

**New perspectives for the European Tele-
communication Industry - How to make the
lead balloon fly.**

**A strategic outline to benefit European so-
ciety and industry.**

**Georg Serentschy (Managing Partner at
Serentschy Advisory Services GmbH)**

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1. Introduction

At the advent of a new European Commission coming into office, policy makers and other stakeholders in Europe should be mindful of the cautionary tale presented by European telecommunications policies. The multi-year pursuit of a “*lowest-price-for-consumer*” policy, with an emphasis on “*maximising-the-number-of-competitors*”, has left Europe¹ and its citizens in many regions with lower quality networks in comparison to its global peers and a digital deficit instead of a digital dividend.

This document addresses **five crucial aspects of the European telecom environment** and the **relevant learnings for a new and revised policy**:

1. **The fact that the European telecoms sector lack investment incentives** in comparison to its global peers;
2. **The negative consequences for the entire European economy and society** following the decline of the telecom sector in Europe;
3. **The need to re-focus European regulators and competition authorities on Dynamic Efficiency Gains** that encompass additional investments and innovation, among other things, instead of sticking to static efficiency and the consequences regarding sector consolidation;
4. **The need to implement a paradigm shift towards a new regulatory regime in Europe**;
5. **The fact that current regulatory framework in Europe needs to change** after successfully delivering considerable consumer benefits;

¹ Except in some countries, like Sweden and others.

Sources: Georg Serentschy, “*The Virtuous Circle: New Regulations, Innovation and Investment – How to Bring Europe Back to the Top*”²; Arthur D. Little Analysis³; HSBC Global Research “Supercollider”⁴; Bernstein Analysis; Goldman Sachs Research, and others.

Acknowledgements: This article reflects my experience as a regulator in Austria, BEREC Chairman and Vice-Chairman as well as an independent consultant⁵. This text is based on parts of my book “*The Virtuous Circle: New Regulations, Innovation and Investment – How to Bring Europe Back to the Top*” and a contribution to it by Robin Bienenstock, (Bernstein Research), Arthur D. Little analysis and the HSBC study “Supercollider”. Most data points have been updated from recent Arthur D. Little studies. I’m very grateful to Andrea Faggiano and Richard Swinford (both Arthur D. Little) for their valuable inputs and discussions. Furthermore, I would like to thank Richard Feasey (Fronfraith Ltd.), Robin Bienenstock (Bernstein Research), Stephen Howard (HSBC Global Research), Rob van der Valk (NORGES fund), Paul Pisjak (RTR - Austria), Marc Lebourges (Orange), Brian Williamson (Plum Consulting), David Cantor (Lawyer) and Marc Furrer (ComCom – Switzerland) for inspiring and fruitful discussions. Special gratitude goes to Roberto Viola and Anthony Whelan (both European Commission – DG Connect) for valuable discussions.

² Download at: <http://www.serentschy.com/the-virtuous-circle/>

³ Arthur D. Little – Exane BNP Paribas Report: Capex – The Long March <http://www.adlittle.com/time-reports.html?&view=654> and „The Growth Value Tracker“ (Exhibit 21)

⁴ <https://www.research.hsbc.com/R/20/QwKEJlI5xmsz>

⁵ <http://www.serentschy.com/>

2. The current EU regulatory framework needs to change

Summary: Over the last two decades the European telecom regulatory regime based on service competition and the Ladder of Investment theory⁶ brought lower pricing and penetration but failed to provide sufficient incentives for further investments in next generation infrastructure (e.g. 4G mobile and fibre) and in creating long-term and sustainable welfare. This led to a whole range of negative social and economic effects for Europe.

The regulated companies of Europe that own and operate the vast majority of telecoms infrastructure have under-performed versus both a class of infrastructure-renting companies ('alternative operators'), fostered by the European regulatory regime, and a class of unregulated infrastructure owners (cable companies).

The creation of these new classes of companies can be said to have nominally increased competition, but to the detriment of investment and innovation. Change is now required.

➔ **The European regulatory regime has successfully reduced the prices of many consumer services** (wireless voice and broadband) and, hence, increased penetration and usage of those services (*Exhibits 1-3*).

➔ **But, this policy has resulted in relative under-investment in European telecoms infrastructure** as the infrastructure renters have not moved up the 'Ladder of Investment' - as promised by the proponents of this theory - i.e. the fact that, after a successful market entry, infrastructure renters would have invested significantly in their own competitive infrastructures.

➔ **The policy of favouring infrastructure renters over builders and owners needs to change** now that basic service uptake is ubiquitous but next generation service availability and quality lag other regions of the world.

Based on this, Europe is experiencing:

- Falling behind other regions on fibre and 4G roll-out, having lost the "GSM mobile lead";
- Continued decline in telecoms infrastructure quality relative to other countries;
- Continued job losses in the sector, both operators and vendors;
- Lack of the sort of internet technology expertise that better-equipped countries enjoy;

⁶ The "Ladder of Investment" concept (similar to the abandoned US "stepping stone"), which tries to combine static and dynamic efficiency, failed in many respect and did not deliver the expected results in many regions. <http://dash.harvard.edu/bitstream/handle/1/4777447/Dogan-Acriticalreview.pdf?sequence=1>

- Continued weakening of telecoms companies leading to the eventual closure or take-over of these companies by other companies, with consequent loss of European innovation potential, national capability and Intellectual Property Rights.

See *Exhibit 4*.

These outcomes have been negative not just for the European telecoms sector but also for the broader European economies and ultimately for citizens.

If, on the other hand, the regulatory regime can provide transparency, certainty, and the possibility of improving returns for infrastructure investors, the sector would see meaningful capital inflows, increased investment in infrastructure, and, hence, more jobs.

Further, this route would create more competition of infrastructure platforms and facility based competition, which would be more sustainable.

Exhibit 1

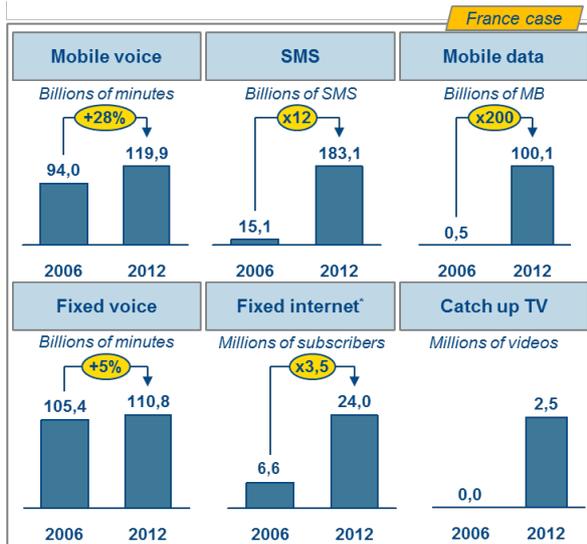
Europe-28 Telecom Indicators

Europe-28 telecom indicators (January 2014)	Type of product (by max speed)	EU average (coverage or penetration)	Min-max ranges (coverage or penetration)
Fixed broadband coverage*	Basic (ADSL)	97%	75%-100%
	NGA	62%	21%-100%
Fixed broadband penetration*	From 144kpbs	30%	19%-41%
	From 30 Mbps	6,3%	0,1%-23%
	From 100 Mbps	1,6%	0%-10%
Mobile broadband coverage*	3G/HSPA	97%	86%-100%
	4G/LTE	59%	0%-99%
Mobile broadband penetration*		61%	25%-124%

Source: European Commission, Arthur D. Little analysis. Note (*): over population

Exhibit 2

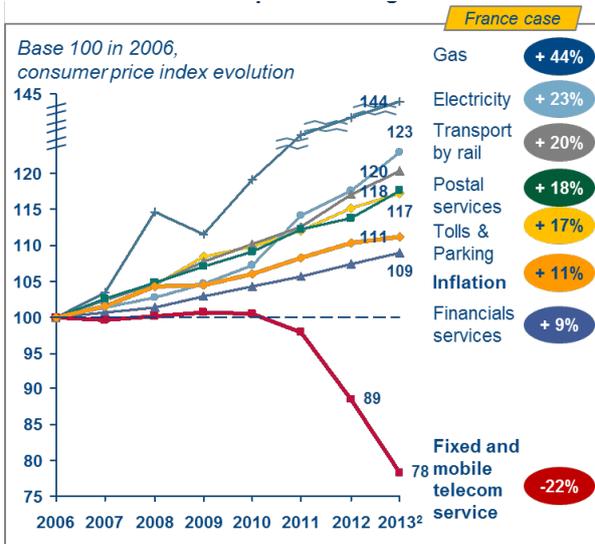
Usages of telecommunication services are soaring



Source: INSEE, ARCEP, CNC, Arthur D. Little analysis

Exhibit 3

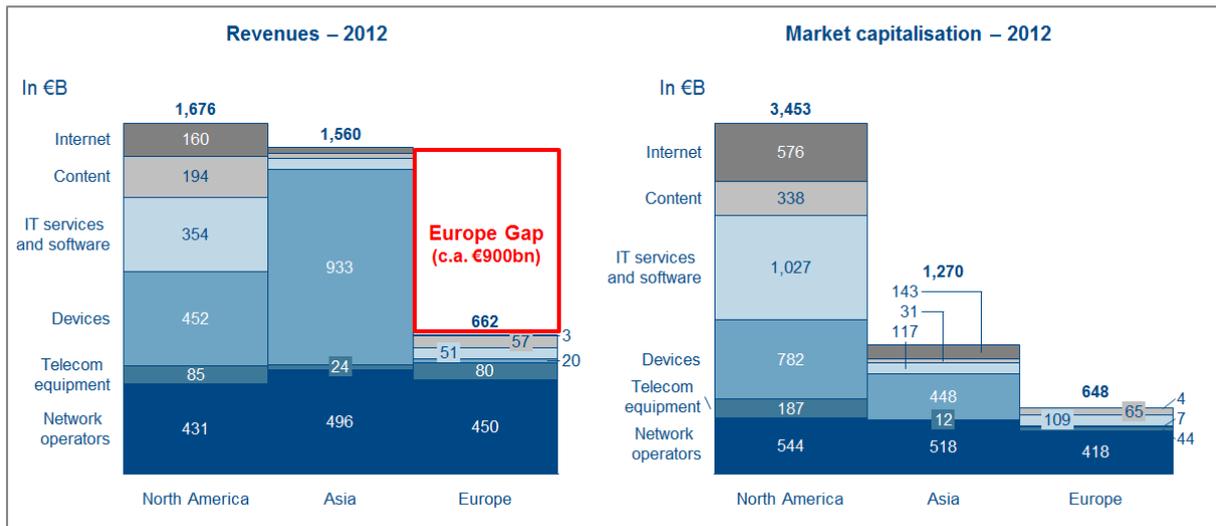
Prices are falling down



(1) All internet access with a minimal speed of 0,128Mb/s
 (2) Average on H1 2013

Exhibit 4

European digital space now cumulates an important gap vs other geographies⁷



Source: Thomson Reuters, Arthur D. Little analysis

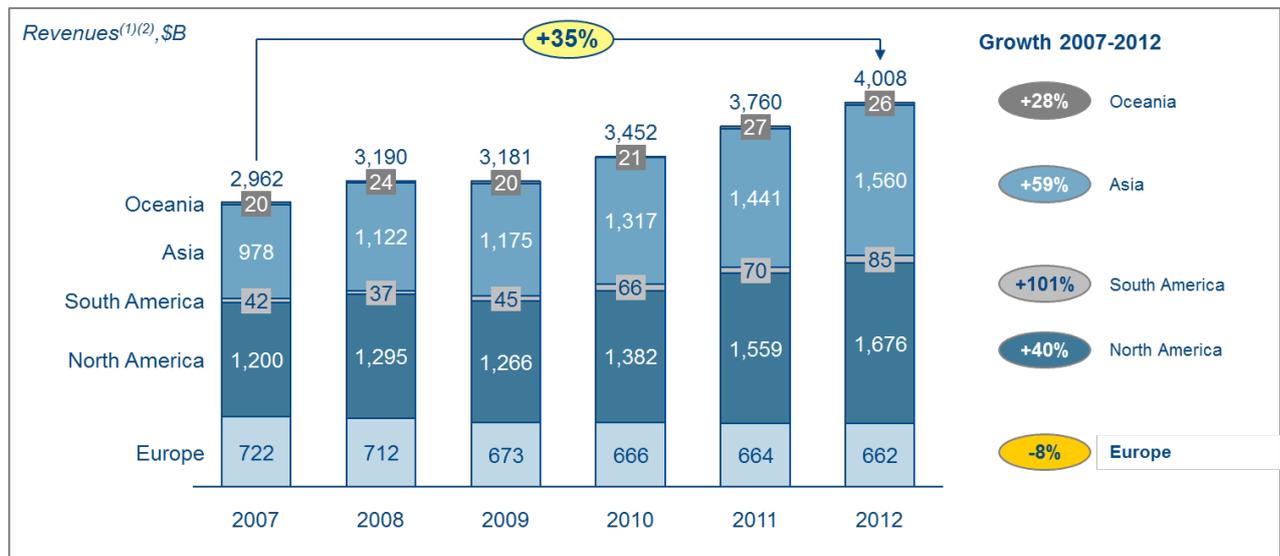
(1) Top 30 players by 2012 revenues in each category, geographic breakdown according to headquarters location

⁷ „North-America“ includes Canada and the US, if not otherwise mentioned.

3. The lack of investment incentives in comparison to the North American situation

Summary: Europe's telecoms industry - and its entire digital ecosystem - is suffering: growth is strong in all parts of the developed world except Europe (Exhibit 5), profits have declined, balance sheets deteriorated, and dividends have been cut (Exhibits 6 & 7). As a consequence, European telecom sector lacks proper investment incentives.

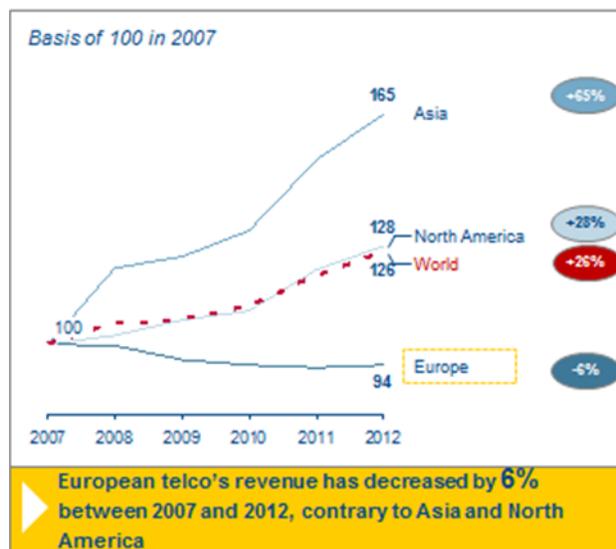
Exhibit 5
Growth is strong in all parts of the world except Europe



Source: Thomson Reuters, Arthur D. Little analysis

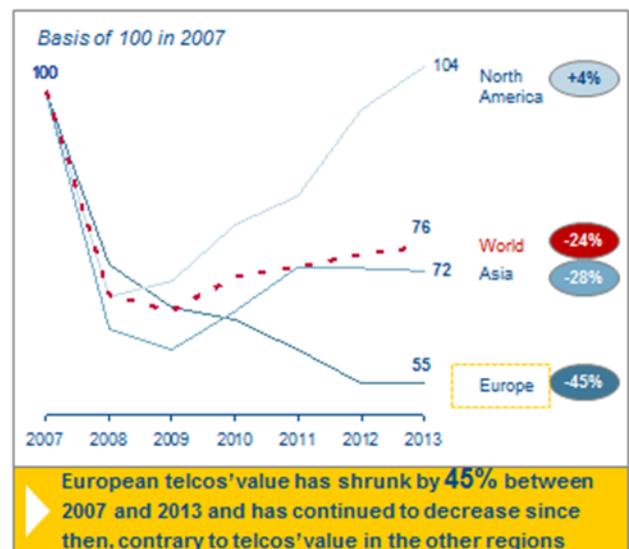
(1) Top 30 per category by 2012 revenues
(2) Nationality according to HQ location

Exhibit 6
European telecom operators' revenues have declined



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

Exhibit 7
Europe telecom market capitalization dropped drastically

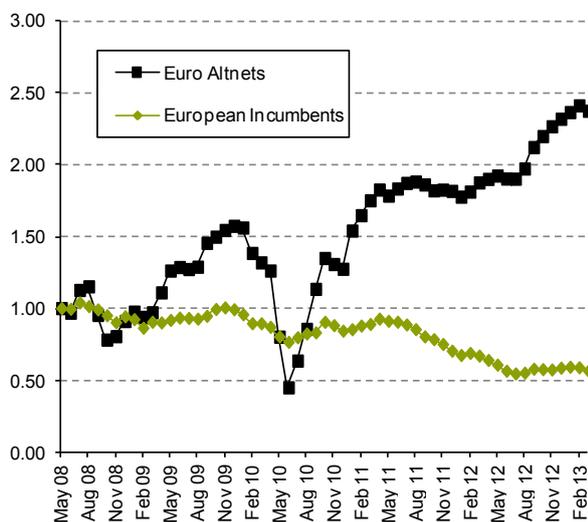


1) In top 30 global operators, nationality according to HQ location, June 2013

The main driver of telecom sector weakness in Europe is the relatively poor performance of the largest incumbent companies, which have suffered from significant declines in profit and Earnings Before Interest, Depreciation and Amortisation (EBITDA). *Exhibit 8* shows the change in Earnings per Share (EPS) of the domestic businesses of the major European incumbents versus infrastructure renters and cable companies. *Exhibit 9* shows the change in EBITDA share price multiples of those companies. Together, these figures show that the market is not punishing European incumbents for making less money by reducing what they are willing to pay per Euro of profit, but rather that these companies are becoming significantly less profitable.

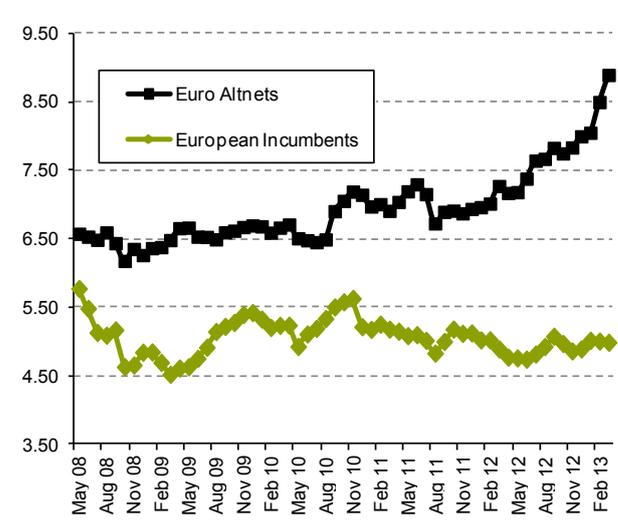
On the other hand, the market does reward the alternative operators for their growth with a higher multiple per Euro of profit (multiple expansion).

Exhibit 8
EPS growth at Altnets/cable has outpaced incumbents



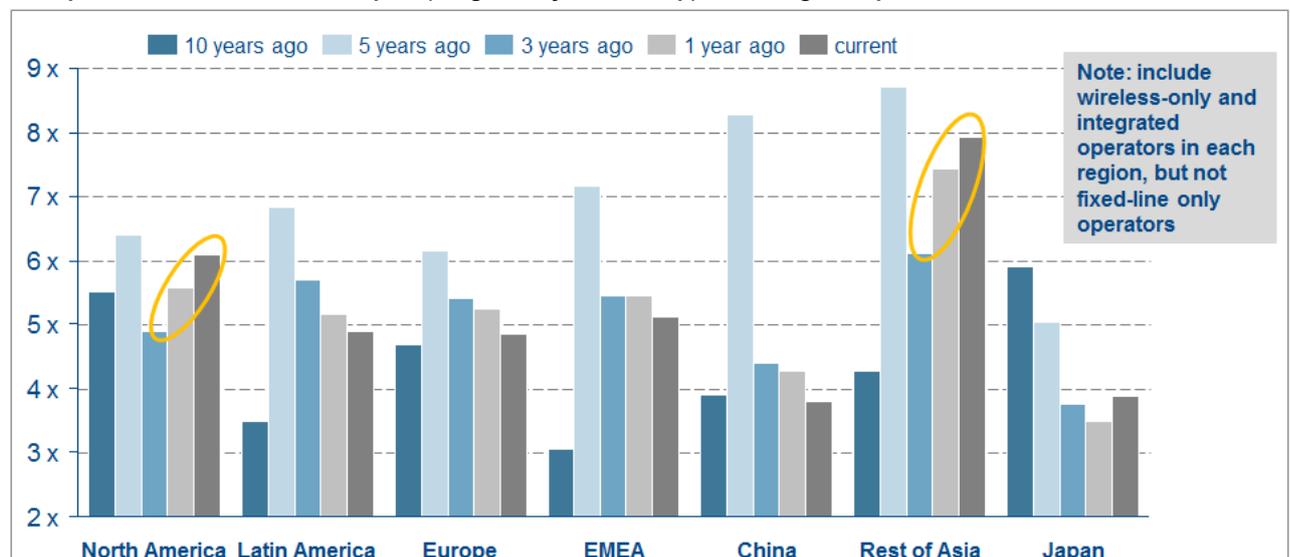
Sources: Factset estimates, Bernstein analysis and estimates

Exhibit 9
EBITDA multiples have diverged



Sources: Factset estimates, Bernstein analysis and estimates

Exhibit 10
Enterprise Value vs EBITDA multiples (weighted by market cap) are falling, except in Asia & the US

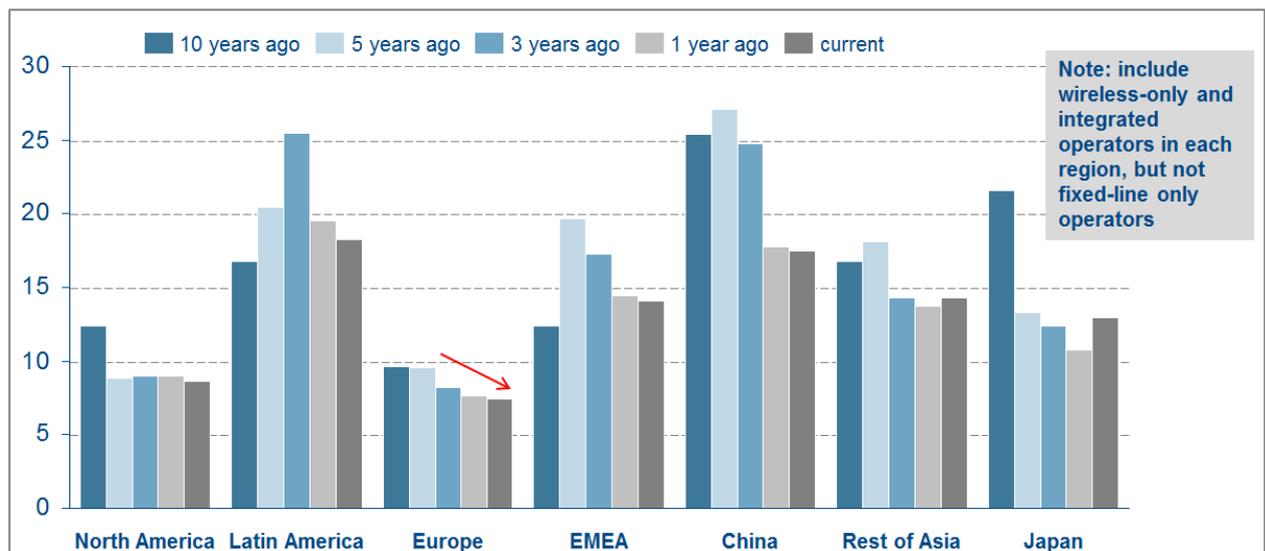


Source: Goldman Sachs Research, Arthur D. Little analysis

Investors award higher multiples only against growth and higher returns on invested capital (*Exhibit 10*). Ultimately, share prices reflect a company or sector's ability to earn returns above their cost of capital.

As we see in *Exhibit 11*, profits from telecoms are strongly under pressure (diminished) in Europe and European companies risk to hardly cover their Weighted Average Cost of Capital (WACC). Actually, profits below 8% / 10% would not properly remunerate invested capital because such profit level would turn insufficient to cover cost of debts and cost of business risks.

Exhibit 11
Cash returns on cash invested (weight by market cap.) are strongly under pressure in Europe



Source: Goldman Sachs Research, Arthur D. Little analysis

As consequence, there is little room and willingness to invest and innovate, unless competition strictly dictates it. As matter of fact, European telecom companies tend to be risk-averse, stretch useful life of their network equipment and assets and delay innovation whose monetization is uncertain or still embryonic (such as 4G or fibre).

The reduced market attractiveness for investors coincides with a decline in relative infrastructure investments

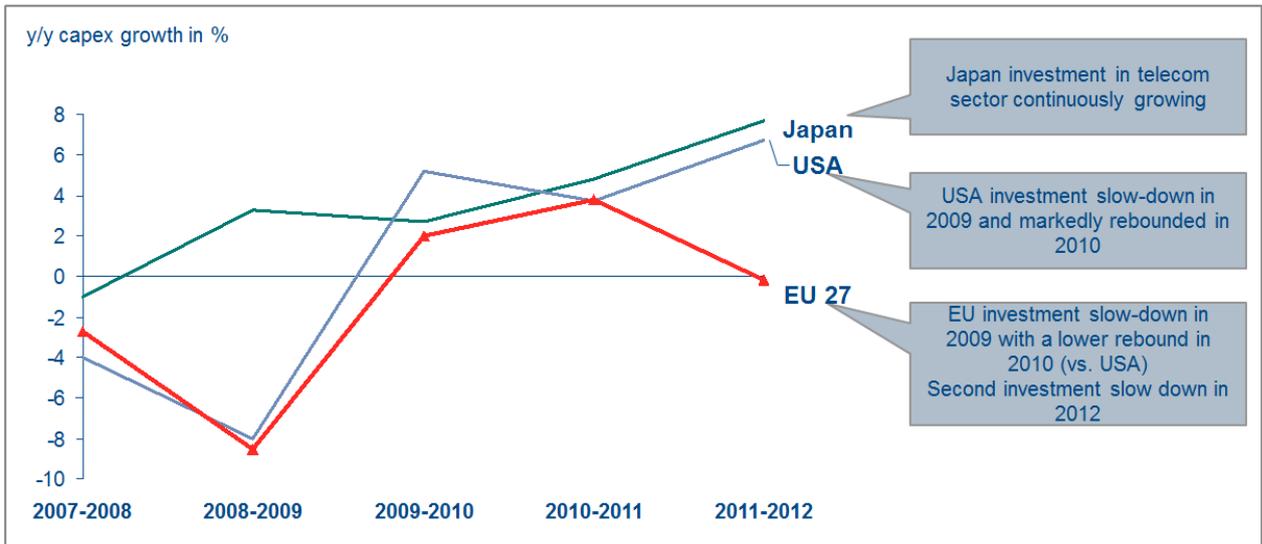
During a period of astonishing technology change and an extraordinary boom in the consumption of telecoms bandwidth by consumers and businesses, most countries have invested more in their infrastructure to keep up. European telecoms companies have invested less on average (just 18% of revenues versus a global average of 21%) and have not increased their spending on new technologies and upkeep (see *Exhibit 12*).

- In the last decade, we have seen widespread introduction of new 3G and 4G wireless standards, new wire-line signalling standards, and techniques for increasing broadband speed over legacy fixed telecom access technologies like DOCSIS 3.1 for cable networks and phantom, vectoring, and, more recently, G.Fast for copper networks.

- Cisco estimates that the amount of data flowing across telecommunications networks has risen ~100 times in Europe in the last decade. They forecast IP traffic will grow at a Compound Average Growth Rate, CAGR, of 18% over the next five years and mobile traffic 66% over the same period.

Exhibit 12

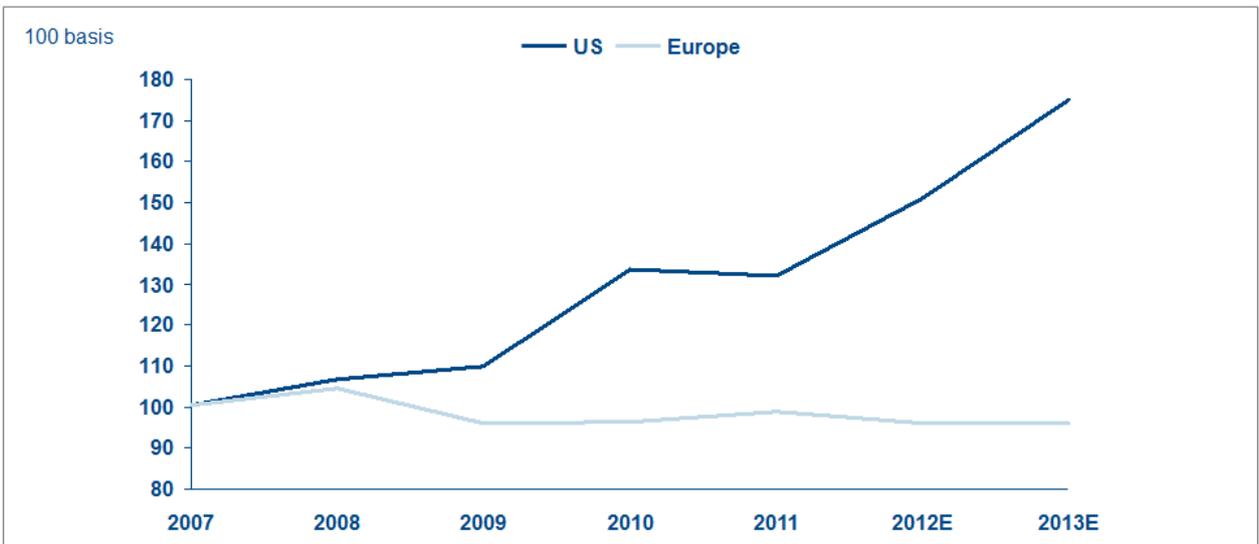
Europe telecoms capital expenditure have been flat-to-down over the last decade, while all other regions have increased their spending



Source: iDate/ETNO, Arthur D. Little, Exane BNP Paribas estimates

Exhibit 13

Europe has lower capital expenditures (CAPEX) than US in wireless sector

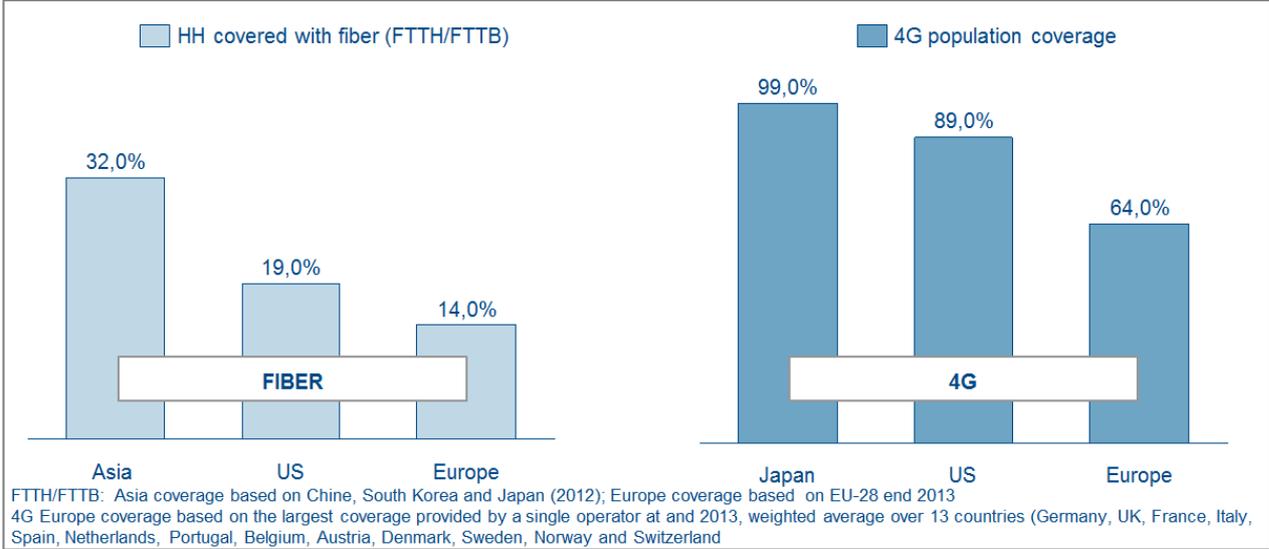


Source: Goldman Sachs, Arthur D. Little analysis

The underinvestment in wireless infrastructure in Europe is particularly stark when compared to the US over the past several years (*Exhibit 13*).

The result is that the quality of European infrastructure has fallen behind that of peers (*Exhibit 14*). There appear to be no coherent plans for Europe to catch up soon, with only meagre fibre plans in most countries (mainly FTTH) solutions as in the UK, Germany, Italy or Belgium), and very modest plans for 4G overall. A telling example is, Vodafone, Europe’s largest mobile operator, which plans to cover just 40% of Europe with 4G services by the end of 2015.

Exhibit 14
Gap in Europe ultra-broadband infrastructures vs other geographies



Source: IDate, Arthur D. Little, Exane BNP Paribas estimates

At the current stage, it can be argued that smarter regulation - including relief from remedies such as cost-orientation (especially for next generation networks)⁸, invasive *ex-ante* price squeeze procedures, further reduction of mobile and fixed wholesale prices or even mandatory obligations in favour of MVNOs - is critical to increasing investments and improving the returns of European telecoms incumbents. In turn, these companies would deliver lower unit broadband prices overall, whether broadband or mobile, and for faster speeds in particular, as well as deeper, faster infrastructure builds and lower government subsidy requirements, because the savings stemming from increased scale can be used by the MNOs for more built-out which drives usage and finally leads to higher overall consumption and lower unit prices. The combination of stronger, more valuable companies with lower unit prices for consumers (“more value for money”) and better infrastructure should ultimately work for regulators, consumers, companies, and investors.

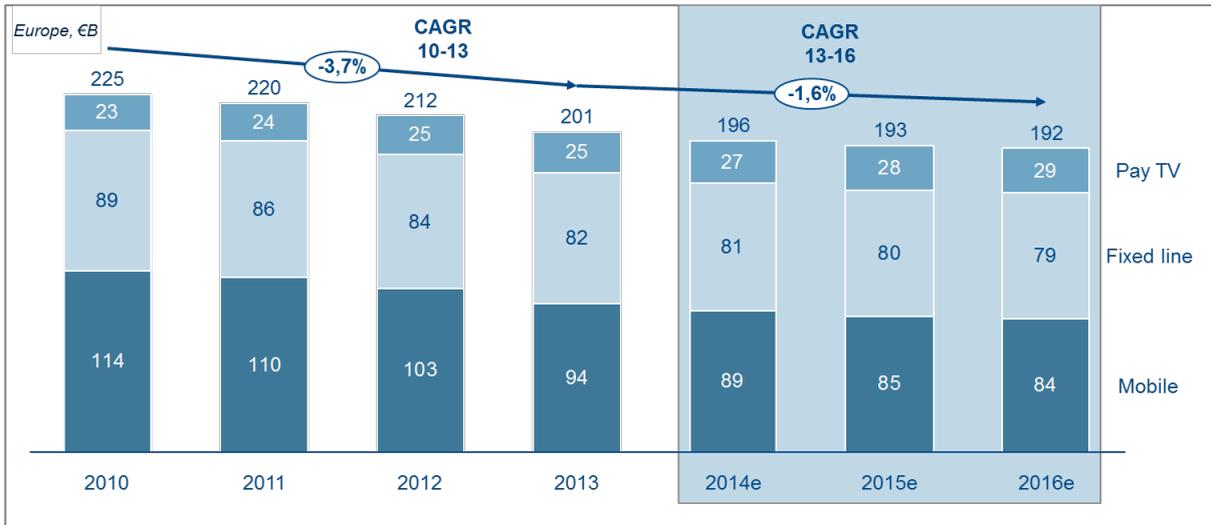
⁸ The EC “Recommendation on non-discrimination and costing methodologies” provides some relief in this sense.

The creation of new, artificially low-cost entrants is only a short-term gain

European wireless policies (in particular, spectrum and termination rates) have focussed on the creation of excess platform competition by favouring the conditions for low-cost entry, which has encouraged the proliferation of infrastructure renters (in this case, mobile virtual network operators - MVNOs). Fragmented spectrum policy has allowed countries to use auctions to create new wireless competitors at an artificially low-cost while extracting repeated rents from mobile network operators (MNOs) - through reductions in termination rates, ring-fencing spectrum for new entrants, and obligations regarding convenient mobile wholesale price and/or spectrum divestitures. As a result, most European operators make returns below their cost of capital and can hardly justify further investments. The consequence has been many relatively poor-quality networks deployed in parallel with duplication of basic infrastructure.

Arthur D. Little and Exane in their 2014 annual report (Exhibits 15 – 17) estimate that few European wireless operators make their cost of capital in their core European markets and pursue a network diversification strategy aimed to shift competition from price to quality, although there is very limited evidence that such strategy will pay off in the current market context. The unattractiveness of European wireless relative to the US is driven by declining revenues and ARPUs coupled with increasing volumes and costs (e.g. churn and subscriber acquisition costs). However, it has to be noted, that in markets with SIM-penetration far beyond 100%, ARPU (which is based on the number of SIMs) should be replaced by “Average Revenue per Capita”.

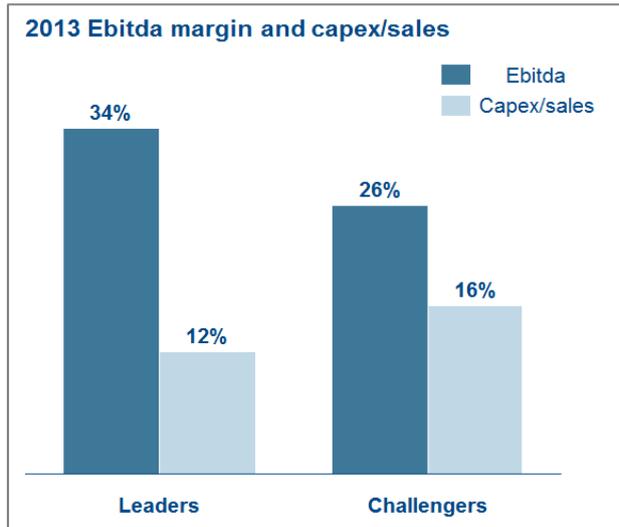
Exhibit 15
Going forward, the telecom sector revenues are expected to keep decreasing in Europe



Source: Arthur D. Little, Exane BNP Paribas
 Note: Countries covered: Germany, France, UK, Italy, Spain, Netherlands, Belgium, Portugal

Exhibit 16

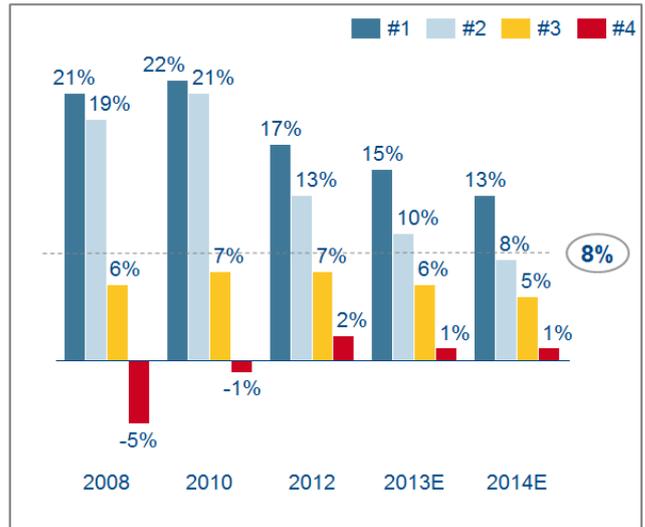
Challengers have lower EBITDA and higher Capex/Sales, i.e. lower room to invest and innovate



Source: Arthur D. Little, Exane BNP Paribas estimates

Exhibit 17

Third and fourth operators show returns below cost of capital as shown by average mobile ROCE in EU



The single biggest factor in what appears to be artificially created new competition is the selective allocation of spectrum or post consolidation remedies that through spectrum divestiture or strong wholesale obligations in favor of MVNOs artificially change the competitive scenario that initial spectrum auction strategy relied on.

Wireless networks consist of two simple elements – a network of infrastructure and the radio spectrum across which signals are sent. The ambiguity of spectrum ownership rules, the fluctuation of auction rules, and the use of adaptations of rollout obligations that change the competitive balance of a market (rather than selling on a competitive basis) reinforce the view that the returns of telecoms companies are more greatly influenced by the ideas of some regulators (and their governments behind the curtain) rather than by fair competition. This has been exacerbated by many cost calculations used in regulation that exclude the cost of spectrum from the cost of providing wireless. It seems like telecoms companies are caught in 'double jeopardy': they must buy high-priced spectrum and then have the fact of the value of the spectrum diminished by changes to the rules. This means, that regulators should keep more coherence between highly competitive spectrum auctions that drain very significant financial resources and successive change in rules that may artificially make such resources available to renters to prices below market level. However, the only effective way to overcome such practices would be a more harmonized spectrum awarding policy in Europe.

It also appears that the 'Ladder of Investment'⁹ for companies given access to cheap spectrum has not worked particularly well. If we look at companies that were given 'new entrant spectrum set asides', we find that they have generally built fewer base stations and less in-

⁹ <http://dash.harvard.edu/bitstream/handle/1/4777447/Dogan-Acriticalreview.pdf?sequence=1>

infrastructure than their incumbent competitors. These 'wireless light' companies have driven the cost of poor-quality wireless services down but have not driven an increase in wireless investment overall.

In conclusion, a key way to generate more investment in wireless infrastructure is to create enough stability and predictability of the regulatory regime such that operators can make a compelling case of their return on investment. This stability and predictability must, of course, be coupled with a policy framework that encourages investment by focusing on facilities-based, not service-based, competition. As it usually takes 8-10 years to make a return on telecoms infrastructure investments, regulators need to provide a long-term visibility on returns of investment. Given Europe's poor track record, this will require hard rules rather than vague promises. This leads to the third change required to make European telecoms more investable.

The regulatory processes of Europe are fragmented, ambiguous and short-lived.

This combination creates such uncertainty that rational investors must apply a high discount to any investment plan. Certainty will create a much better environment for investment. The European incumbent telecoms companies trade at a 45% discount to large regulated companies such as US utilities to account for the very high level of regulatory uncertainty and other frailties in the regulatory framework.

Regulation also means cost of compliance to operators and, today, investors must wade through many layers of decision making (EU-DG Connect, EU-DG Competition, BEREC, NRAs and national anti-trust authorities, across many jurisdictions) to understand how a particular regulation impacts a company in which they want to invest. EU recommendations ("soft law") are powerful but – strictly spoken - not legally binding¹⁰, and the language of recommendations is often ambiguous and leaves room for very wide interpretation¹¹. Unbundling fees, for example, which in theory are based on the same methodology across Europe, result in very different prices country by country, not just because those countries are different, but also because different regulators (NRAs) make different assumptions about inputs. Furthermore, those inputs and assumptions can change as the interests of regulators do or as the head of a unit changes.

In short, the regulatory process does not deliver clarity or certainty but a variety of different interpretations. Given that different interpretations of the same rules can result in a positive or negative return on investment, this problem, combined with a history of highly disruptive

¹⁰ A national regulator (NRA) not following the recommendation is required to justify strongly its case and may face an uphill battle before an appeal court.

¹¹ The process of finding a European compromise often causes this ambiguity.

price focus, much chopping and changing of rules, and a central emphasis on service-based competition, is one of the largest impediments to investment in Europe.

4. The negative consequences for the entire economy following the decline of the telecom sector in Europe

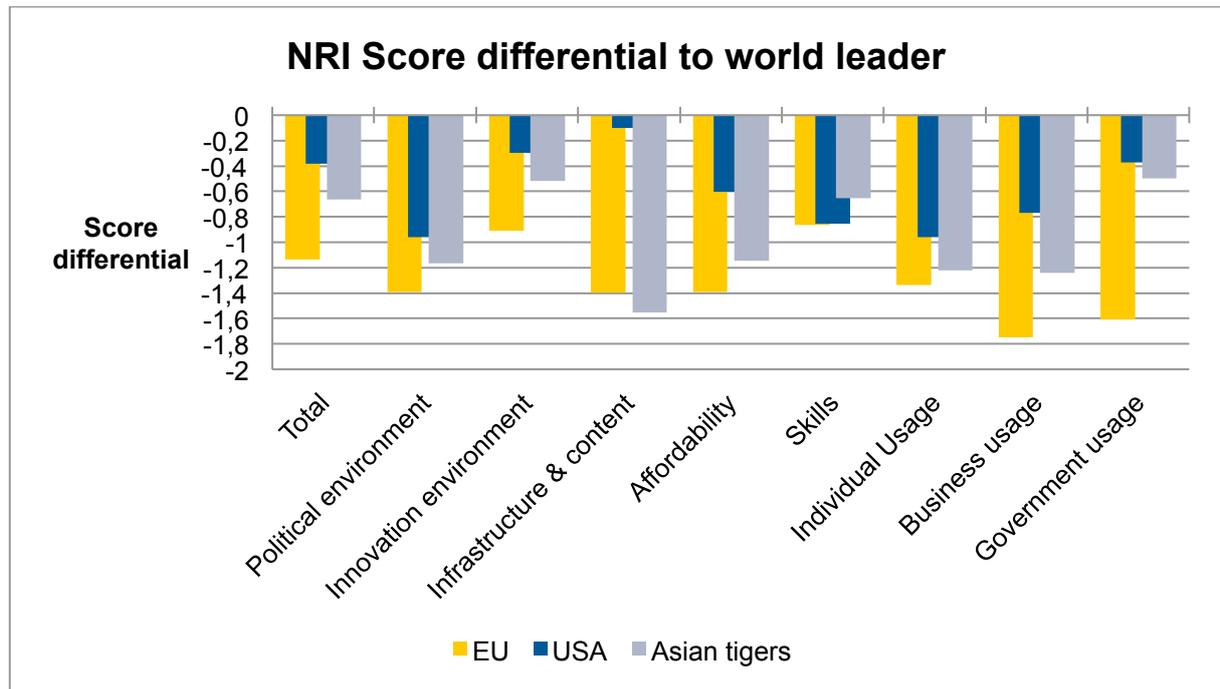
Summary: Considering the developments in the telecommunications sector outlined above and the challenges that emerge for regulators, policymakers, investors, and (regulated) companies, it seems to be wise to rethink relevant parts of the European policy framework in place. The current controversial debate amongst the Member States on the creation of a “Telecommunication Single Market (TSM)” in Europe shows that such a move cannot be done as a quick fix, even if the political goal per se seems to be widely undisputed; a profound overhaul of the European regulatory system is required in order to bring Europe back to the top.

In the ICT world, recent developments do not speak in favour of the European continent. North America and parts of Asia are currently in the lead in many areas of ICT. Taking the Networked Readiness Index into account (see *Exhibit 18*, which provides a score differential of main regions against the respective world leader) as a measure for the prosperity of ICT, the EU-28 are currently significantly behind the US and leading Asian countries (World Economic Forum 2012). Whereas the US is very close to world leaders in many areas, in Europe, only Sweden, Denmark and Finland are amongst the top performers.¹²

¹² Sweden is leading in the total NRI, as well as in four more sub-indices (infrastructure & content, individual usage, business usage, economic impact (not in graph)). Singapore leads in political environment and innovation environment. Korea is the leader in government usage and social impact; India is top in affordability; and Finland is the leader in the skills-index.

Exhibit 18

According to the Networked Readiness Index with an ascending scale from 1 to 7, Europe is lagging behind in almost all telecoms-related areas against US and Asian tigers (Hong Kong, Singapore, S. Korea, Taiwan, China)



Source: Calculations based on World Economic Forum figures (2012).

As shown in *Exhibit 5*, Arthur D. Little found out that the digital ecosystem in Europe shrank 8% in terms of revenues, while at the same time it grew elsewhere between 28% and 67% (in North and South America, respectively).

This investigation also shows that in 2011 European revenues in the areas of Internet, content, IT services & software and devices lagged far behind Asia and North America. For instance, European firms' devices revenue was € 33 billion, compared to € 345 billion for US-based companies and € 908 billion for Asian.

Other studies have shown that the impact of ICT on economic growth is much lower in most European countries than in the US. OECD (2011a) concludes that technology acceleration and, particularly, ICT, explains the differential between US and EU productivity growth from 1995 onward. Hence, ICT is the area that will determine future economic and social development in Europe and the entire region's position in the global economy.

At present, Europe is losing ground in the ICT sector in:

- **Infrastructure roll-out:** Ericsson Mobility Report, June 2014 update demonstrates, that in countries such as Japan or South Korea, NGA networks already serve a majority of the population and 85% of North American mobile subscriptions will be LTE by 2019, most European countries are at least several years behind in these developments which

is to the detriment of the entire economy and society. Positive examples in some of the smaller nations of Europe, such as Lithuania, with almost full FTTx coverage, and Sweden, with 93% LTE population coverage by 2012, cannot discount shortages in most Member States.¹³ Investors complain about adverse regulatory conditions in Europe, i.e. lack of sufficient returns and long-term stability for investments, and therefore focus on activities outside the region.¹⁴

- **Innovation potential:** Both in service and devices, the US and some Asian countries are leading in technological developments. Be it Apple, with their recently announced iWatch; Samsung, with significant software improvements in the smart phone and tablet world; or Google, with their i-Glasses; Europe as a whole does not seem to offer the right environment for outstanding technological and procedural development. Moreover, highly developed tech-clusters in the US make it very hard for Europe to catch up. While some important companies or innovations have been born in the EU (such as Nokia or Skype), they went or were sold to the US at a later stage or even went through tough layoffs programs.
- **Service Providers and Start-ups:** Like What's App or services from Google and Apple, most successful service providers today are US-based. Often European start-ups want to sell to the US or base their activities in the first place in Silicon Valley or New York. Examples like Skype or Jajah demonstrate clearly this drain out of Europe. European-based services such as Spotify face strong headwinds because of unnecessarily complicated regulations (such as specifics in copyright law, which is overly fragmented in Europe).

As a result of these issues, financial capital, human capital, and ideas that might initially have emerged in Europe come upon more conducive conditions in the US or Asia. Within Europe, only Scandinavia remains amongst the most innovative regions in the world. However, the recent development of Nokia shows that such advantage in very innovative industries may be lost in the blink of an eye. Europe needs to preserve a technical advantage where it still exists and re-establish it where it has been lost to other regions of the world.

¹³ Telegeography.com (2013) – “53% covered by 100Mbps-plus broadband; take-up rate 27%.

¹⁴ A hot topic in this regard is the dedication of spectrum for mobile networks. While in the US, licences for mobile spectrum are granted at high prices for an “unlimited” time, European spectrum is usually re-auctioned in shorter periods. While an “eternal” dedication of spectrum on the one hand ensures predictability for investment, it restricts on the other hand the flexibility to adjust to new market developments, new technologies, mergers, etc. Whether the whole effect of such a measure was positive would require a more detailed analysis, which also needs to take into account legal and institutional aspects.

5. The Role of Dynamic Efficiency Gains and sector consolidation

Summary: Recent cases (for example the merger between Orange and Hutchison in Austria) demonstrated that, if operators were to be convincing on the benefits of consolidation, they would need to demonstrate the associated dynamic efficiency gains from investment¹⁵. In the past, static effects (such as the number of competitors in a market) have tended to receive more regulatory focus, but it has to be emphasised that only network investment can harness the full benefits of technological innovation. This section is aiming at demonstrating that dynamic efficiency gains (specifically, CAPEX) are primarily responsible for powering unit price declines, and that healthy margins are required to support the CAPEX involved.

Despite recent small advances¹⁶, European telecommunications regulation is still focussed on promoting static efficiency. In particular the **most recent mobile merger cases** in Austria, Ireland and Germany showed that **competition watchdogs strongly base their decisions on static efficiency considerations**. Low prices for consumers are widely seen as the single ultimate goal. However, a few drawbacks result from this approach. The main downside is that firms – especially incumbents – can hardly earn the profits needed for broad investment in new infrastructure. The entrants, on the other hand, have few incentives to invest in their own infrastructure, because they can easily access the incumbents' networks (option value). Sector consolidation – within certain limits - would produce a healthier European industry able to invest more to provide European citizens with better value-for-money services.

The "Ladder of Investment" concept, which tries to combine static and dynamic efficiency, failed in many respects. Due to insufficient economies of scale and the lack of investment incentives, entrants have no motivation to step up the ladder from resellers or service providers based on bit-stream to local loop/sub-loop unbundlers or infrastructure providers in many regions (Examples are a great deal of re-sellers or "unbundlers" in Austria which prefer to stay in the "comfort zone" of the lowest access price in EU). Particularly with regard to the last rung of the ladder, where entrants were expected to invest in their own local loop or sub-loop infrastructure, the "Ladder of Investment" concept¹⁷ did not deliver the expected results in many regions. Additionally, as outlined, new technological developments in copper networks, such as vectoring, will render local copper loop unbundling infeasible. Entrants might

¹⁵ Dynamic Efficiency Gain means (very simplistic) that the cost benefit from the merger is invested in CAPEX for the network instead of spending it in the form of lower consumer prices

¹⁶ Such as the EC Recommendation on Cost-Accounting and Non-Discrimination

¹⁷ It is worth noting that the concept of the "Ladder of Investment" was instrumental for opening the market. However, it became obsolete and even counter-productive when it comes to fostering investments in new infrastructure.

in these cases step back on the ladder and return to bit-stream or newly created services such as 'virtual unbundling' (a kind of enhanced bit-stream). In contrast to the EU, the US has abandoned their "stepping stone" hypothesis, which is similar to the European "Ladder of Investment."

One needs to realise that the ultimate goal of regulation – to favour end-users – depends not only on prices, but also on more-value-for-money, higher quality in the long term, sustainable welfare and, thus, on investment. Therefore, the focus of regulation has to shift from static efficiency towards a more dynamic approach, which should also be reflected in the toolbox at hand. A step in this direction would also be to concentrate on facility-based competition, as described below.

HSBC's Global Research published a **profound econometric study ("Supercollider")**¹⁸ in February 2014, highlighting the role of **Dynamic Efficiency Gains** in detail. HSBC's Global Research outlined that sector consolidation – to a certain extent - would produce a healthier European industry able to invest more to provide European citizens with better value-for-money services. At present Europe is lagging globally in this regard. *"Admittedly, American mobile bills are higher, but our analysis shows US unit prices are cheaper. Moreover, it is already clear that Europe is of diminished priority to handset vendors, while the region's fragmented operators lack much bargaining power with which to respond: hence Apple and Samsung look likely to take a disproportionate share of the value chain."*

International parallels could become all the more striking if US or other global players make substantial acquisitions in Europe (although operators like America Movil and Hutchison are, of course, already present). Meanwhile, note that AT&T's denial of an interest in Vodafone would not preclude it from making a friendly bid (always its most likely mode of approach, in our view). The activity from international players suggests that consolidation is probable in any case – the only question being whether European operators will be permitted to participate. If concentration concerns entail remedies that deter would-be European dealmakers, then the field would be left by default to their global peers."

"We believe it should be clear from the 'Austrian case' (recent merger Hutchison – Orange) that, if operators are to be convincing on the benefits of consolidation, they will need to demonstrate the associated dynamic efficiency gains from investment. In the past, static effects (such as competition) have tended to receive more regulatory focus, but we would emphasise that only network investment can harness the full benefits of technological innovation (making it all the more unfortunate that Europe is falling behind its global peers in terms of CAPEX). In this report we therefore seek to demonstrate that dynamic efficiency gains (spe-

¹⁸ <https://www.research.hsbc.com/R/20/QwKEJlI5xmsz>

cifically, CAPEX) are primarily responsible for powering unit price declines, and that healthy margins are required to support the CAPEX involved".

6. The need to implement a paradigm shift towards a new regulatory regime in Europe.

Summary: This section outlines a proposal for a future design of regulatory policies in Europe, “*Regulation 2.0*”, which should help build the framework for the virtuous circle outlined in the book “*The Virtuous Circle: New Regulations, Innovation and Investment – How to Bring Europe Back to the Top*”.¹⁹

The goal is to find new approaches that improve investment activities and provide more flexibility while maintaining and even fostering competition. “Regulation 2.0”, therefore, is a more dynamic regulatory framework based on:

- Creating a more flexible environment for regulation and the sector;
- Promoting an integrated telecommunication (e-communication) market;
- Granting network access and designing sustainable and clear-cut net neutrality rules;
- Strengthening of a central European regulatory system and shifting the focus of national regulators to new challenges (such as quality monitoring);
- Establishing dynamic efficiency and facility-based competition as the centrepieces of regulatory policies;
- Strengthening technological neutrality as a basic principle.

Concrete challenges for regulation

Dynamic efficiency should become increasingly important. Despite recent small advances,²⁰ European telecommunications regulation and competition policy is still focussed on promoting static efficiency²¹.

Today, it seems necessary that competitors have a less deep but broader footprint when customers’ demand moves toward quadruple-play offers and one-stop-shopping for electronic services.

As noted, the ultimate goal of regulation – to favour end-users – depends not only on prices, but also on higher quality in the long term and, thus, on investment. A step in this direction would also be to concentrate on facility-based competition, as described below.

Setting the focus on facility-based competition. Mobile operators have increasingly competed with fixed-line services; cable companies, which concentrate more and more on digital-

¹⁹ Download at: <http://www.serentschy.com/the-virtuous-circle/>

²⁰ Such as the EC Recommendation on non-discrimination and costing methodologies

²¹ See recent mobile four-to-three merger cases in Austria, Ireland and Germany.

isation and the provision of high-speed broadband, have become the most significant competitive force in telecommunications markets in recent years.²² Especially when it comes to high-speed broadband services, the current implementation of LTE and full adoption of DOCSIS 3.0 in cable networks as well as new developments such as LTE advanced, 5G and DOCSIS 3.x, will further increase the competitive pressure from mobile and cable networks.

On the other hand, alternative network operators using incumbents' legacy networks through regulated access have been able (or willing) only to a limited extent to deploy their own infrastructure to the end-user and therefore to climb the "Ladder of Investment" to the top. To **achieve the goal of sustainable effective competition**, the **focus of every regulatory policy** should therefore clearly be broadened and **shifted from a re-selling model to a facility-based approach**.²³ As a consequence, **access seekers shall be reminded, that their business models** – without investing significantly in their own (physical) networks - will become less and less attractive over time because **regulatory protection** of these models **will be phased out** sooner or later. Furthermore, competitive forces stemming from developments in the mobile and cable industries should be promoted and considered in market analyses. It has to be borne in mind that regulatory measures for legacy networks might also have effects on other infrastructures. For example, lower copper-access charges²⁴ might reduce incentives to invest in cable or mobile broadband, because of a lower overall level of broadband prices. Similarly, stricter non-discrimination rules for access to the incumbent's infrastructure might accelerate (regulated) access-based competition (while facility-based competition is the actual competitive force) and, therefore, unnecessarily increase the regulatory burden.

In this regard, it should be highlighted that, today, regulation often seems to focus too much on details ("regulatory micro-management") and at the same time obstructing the view at the big picture. There are many telling examples for regulatory micro-management, such as on ensuring consistency between different access products in the value chain, or on how costs should be calculated, etc. This creates insecurity and high regulatory costs because of high complexity. Rather, regulatory policy should develop further sound fundamentals of facility-based competition.

²² According to Cable Europe (2012), already in 2013, one out of two European households has access to a 100+Mbps cable broadband connection.

²³ However, **in specific areas, the full range of access regulation will remain important**, for example, for transnational business service providers and their customers.

²⁴ In October 2011 the European Commission proposed a massive lowering of copper access price to foster fibre rollout. <https://www.etno.eu/datas/publications/studies/plumreport-costing-dec2011.pdf> This proposal has been abandoned mid-2012.

The recent developments for a smarter regulatory regime in Europe

Heated discussions about regulatory policies in Europe and the debate about the “paradigm shift” in regulatory regime have been already announced for wholesale fixed telecoms and are under way in the mobile sector.

On the **fixed side**, one outcome of this paradigm change, which included a deviation from former plans to artificially lower wholesale copper network prices, was planned to be a Recommendation for a lighter regulation in Europe against increased focus on non-discrimination and costing methodologies. A first draft for this Recommendation was published by the Commission on 12 December 2012 (EC 2012d) and concentrated on balancing stricter non-discrimination rules with maintaining wholesale copper prices or/and removing cost-oriented price control obligations for NGA networks under certain conditions.

On the **mobile side**, the single most important factor for more investment is a harmonization of spectrum rules across Europe. In particular different spectrum-award methods, usage durations, auction mechanisms and a complex puzzle of different rollout obligations make it difficult for investors to find European opportunities attractive. It has to be noted, that this part of the European Commission’s proposal for a “Telecom Single Market” in Europe faced the strongest headwind from the Member States Assembly. **The most important take-away in this regard** is the fact, that in several four-to-three consolidation cases the **European regulatory and competition focus was still based on static efficiency arguments** which led to MVNOs obligations with very stringent wholesale requirements in favour of MVNOs mobile bit-stream or spectrum divestiture. These obligations – neglecting Dynamic Efficiency Gains – are thwarting the economic benefits from the merger.

Conclusions and Recommendations

Over the last two decades, the European regulatory regime has successfully reduced the prices of many consumer services (including wireless voice and broadband). However, this policy focus on price has resulted in under-investment and underperformance in European telecoms infrastructure relative to its peers in North America and Asia. European wireless policies (including policies relating to spectrum, termination rates and MVNOs) have focused on the creation of new, artificially low-cost entrants and have encouraged the proliferation of infrastructure renters. But these policy-induced, low-cost entrants have failed to climb the “ladder of investment”, while extracting repeated rents from mobile network operators (MNOs). As a result, most European network operators make returns below their cost of capital and can hardly justify further investments. The consequence has been many relatively poor-quality networks in Europe.

But the **harm to Europe**, its citizens and economies **is even larger** than the above suggests. In the 21st century, **network policy is economic policy**. And policy makers (and regulators) that get the former wrong impose enormous costs on society. Based on its communications policy missteps, Europe is:

- Falling behind other regions on fibre and 4G roll-out, having lost the “GSM mobile lead”;
- Experiencing continued decline in telecoms infrastructure quality relative to other regions;
- Facing continued job losses in the telecoms sector, both operators and vendors;
- Lacking the sort of internet and technology expertise that other, better-equipped countries enjoy; and
- Confronting the prospect that a weakening of telecoms companies will lead to the eventual closure or takeover of these companies by other global companies, with consequent loss of innovation power, national capability and intellectual property rights.

It is clear that Europe is not well served by its communications policies and that a new path forward must be charted. This new regulatory framework will feature the following centre-piece elements:

- Foregrounding dynamic efficiency concerns, most notably by fostering conditions for investment and innovation by network operators. This will become increasingly important if operators are to catch up to their peers in North America and Asia in terms of network quality and performance. A regulatory framework obsessed with static ef-

efficiency concerns – such as low prices – will not build tomorrow’s networks. New thinking is required to build new networks; and

- Setting a clear focus on facilities-based competition as the primary means of achieving investment and innovation and, accordingly, making consumers better off because of lower unit prices (more value for money). The focus of every regulatory policy should therefore be broadened and shifted from a re-selling model by an access seeker to a facility-based approach.

At the advent of a new European Commission coming into office, policy makers and other stakeholders in Europe should be mindful of the cautionary tale presented by European telecommunications policies. The multi-year pursuit of “*lowest-price-for-consumer*” policy, with an emphasis on “*maximising-the-number-of-competitors*”, has left Europe²⁵ and its citizens in many regions with lower quality networks in comparison to its global peers and a digital deficit instead of a digital dividend.

The recommendations for the European Institutions, in the circumstances, are that:

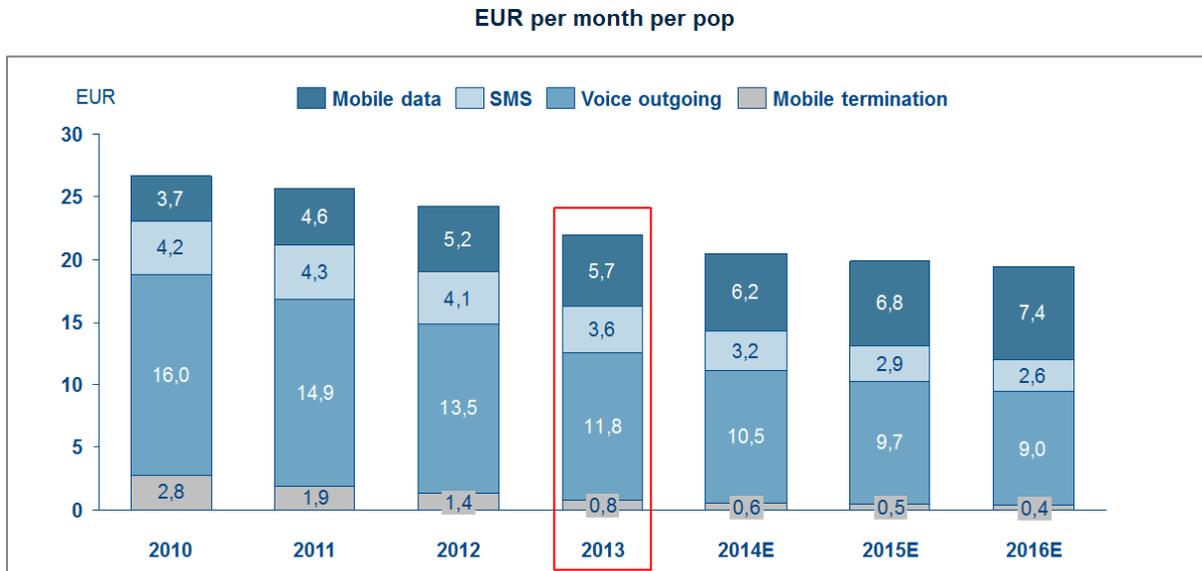
- The path forward for the European telecommunication policy makers and the entire ecosystem involves creating conditions that encourage investment and innovation by network operators. Investment in networks, and the resulting innovation benefits, will be achieved by a clear focus on facilities-based competition; and
- The European policy makers must not lose sight of the link between network policy and macro-economic policy in a digital society. Networks are the backbone of the digital economy and society. The burden of missteps in communications policy will be borne by all Europeans.

²⁵ Except in some countries, like Sweden and others.

7. Appendix I. Additional data points

Exhibit 19

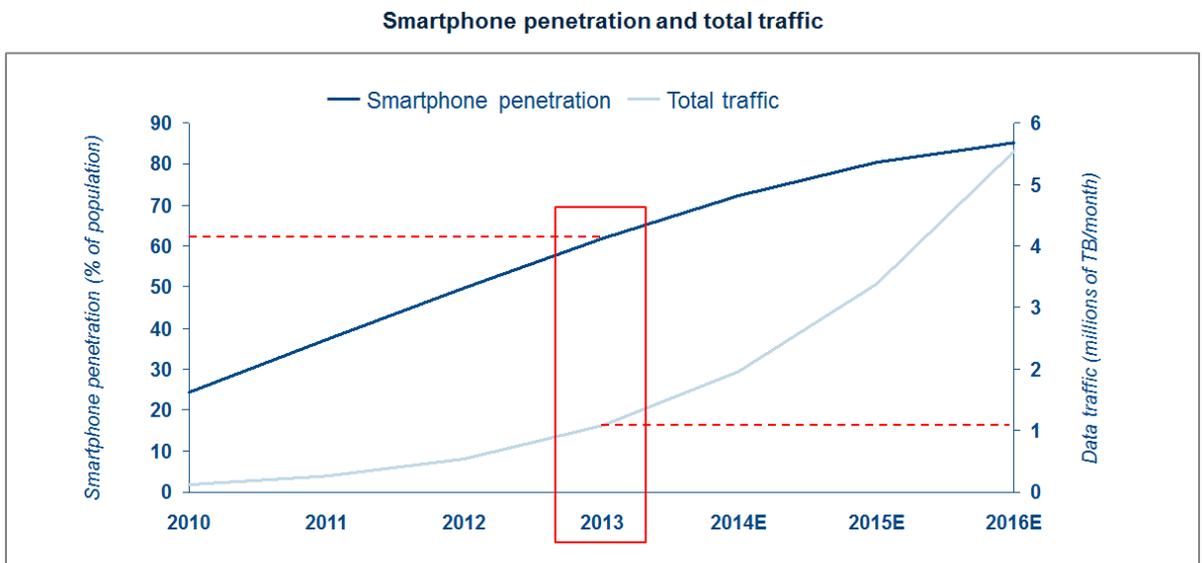
Revenue per capita is expected to continue to drop...



Source: Arthur D. Little, Exane BNP Paribas estimates

Exhibit 20

...while volumes are expected to increase



Source: Arthur D. Little, Exane BNP Paribas estimates

Exhibit 21

List of top-30 companies tracked in Arthur D. Little Value Growth Tracker 2013

Network operators	Telecom equipment	Devices	IT and software services	Content	Internet
AT & T Inc	Cisco Systems Inc	Samsung Electronics	International Business Machines	The Walt Disney Company	Amazon.com Inc
Nippon Telegraph & Telephone	Ericsson 'B' AB	Apple Inc	Microsoft Corp.	News Corp.	Google Inc
Verizon Communications	Alcatel-Lucent	Hon Hai Precision	Oracle Corp.	Time Warner Inc	Ebay Inc
China Mobile Limited	NSN	Hewlett-Packard Company	Accenture PLC	Thomson Reuters Corp.	Tencent Holdings Limited
Telefonica SA	ZTE Corp.	Panasonic Corporation	SAP AG	CBS Corp.	Priceline.com Inc
Deutsche Telekom AG	Motorola Solutions Inc	Sony Corporation	Computer Sciences Corp.	Viacom Inc	Rakuten Inc
Vodafone Group PLC	Harris Corp.	Toshiba Corporation	NTT Data Corp.	Lagardere Groupe	Facebook Inc
Comcast Corp.	Technicolor SA	Dell Inc	Cap Gemini SA	Pearson PLC	Yahoo Inc
America Movil Sab De CV	Juniper Networks Inc	Intel Corp.	Atos	RTL Group	Expedia Inc
France Telecom	JDS Uniphase Corp.	LG Electronics Inc	Saic Inc	Nintendo Company Limited	Yahoo Japan Corporation
NTT Docomo Inc	Echostar Corp.	Quanta Computer Inc	Automatic Data Processing Inc	Fuji Media Holdings Inc	Netflix Inc
China Telecom Corp. Limited	Pace PLC	Pegatron Corp.	Visa Inc	CC Media Holdings Inc	Baidu
Kddi Corp.	Brocade Communications Systems	Sharp Corp.	Tata Consultancy Services Limited	Live Nation Entertainment Inc	IAC/Interactivecorp
China United Network	Equinix Inc	Lenovo Group Limited	Mastercard Inc	Grupo Televisa Sab	B2W Companhia Global Do Varejo
China Unicom (Hong Kong)	Ciena Corp.	LG Display Company Limited	Cognizant Technology Solutions	Gannett Company Inc	Groupon Inc
Telecom Italia	Hitachi Kokusai Electric Inc	Compal Electronics Inc	Wipro Limited	Mediaset Spa	NHN Corporation
Softbank Corporation	TKH Group NV	Wistron	Symantec Corp.	Activision Blizzard Inco	AOL Inc
Vivendi	F5 Networks Inc	Nokia Devices	Infosys Limited	Wolters Kluwer NV	Gree Incorporated
Sprint Nextel Corp.	Akamai Technologies Inc	Qualcomm Inc	Otsuka Corp.	Discovery Communications Inc	Dena Company Limited
BT Group PLC	Arris Group Inc	Research In Motion Limited	Fidelity National Information	Axel Springer AG	Ocado Group PLC
Directv	Fiberhome Telecommunications	Taiwan Semiconductor	Western Union Company (The)	Tokyo Broadcasting System	Overstock Com Inc
Telstra Corporation Limited	Rackspace Hosting Inc	Innolux Corporation	CGI Group Inc	Electronic Arts Inc	Sohu.com Inc
KT Corp.	Netgear Inc	Asustek Computer Inc	CA Inc	The Washington Post Company	Linkedin Corp.
Time Warner Cable Inc	Hengtong Optic-Electric Company	Seagate Technology	Computacenter PLC	Nippon Television Holdings Inc	Vistaprint NV
BCE Inc	Japan Radio Company Limited	Acer Inc	Vmware Inc	ITV PLC	Yandex NV
Centurylink Inc	Senao International Company	Inventec Corp.	Fiserv Inc	TF1 (Television Francaise 1)	Asos PLC
Telenor ASA	Wistron Neweb Corp.	AU Optronics Corp.	Adobe Systems Inc	Promotora De Informaciones SA	Monster Worldwide Inc
Telefonica Brasil SA	Internet Initiative Japan Inc	China Great Wall Computer	Intuit Inc	Sanoma Corporation	Verisign Inc
Koninklijke KPN NV	D-Link Corporation	Western Digital Corp.	Nomura Research Institute L	Prosiebensat 1 Media AG	United Online Inc
Teliasenera AB	Black Box Corp.	TPV Technology Limited	It Holdings Corp.	TV Asahi Corp.	GMO Internet Inc

Source: Thomson Reuters, Arthur D. Little analysis

Note: when less than 50% of total revenue is made in digital businesses, the company is not tracked; when companies have several digital activities, they are tracked in the segment with more revenue; ODMs included in tracking

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