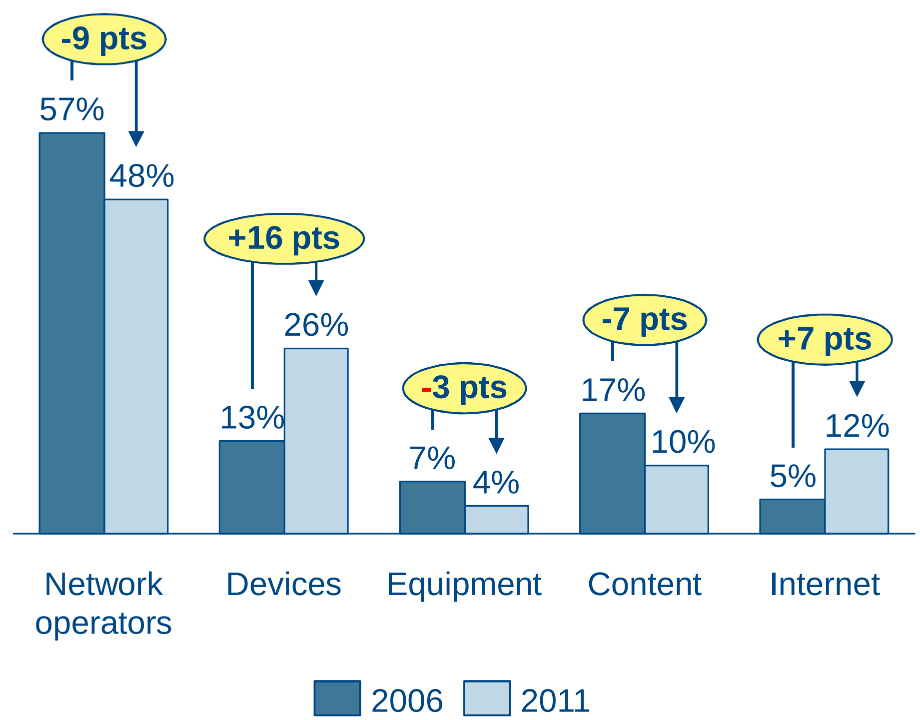
Investment by sub-sector(1)

% of total ecosystem investment



Free cash flows by sub-sector(1)

% of total ecosystem FCF



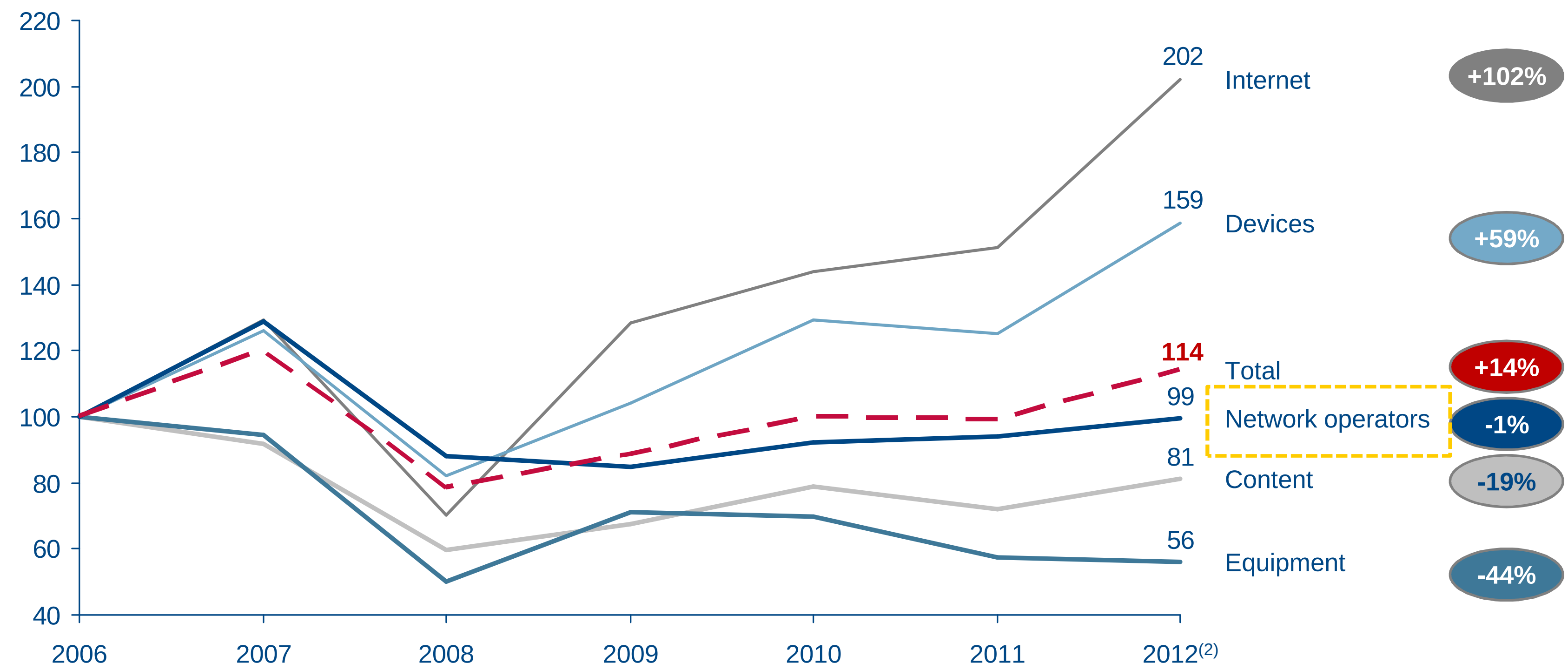
Source: Thomson Reuters, Arthur D. Little analysis

(1) Top 30 per category by 2011 revenue

Globally, market capitalisation reflects the value capture of players in the digital ecosystem

Market capitalisation by sub-sector[1]

Basis of 100 in 2006



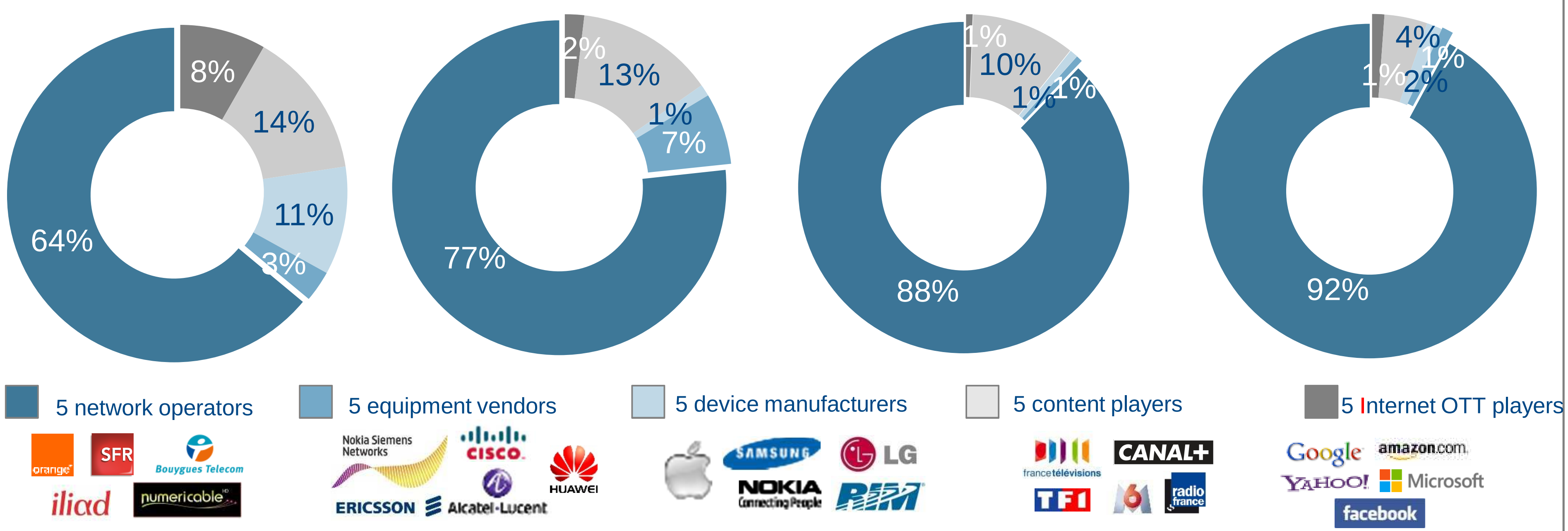
Source: Thomson Reuters, Arthur D. Little analysis

(1) Top 30 per category by 2011 revenue
(2) As of Sept 28, 2012

In France, telecom operators are by far the main contributors to revenue, employment, taxes and investment

Revenue, jobs, taxes and investment 2011 of 5 players by sub-sector – in France

Revenue[(1)]: €68B	Direct jobs: 167,000	Taxes and licenses[(2)]: €7.1B	Investment[(3)]: €7.6B



Source: ARCEP, Diane, Reuters, annual reports, Arthur D. Little analysis

(1) Revenue reported for France or disclosed in press, some adjusted data to estimate actual revenue generated in French market
(2) Income tax, other taxes excl. VAT, licenses and industry-specific taxation
3) Excl. licenses, if data for France unavailable then estimated with pro rata of jobs in France

Telecom operators are key contributors to the growth of the digital ecosystem in France and abroad

Selected examples

Cloud computing

orange, Caisse des Dépôts, THALES → Cloudwatt

Public funding: €75M

SFR, Caisse des Dépôts, BULL → NUMERGY

Public funding: €75M

Strategic partnership

Bouygues Telecom ↔ Microsoft, AtoS

Contactless payment

Association Française du Sans Contact Mobile

- **Association Française du Sans Contact Mobile (AFSCM)** initiated by Orange, SFR et Bouygues Telecom
  - Over 1 million Cityzi mobile handsets distributed in France by H1 2012
  - Objective of 2.5 million by end of 2012
- **Creation of electronic wallet solution**

Bouygues, orange, AtoS, SFR → Buyster E-PAIEMENT MOBILE

E-health

Strategic partnerships

SFR ↔ FUJIFILM MEDICAL SYSTEMS, Le Noble Age

orange ↔ MONDIAL ASSISTANCE, SORIN GROUP

- **Illustrative sevices**
  - **Medical imaging** through cloud
  - Partnership for management of **chronic diseases, mobile assistance** …
- Orange's 2020 objective for access to **digitized health services**[1] **:**
  - **1/3 of EU hospitals**
  - **20% of citizens**

Support to start-ups

Bouygues Telecom Initiatives

- Support to start-ups in communication services, e.g.

recommerce solutions, Nomadic Solutions

SFR Développement

- Investment fund in start-up companies such as

digitick, intersec

Technocom 2 orange, Alcatel-Lucent, Soitec, cdc entreprises, SEB

- Investment funds in start-up companies with focus on digital developments in networks, energy, smart home and health

Source: companies, Arthur D. Little analysis

1) Orange's "10 commitments" contributing to Europe's Digital Agenda

Through their broadband investments, telecom operators can generate over 1 point of GDP growth in France

Impact of investment in mobile and fixed broadband in France
directly or through the digital ecosystem and improvement of competitiveness of companies

~€20 to 30B
investment in fiber
in coming 15 years

Fixed broadband throughput x5
in equipped households
(from 20 Mbps to 100 Mbps)

Doubling the broadband speed for an economy increases GDP by 0.3 point(1)

+0.75 point
extra GDP(1)

~€6.2B
investment in 4G
(excluding licenses)
In coming 5 years

Investing ~€5B in 4G would yield 0.37 point additional GDP2)

+0.46 point
extra GDP(1)

Source: ARCEP, Tactis, IDATE, Capital Economics, Arthur D. Little analysis

(1) According to Ericsson ("Socioeconomic effects of broadband speeds", September 2011) in a study focused on OECD countries
(2) According to Capital Economics ("Mobile Broadband and the UK Economy", April 2012) addressing the UK market

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Sharp drop in telecom operators' performance

Market capitalization of European telecom operators since 2006

-28%

-€15B **of revenue loss for French telecom operators due to decrease in mobile termination rates and roaming charges since 2006**

Expected trend of French telcos' revenue until 2014

-9%

€1.2B **of industry-specific taxation paid each year by telcos in France**

Expected trend of French telcos' EBITDA until 2014

-5 points

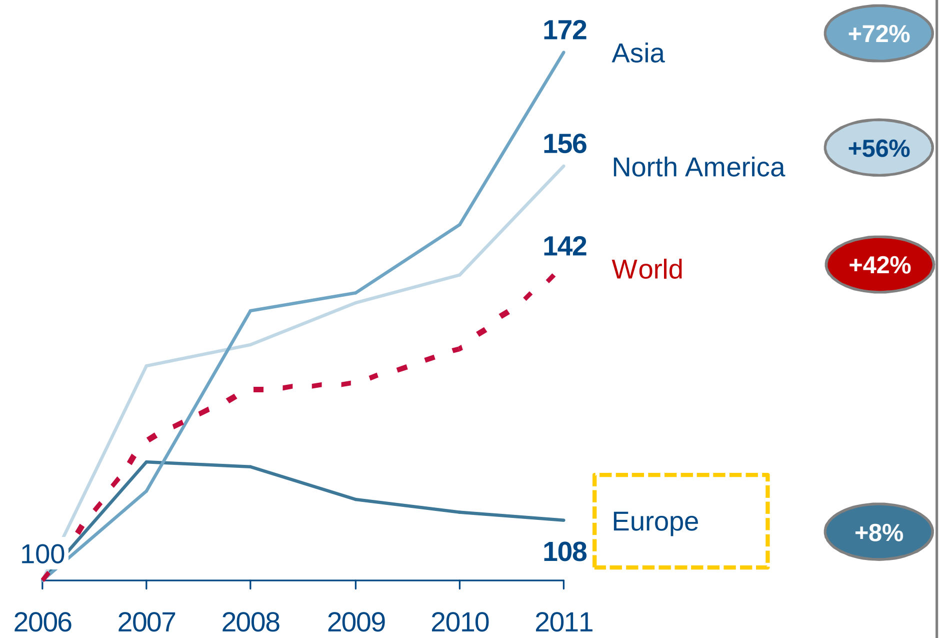
Telcos' mobile revenue that may be captured by Internet players

7.5%

Contrary to other regions of the world, European telecom operators have hardly grown in 5 years, which is reflected in a sharp drop in value

Revenue of network operators by region(1)

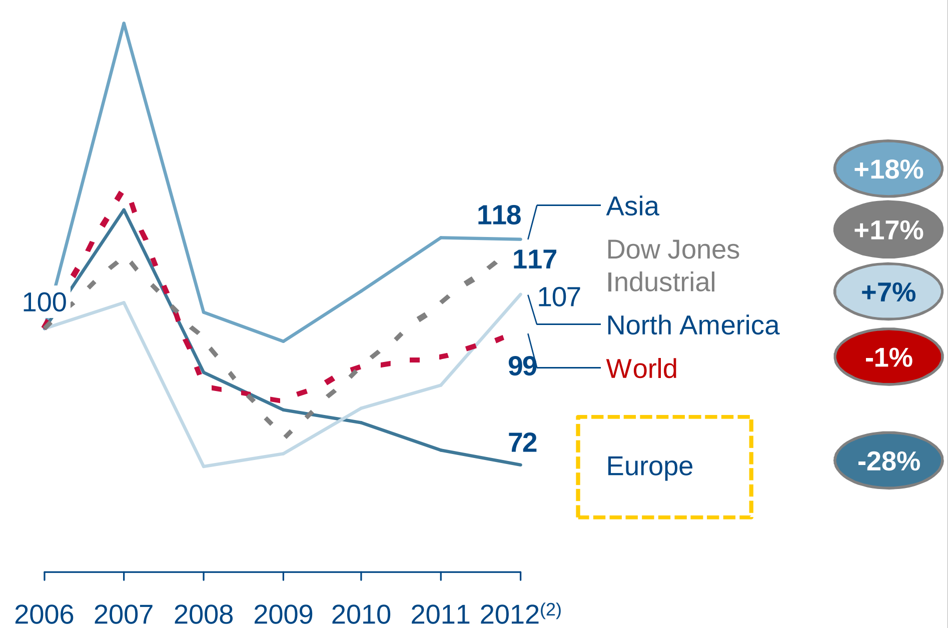
Basis of 100 in 2006



European telcos' revenue growth is 7 to 9 times lower than that in Asia and North America

Market cap of network operators by region(1)

Basis of 100 in 2006



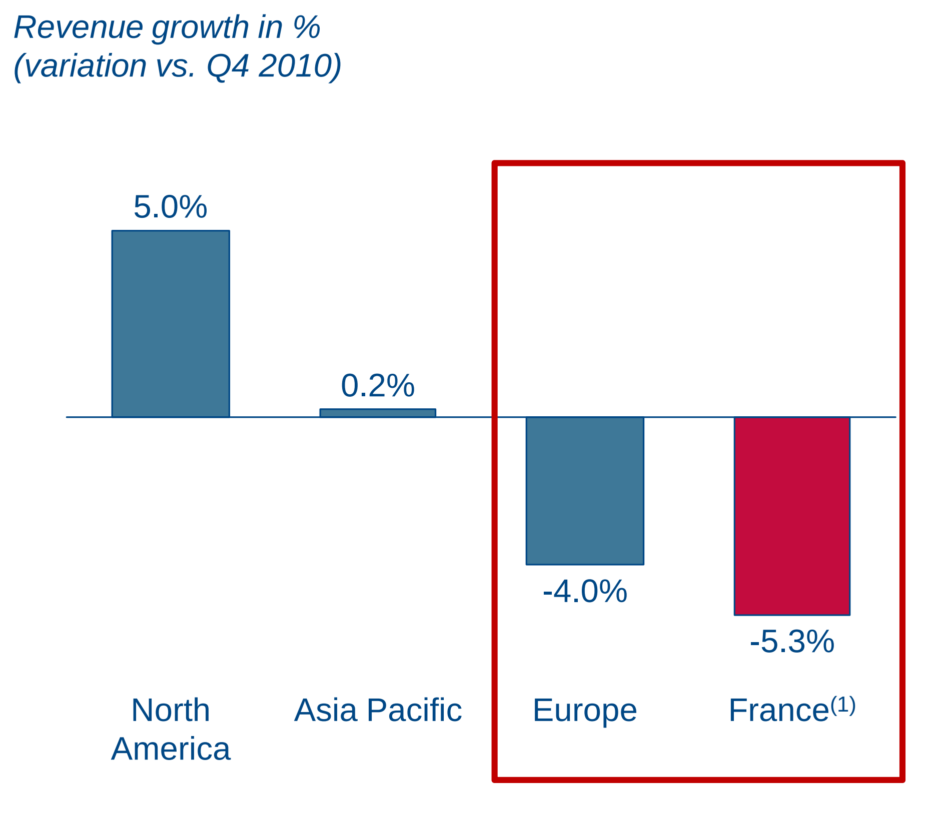
European telcos' value shrank by 28% between 2006 and 2012(2)

Source: Thomson Reuters, World Bank, Arthur D. Little analysis

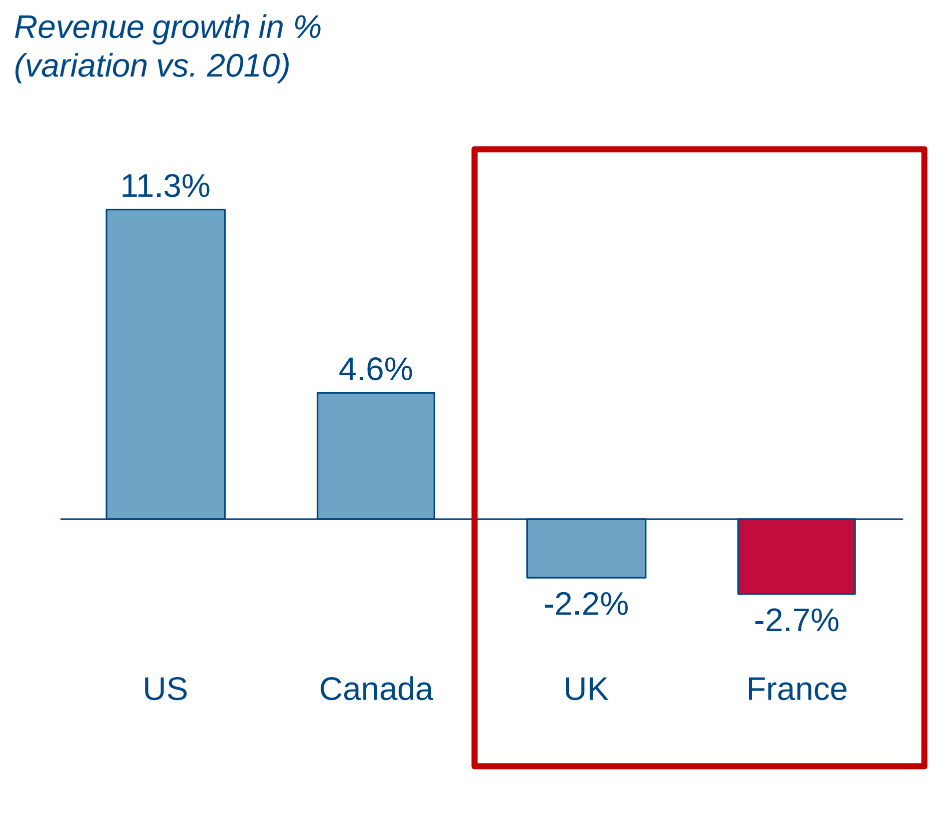
(1) In top 30 global operators, nationality according to HQ location
Revenue growth of Australian and South American network operators is respectively 13% and 26%
(2) As of Sept 28, 2012

Negative growth is stronger in France than in other European countries and other parts of the world

Mobile revenue growth, Q4 2011 vs. Q4 2010



Fixed revenue growth(2) 2011 vs. 2010

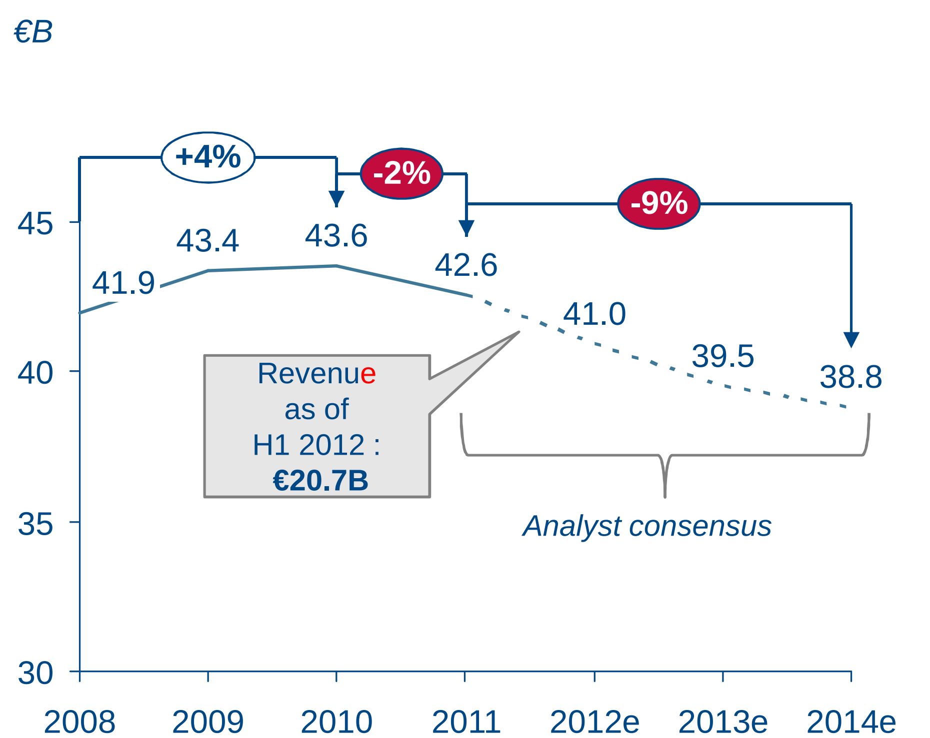


Source: Bank of America Merrill Lynch, ARCEP, Arthur D. Little analysis

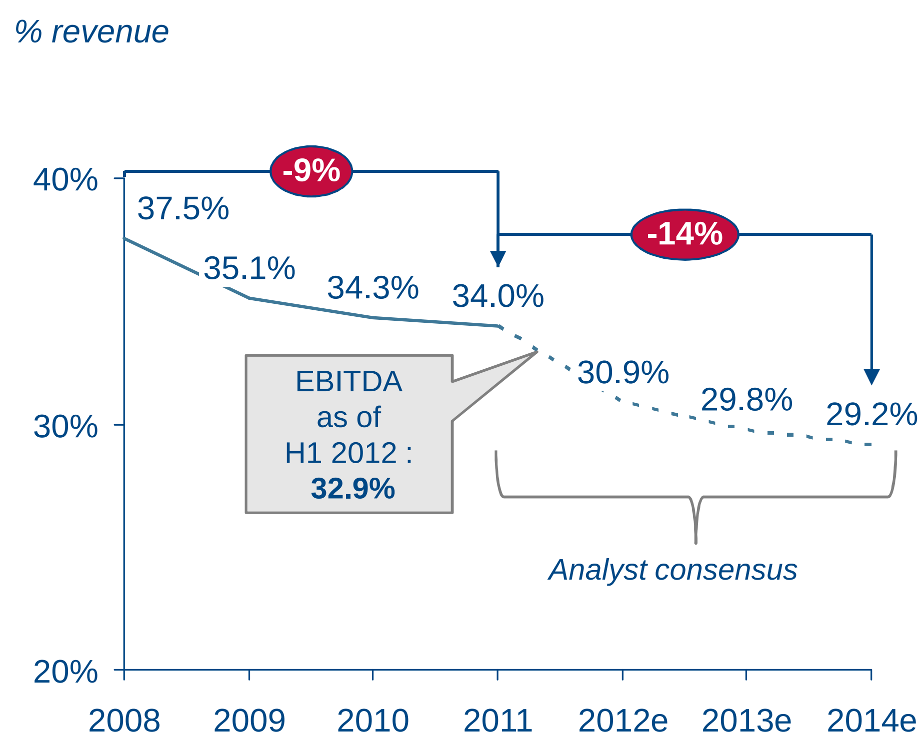
(1) Retail market revenue (source: ARCEP)
(2) 3 main wireline operators (US: AT&T, Verizon, Sprint; Canada: BCE, Telus, Shaw Communications; UK: BT, Virgin Media, TalkTalk; France: Orange France, SFR, Iliad)

In France, revenue and margins of telecom operators are expected to decrease strongly

Aggregated revenue of main telcos(1) in France



Aggregated EBITDA margin of main telcos(1) in France



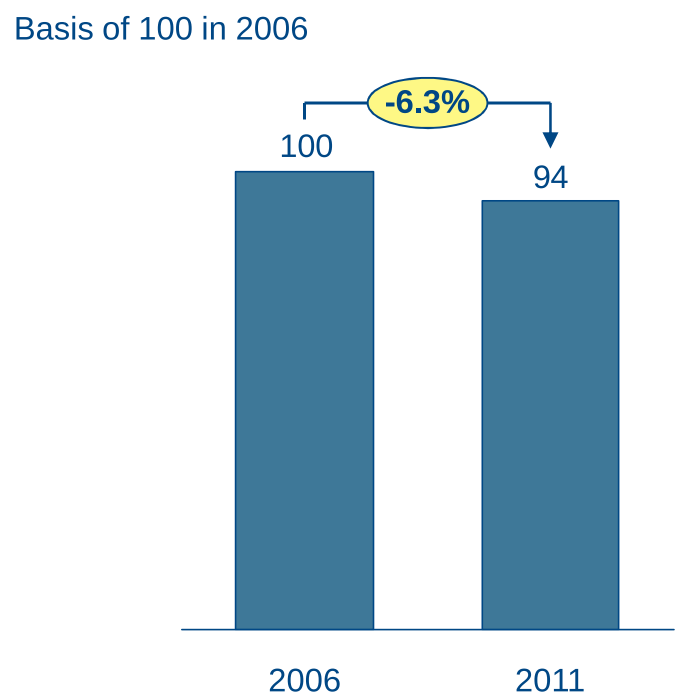
Source: Citigroup, HSBC, Exane, Natixis, Credit Suisse, JP Morgan, Deutsche Bank, Arthur D. Little analysis

(1) Orange France, SFR, Bouygues Telecom, Iliad

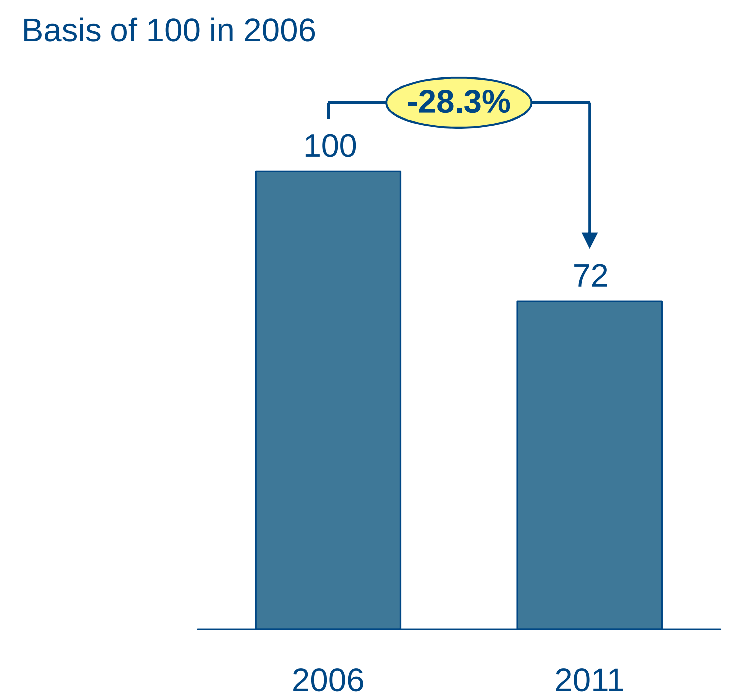
Margin decline will pressure investment capacity, as illustrated by the case of the UK market

Case of UK – Mobile and Fixed[1]

EBITDA / Revenue (%)



Investment / Revenue (%)

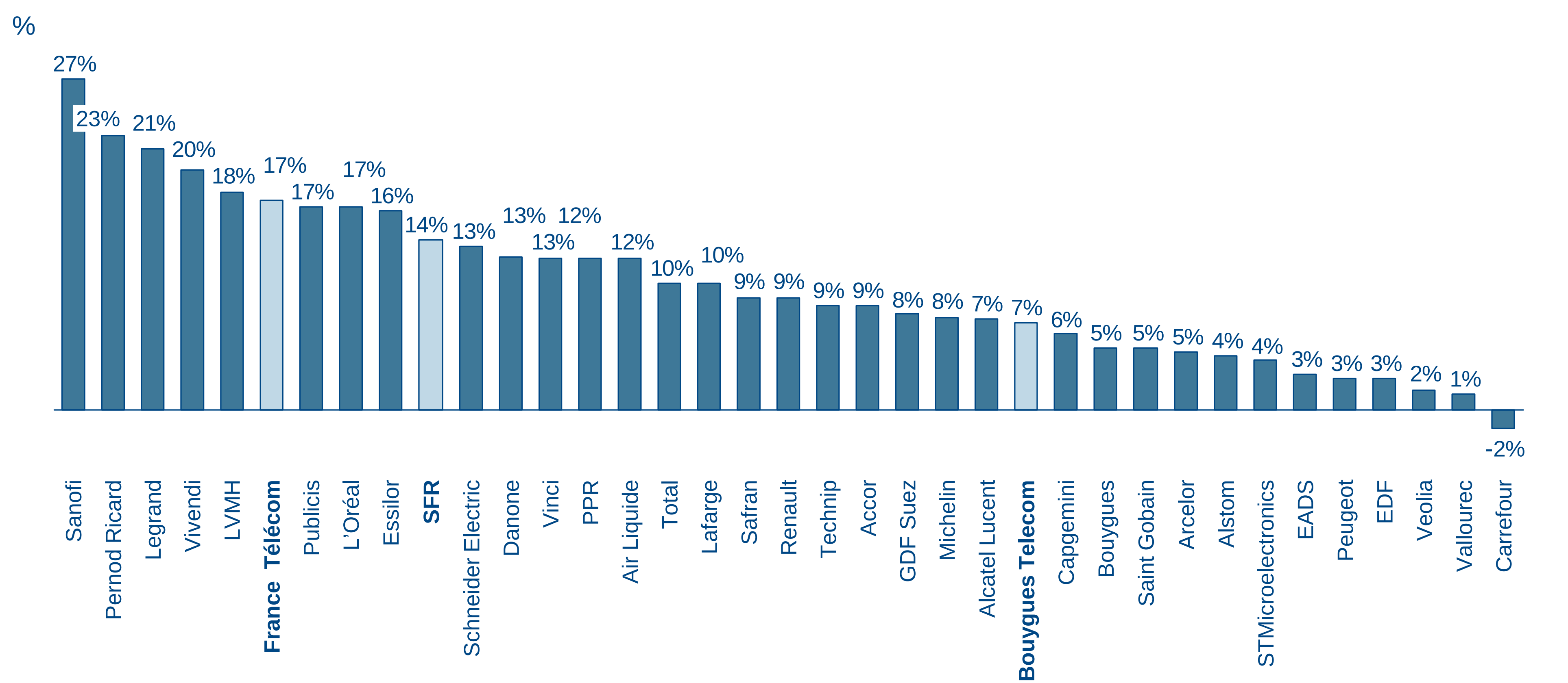


Source: Bank of America Merrill Lynch, Arthur D. Little analysis

(1) Mobile: Vodafone, O2, Orange / T-Mobile, Three; Fixed: BT only

Operational cash flows of French telcos are in the same range as those of CAC40 companies

(EBITDA – CAPEX) / Revenue
CAC 40, 2011

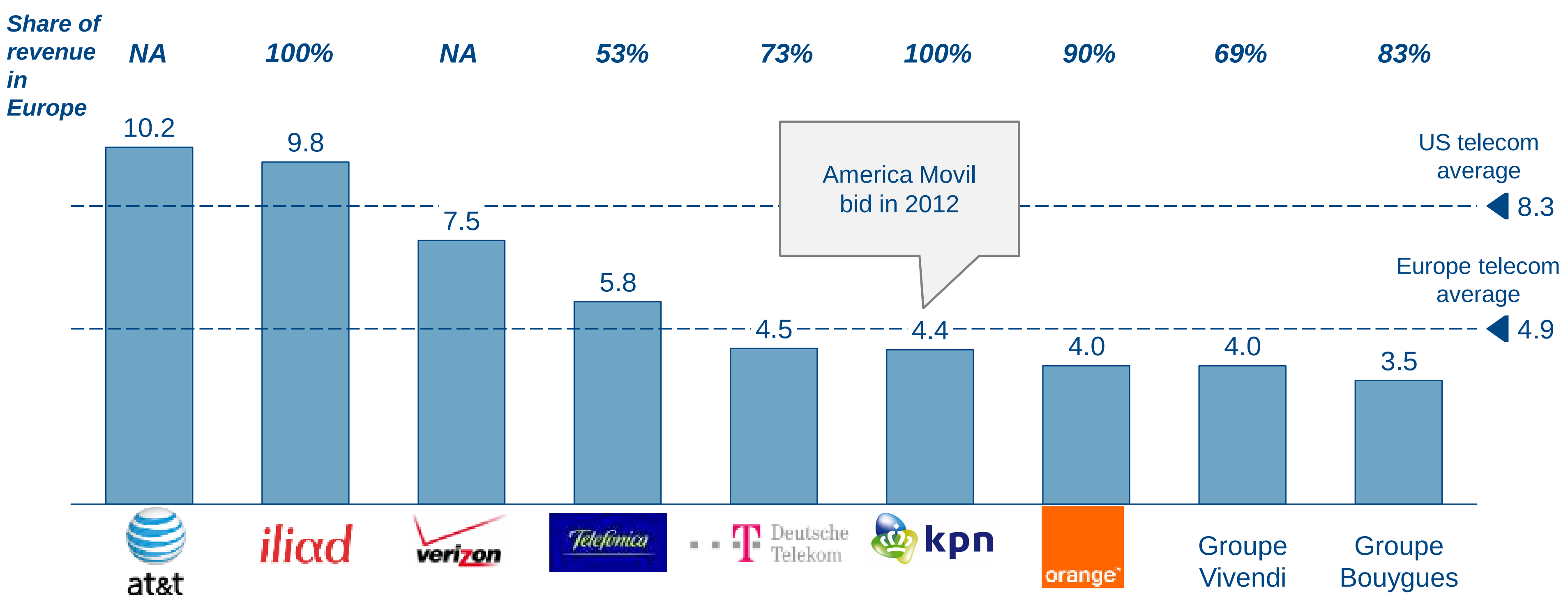


Source: Thomson Reuters, operators, Arthur D. Little analysis

Market value is negatively impacted by declining performance, which may open the door to bids by foreign players

Compared value of selected US and European telcos(1)

Enterprise Value(2) / EBITDA 2011



Source: Reuters, KPN, Infinancials.com, Morgan Stanley, Arthur D. Little analysis

(1) Bouygues Group and Vivendi used as proxies for Bouygues Telecom and SFR

(2) As of Sept 28, 2012

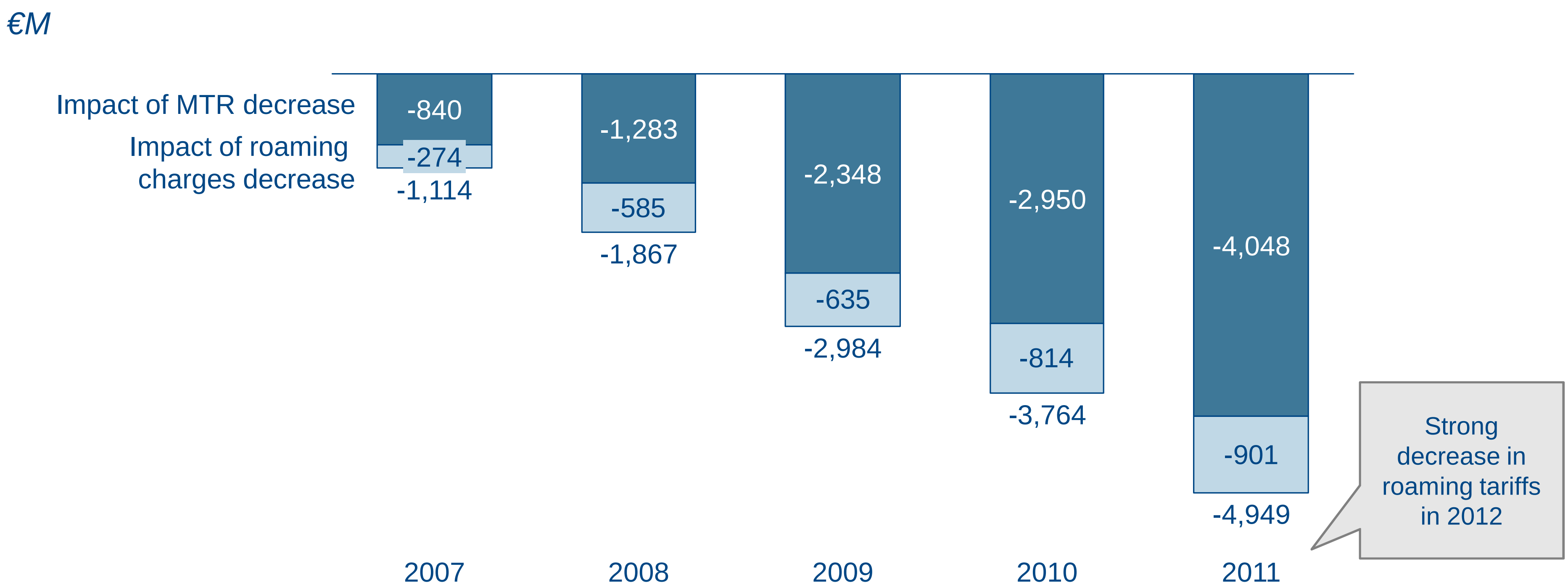
The drop in performance of French telcos is explained by the deterioration of regulation and taxation as well as stronger competition

	Regulation	Taxation	Competition
France	**National regulation** ▪ **Regulatory pressure** (Chatel regulation, decision on VAS …) ▪ **Slow definition of the national regulation framework for investment** (LTE, fiber) compared to policies followed by other countries (Japan, South Korea, US…)	**Industry-specific taxes** ▪ **Taxes applied to telecom operators** to benefit other sectors instead of investments in telecom infrastructure and new services	**Growth of low-cost model** ▪ **Model based on lighter customer management** with limited distribution footprint, no handset subsidies ▪ Lower prices **impacting profitability, investments, jobs and quality of service**
International	**European regulation** ▪ **Regulatory pressure towards tariff decrease** (interco, roaming)	**Tax optimization by other players** ▪ **Unfair taxation vs. worldwide Internet companies** that use tax loopholes in Europe e.g. VAT in Luxembourg and income tax in Ireland)	**New over-the-top players** ▪ **Integration of communication channels** (telephony, SMS, videocalling, video …) ▪ **Customer relationship partially captured through closed ecosystems** (Apple, Google…)

Source: Arthur D. Little analysis

Regulation: since 2006, decreases in termination rates and roaming tariffs have reduced telcos' revenue in France by ~€15B

Impact of decreases in MTR and roaming charges (1) on the revenue (2) of telecom operators in France



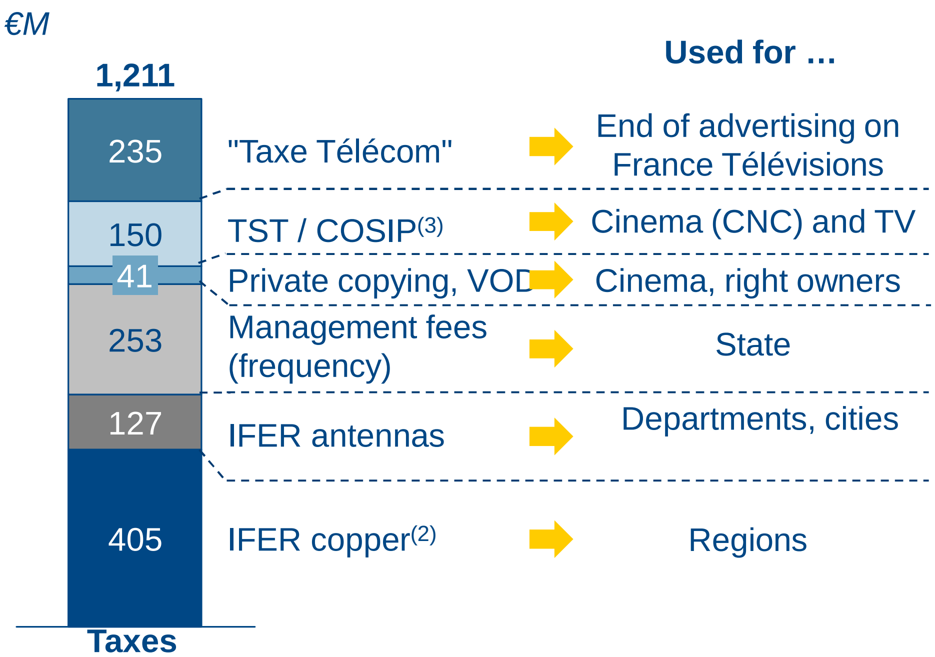
Total 2006-2011 : ~€14.7B

Source: ARCEP, Arthur D. Little analysis

(1) Roaming-in and roaming-out
(2) Gap analysis with same volumes vs. case where MTR and roaming charges would have remained flat since 2006

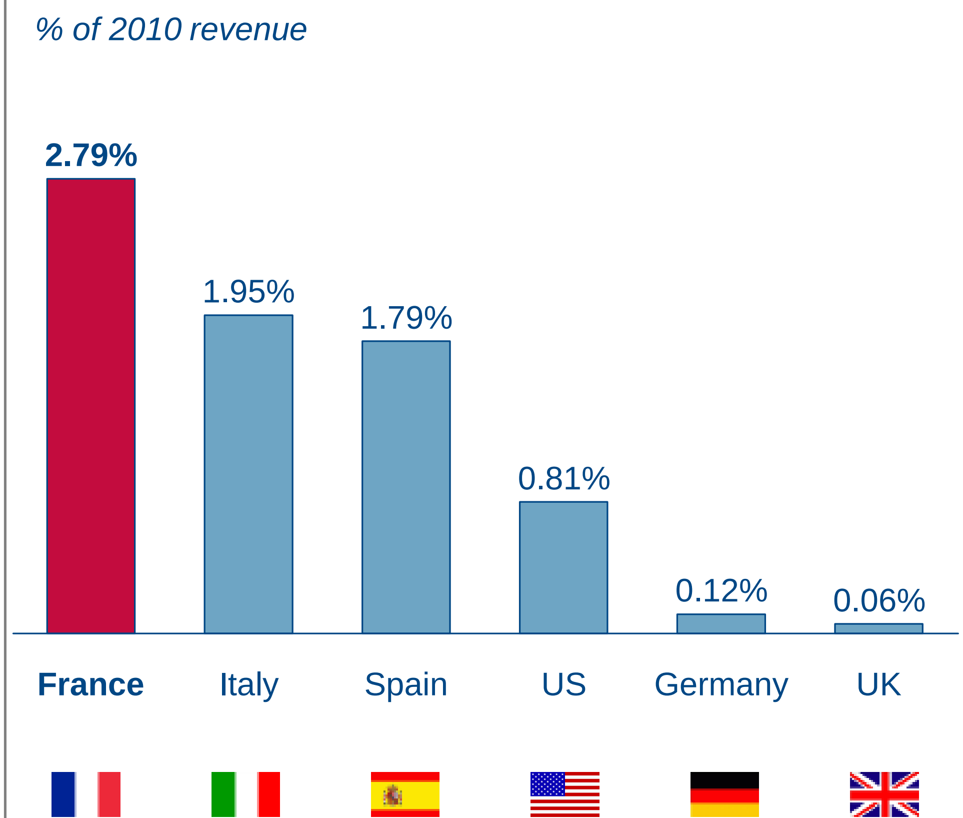
Taxation: telecom operators in France suffer from an industry-specific taxation of €1.2B per year, much higher than in other large European countries and the US

Main telecom industry-specific taxes[1] 2011



Total: €1.2B per year
i.e 15% to 20% of annual investments

Telecom industry-specific taxation



Source: FFT, Reuters, rapport Durieux, Upnext Research, press

(1) On the perimeter of Fédération Française des Télécoms members
(2) IFER: tax on network infrastructures
(3) TST: Tax on TV services, used for COSIP (Compte de Soutien à l'Industrie des Programmes Audiovisuels)

Taxation: unlike telecom operators, global Internet players choose to benefit from tax loopholes in Europe

Tax optimization mechanisms used by some large Internet companies

Country of end consumption → Country of taxation

Examples
Ireland
Luxembourg

VAT

- **€300M lost VAT by France** on electronic services in 2008, **€600M** expected in 2014

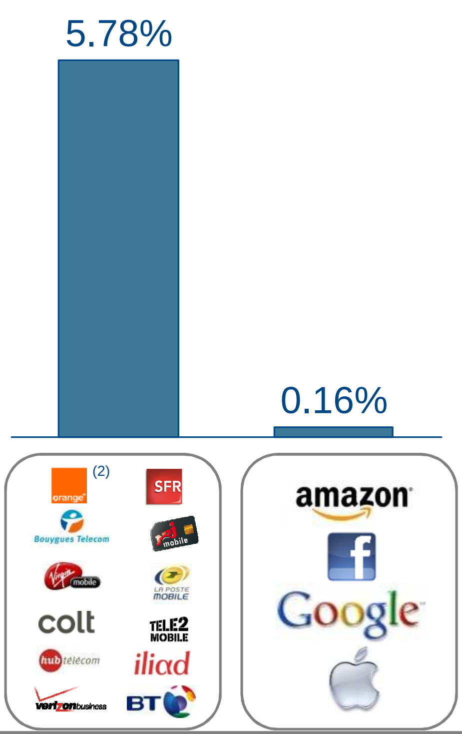
Income tax

- Only **€12M** of income tax paid by "GAFA"(1) companies in France in 2011

From 2019 onwards, VAT will be fully due in country of end consumption

Income tax paid in France

2011, % of revenue



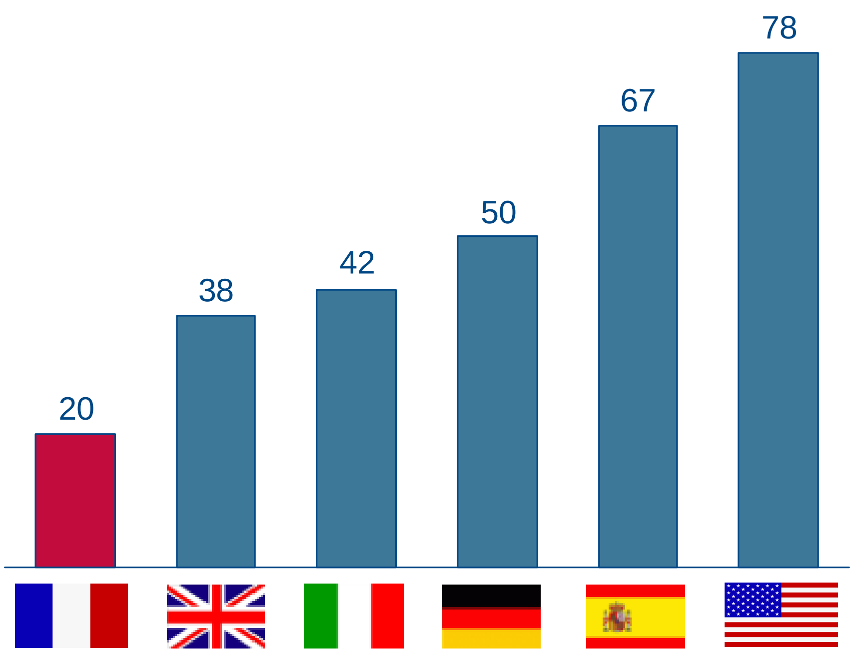
Source: Greenwich Consulting, Conseil National du Numérique, PPL Marini, Arthur D. Little analysis

(1) Google, Apple, Facebook, Amazon
(2) Groupe fiscal France

Competition: on mobile and fixed, French prices are the lowest compared to other large European countries and the US

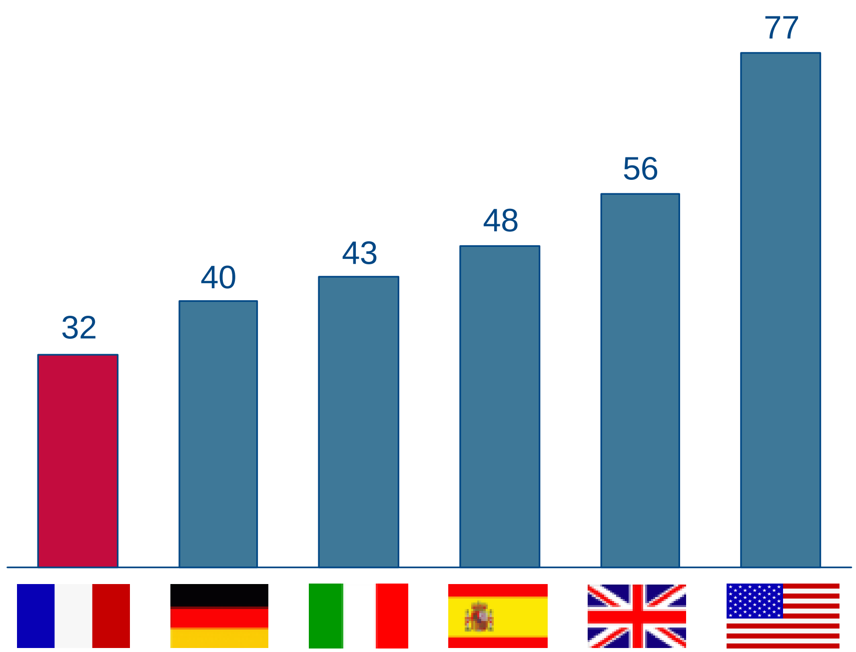
Price of a comparable mobile offer(1)

€ per month, October 2012



Price of a comparable fixed offer(2)

€ per month, October 2012



Source: operators, Arthur D. Little analysis

(1) Unlimited voice (min. 500 minutes), unlimited SMS/MMS (min.1,000 SMS,) Internet 1, 2 or 3 Go; SIM only, tethering when available, no contract when available, operators having a market share > 15%;

(2) Unlimited fixed national calls (min. 3,000 minutes), broadband with no fair usage for heavy users when available, TV; excluding cablecos

Competition: in addition, new competition from over-the-top players is materializing, notably in France on TV and VOD services

Voice	SMS /IM	Video calls	Video
Google	Google	Google	GoogleTV
Skype	Skype	Skype	Apple TV
Re Tel	Re Tel	FaceTime	Samsung TV
Jajah	Jajah	Tango	LoveFilm.com
Mo – Call	iMessage	Fring	Netflix
RAKETU	WhatsApp		
	Facebook		

Skype — Skype: 254 million active users in the world, 20% of calls globally and 33% of international calls

WhatsApp — WhatsApp: 5% of text messages in the world as of November 2011

Netflix — Netflix: 33% of US peak time traffic in 2011

OTT services may capture up to 7.5% of mobile revenue in Europe by 2015

Source: Exane BNP Paribas, Sandvine Intelligent Broadband Networks, press, Arthur D. Little analysis

The Economics of Telecoms Report (period 2006 to 2011)

1 The telecom sector is at the heart of society and economy

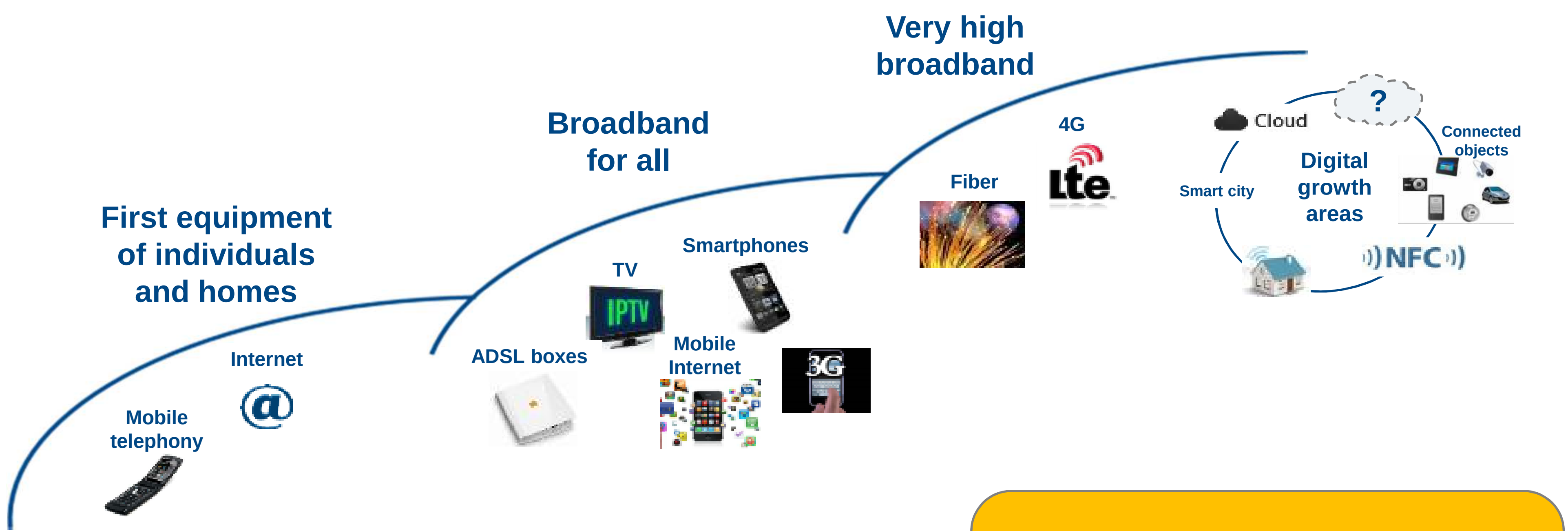
2 Telecoms are a major driver in the development of the digital sector

3 In France, the performance of telecom operators is declining due to regulatory, tax and competition pressure

4 An ambitious and consistent industrial policy is required for telecoms at French and European levels

An ambitious and consistent industrial policy for telecoms is needed in France and in Europe

Rebuilding an industrial policy is key to fostering investment and growth in the telecoms sector



Markets open for competition
License "beauty contests"
Tariff asymmetry
High MTR and roaming to finance network investment
Internet, Internet players not regulated

"Consumerist" approach (new licenses, lower MTR, roaming)
License auctions
Network unbundling
Net neutrality

What regulatory and tax framework to foster next-generation networks?

What industrial policy to grow very high broadband and new digital services?

1990 | 2000 | 2012

Source: Arthur D. Little analysis

So far initiatives to support the growth of the digital economy have remained patchy and heterogeneous

Initiatives in France

Government Digital Plan

- Very high broadband for all by 2022
- Development of digital services in education, health and government
- "Paris Capital Numérique", tech cluster with start-up companies, universities and investors

Government announcement on Oct 9, 2012 of measures in favor of employment and investment in telecoms

- Observation of investment in mobile networks
- Incentives for acceleration of 4G deployment
- Operators' commitments to France-based jobs in call centers
- Updating of rules for handset subsidies

Investments for the future: digital part

- Innovative digital services, usages and content
  - Digitization of scientific, education and cultural content
  - Cloud computing …
- Support for private investment in fiber
- Smart electricity networks

Initiatives in Europe

Digital Agenda for Europe

- Broadband target: **>30 Mbps for all and >100 Mbps for at least 50% of households by 2020**
- **Double public investment of Member States** to €11B in ICT R&D
- **Digital inclusion** (increase regular Internet use to 75% by 2015)
- **eGovernment:** 50% of citizens using it by 2015
- …

EU infrastructure funds: "Connecting Europe Facility" (European Commission proposal)

- €50B, of which €9.2B for telecoms

Europe 2020 project bond initiative

- Start of pilot phase with €230M for **strategic infrastructure investment**
- Target sectors: **communications**, transport, energy
- Expected private investment: up to **€4.6B** due to x15-20 multiplying effect

Source: French government, EU, Arthur D. Little analysis

3 priorities for France and Europe to invest and create jobs in the telecom sector

Priority #1	**Ensure and support continued investment in the telecom infrastructures of tomorrow**
Priority #2	**Ensure fair competition and negotiations between telecom operators and Internet players**
Priority #3	**Support the development of new digital growth areas around telecom operators**

Source: FFT

3 priorities for France and Europe: detailed actions to implement

1. Continued investment in networks

Regulatory framework balancing profitability, investment and competition

- EU support to investment in very high broadband networks
- End of termination rate asymmetry

Tax incentives for investment

- Public stimulation of demand through tax incentives to **very high broadband installation**

2. Fair tax and regulatory treatment

End of regulatory asymmetry

- Same regulatory treatment of telecom operators and OTT players to ensure fair competition

Tax relief

- Tax relief for industry-specific taxation and new rules for governance (TV tax, TST, private copying, …), restrictions on taxes on new services (VOD and catch-up TV,…), no new taxes such as CNM, eBook,…

Fair taxation

- **Same calculation base for OTT players and telcos** regarding industry-specific taxes
- Taxation of OTT players **in proportion with their actual business in France** (IS, TVA, CVAE, accis project, …)

Fair remuneration for usage of infrastructure for all players

3. New digital growth areas

Incentives to develop digital clusters around telcos and start-up companies

Exemplary usage of new technologies by public services (e.g. in NFC, eHealth and eEducation)

Continuation of **Crédit Impôt Recherche (tax relief based on R&D expenditures) for digital businesses**

Training programs for technicians and engineers and **communication campaigns to bolster attractiveness of digital jobs**

Source: FFT

"The Economics of Telecoms Report", 2012 edition: key conclusions

- **Telecoms are at the heart of society and the economy**
  - Demand and usage are growing strongly
  - Telecom operators are by far the first investors in private infrastructure in France (€6.6B per year), and have injected over €200B into the French economy since 2006
- **Telecoms are a major driver in the development of the digital sector**
  - Globally the digital ecosystem is growing strongly (+49% since 2006), but Europe is lagging (+7% since 2006)
  - Telecom operators generate the vast majority of investments, while it is the device and Internet players that capture more and more value
  - In France, telcos are the main contributors to revenue (64%), jobs (77%), taxes (88%) and investment (92%)
- **The performance of telecom operators is declining strongly due to regulatory, tax and competition pressure**
  - In France, revenue and margins have started to drop, and the trend is expected to continue
  - This drop in performance is due to a combination of regulation and taxation, as well as stronger competition
  - On mobile and fixed, French prices are now the lowest compared to large European countries and the US
- **To drive investment and growth in telecoms, it is key to rebuild an ambitious and consistent industrial policy in France and in Europe**
  - Priority #1: Ensure and support continued investment in the telecom infrastructures of tomorrow
  - Priority #2: Ensure fair competition and negotiations between telecom operators and Internet players
  - Priority #3: Support the development of new digital growth areas around telecom operators