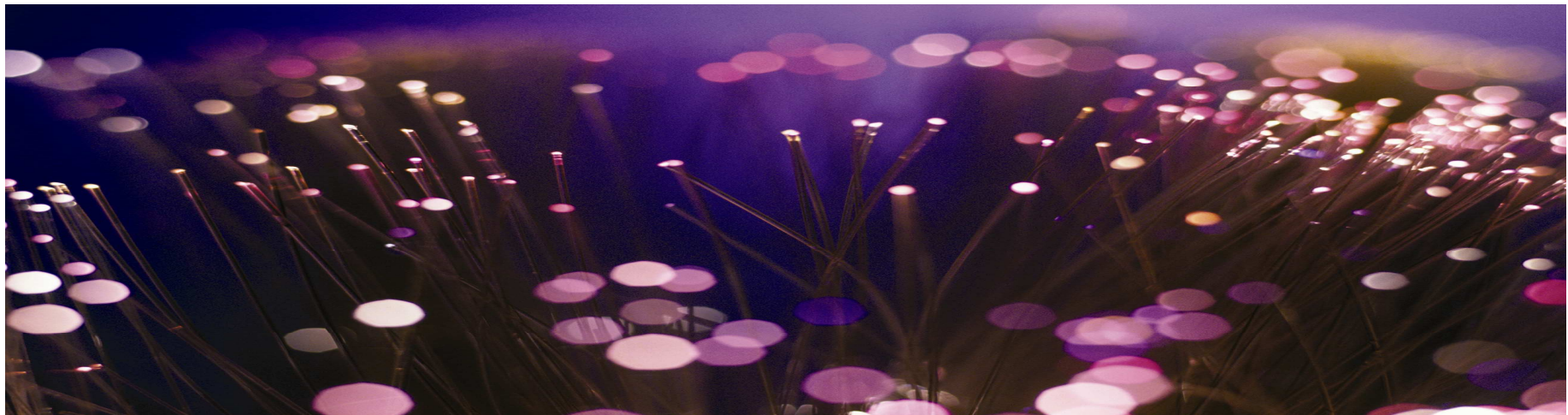


Telco 2015

five telling years, four future scenarios



Contents

A decade of structural change in Telecom

Forces shaping the future of Telecom

Uncertainties and Scenarios for Telco 2015

Scenario Realization, Financials and Imperatives

- Survivor Consolidation

- Generative Bazaar

- Clash of Giants

- Generative Bazaar

Summary and Conclusions

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❖ A decade of structural change in Telecom

Forces shaping the future of Telecoms

Critical Variables and Scenario Framework

Detailed Scenario Descriptions

Survivor Consolidation

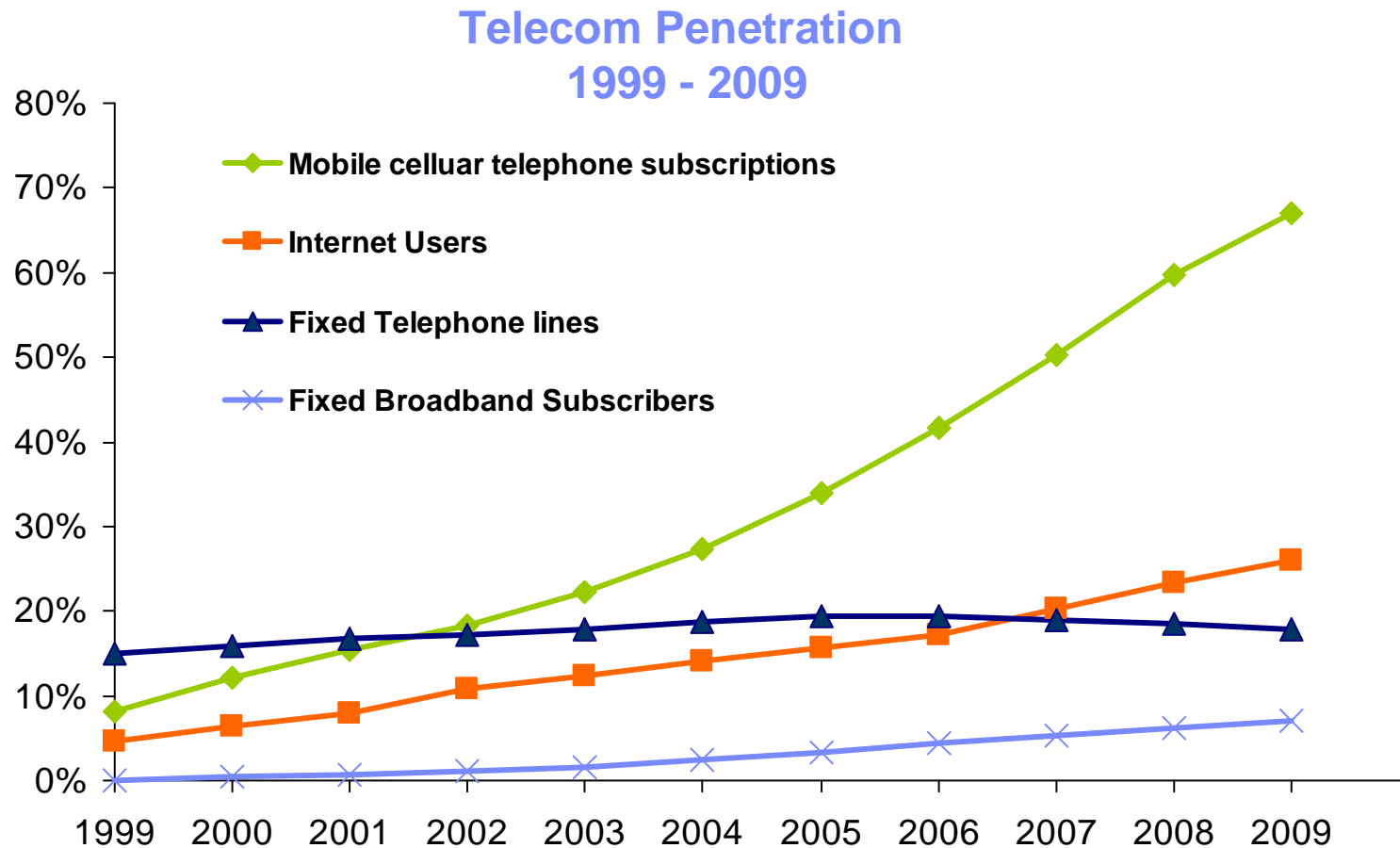
Generative Bazaar

Clash of Giants

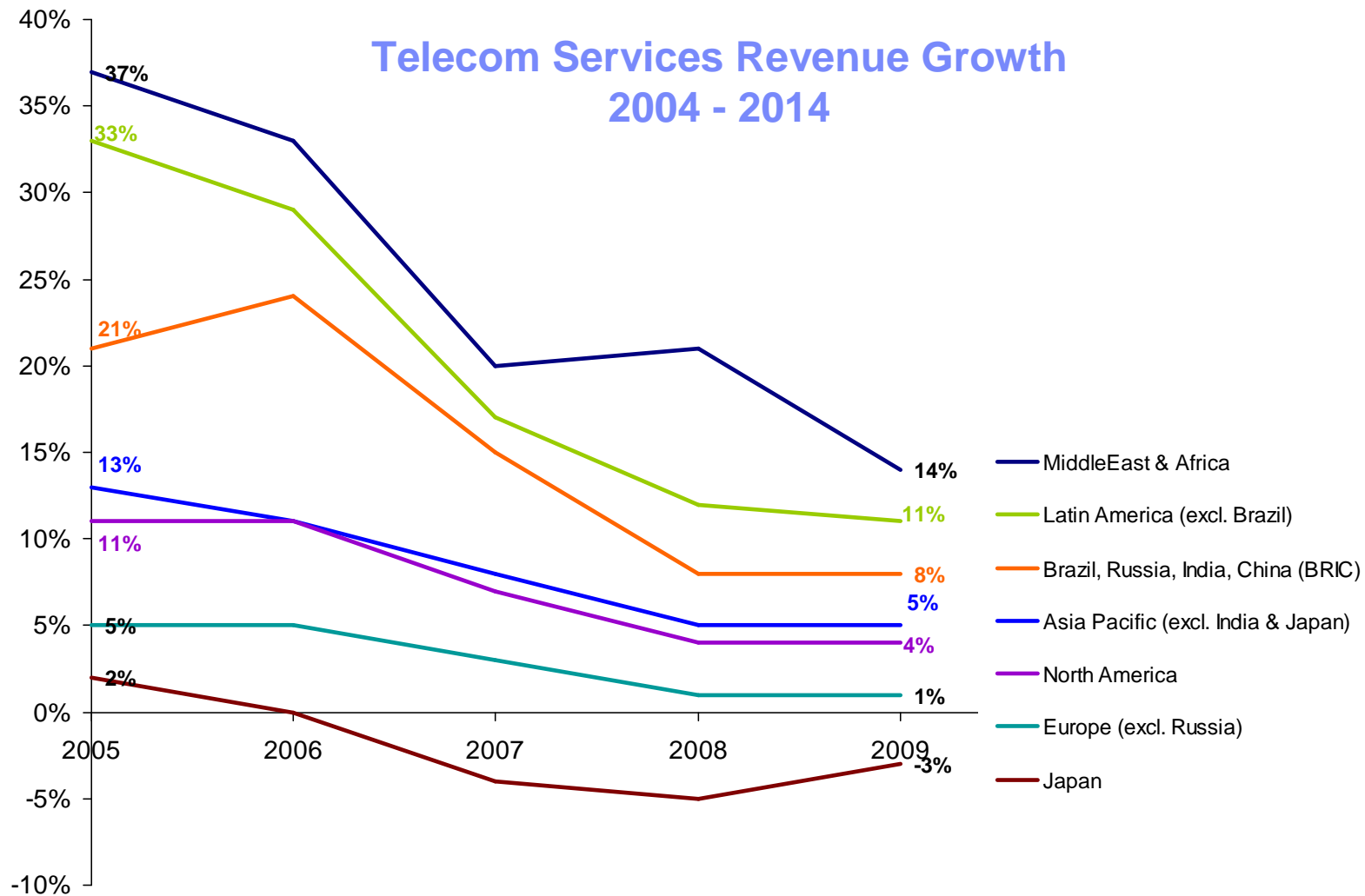
Generative Bazaar

Summary and Conclusions

Over the past decade global communications penetration and in mobile cellular telephony specifically has been phenomenal

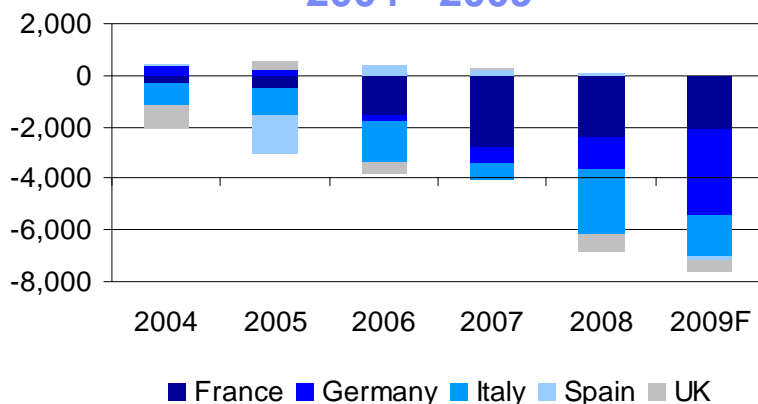


However, the key engines for growth - mobile cellular telephony and emerging markets expansion - have begun to stall

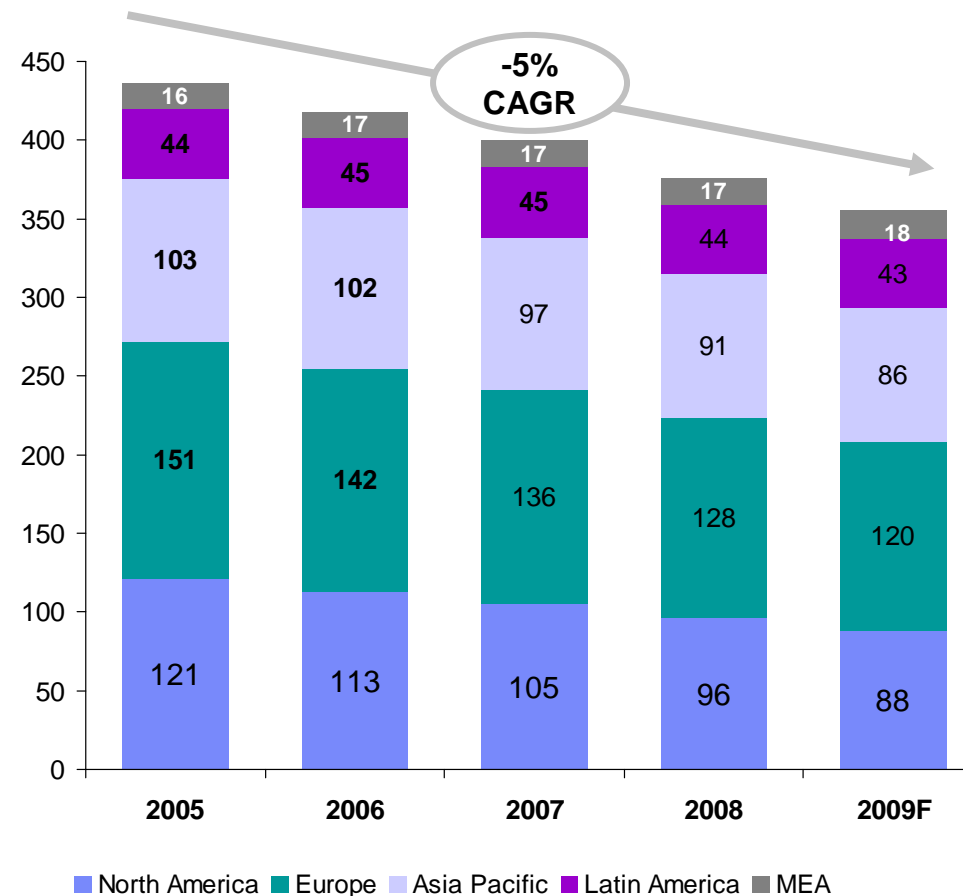
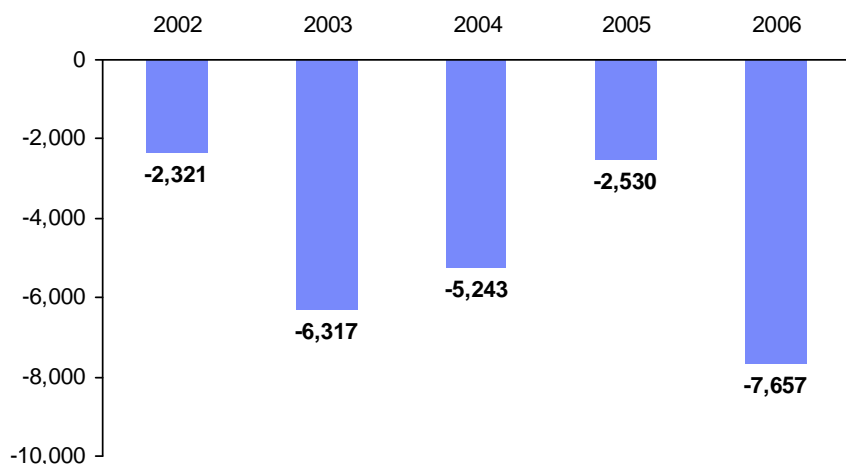


There is a long-term decline in fixed telephony (PSTN) lines and revenues

**EU5 PSTN/ISDN Lines (000s)
2004 - 2009**

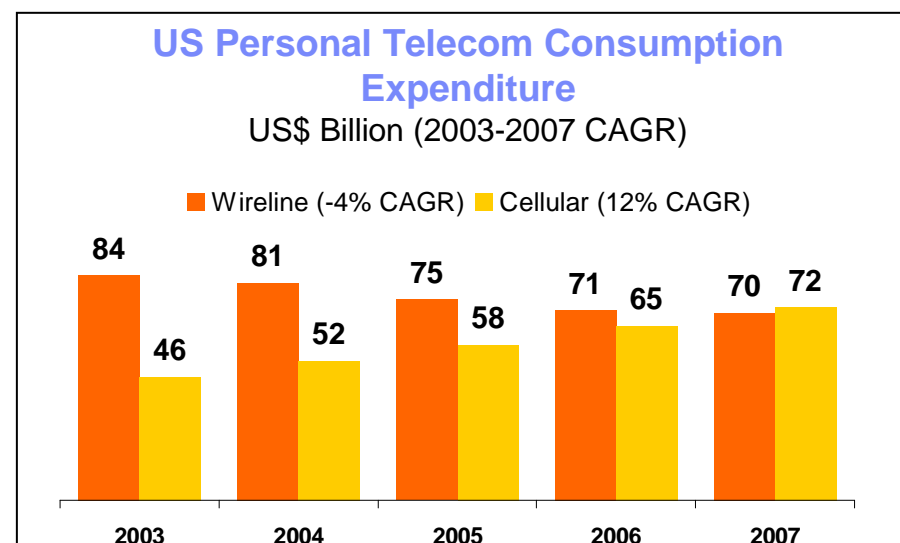
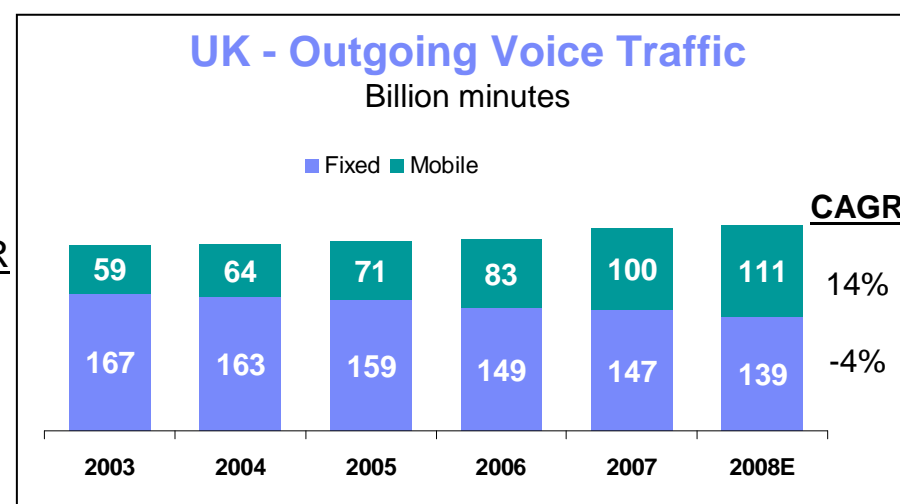
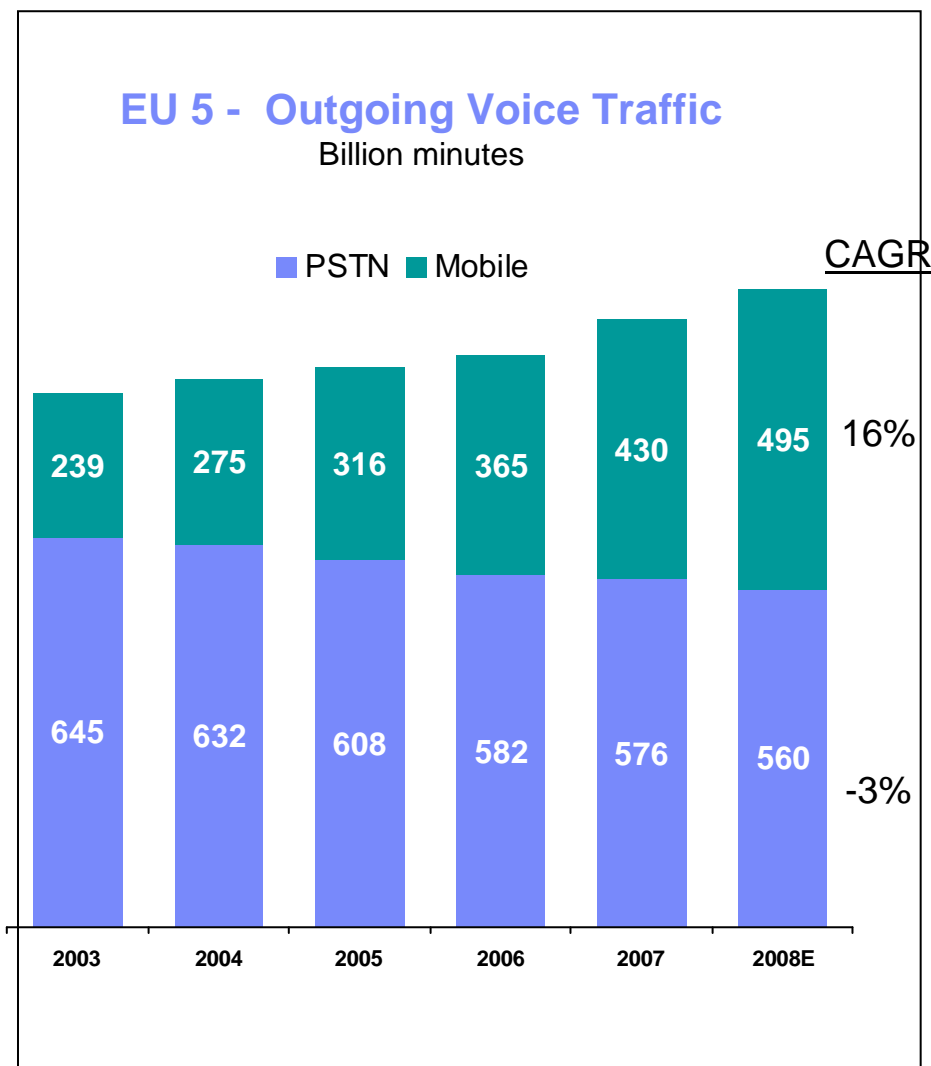


**US Wireline Losses
2002 - 2006**



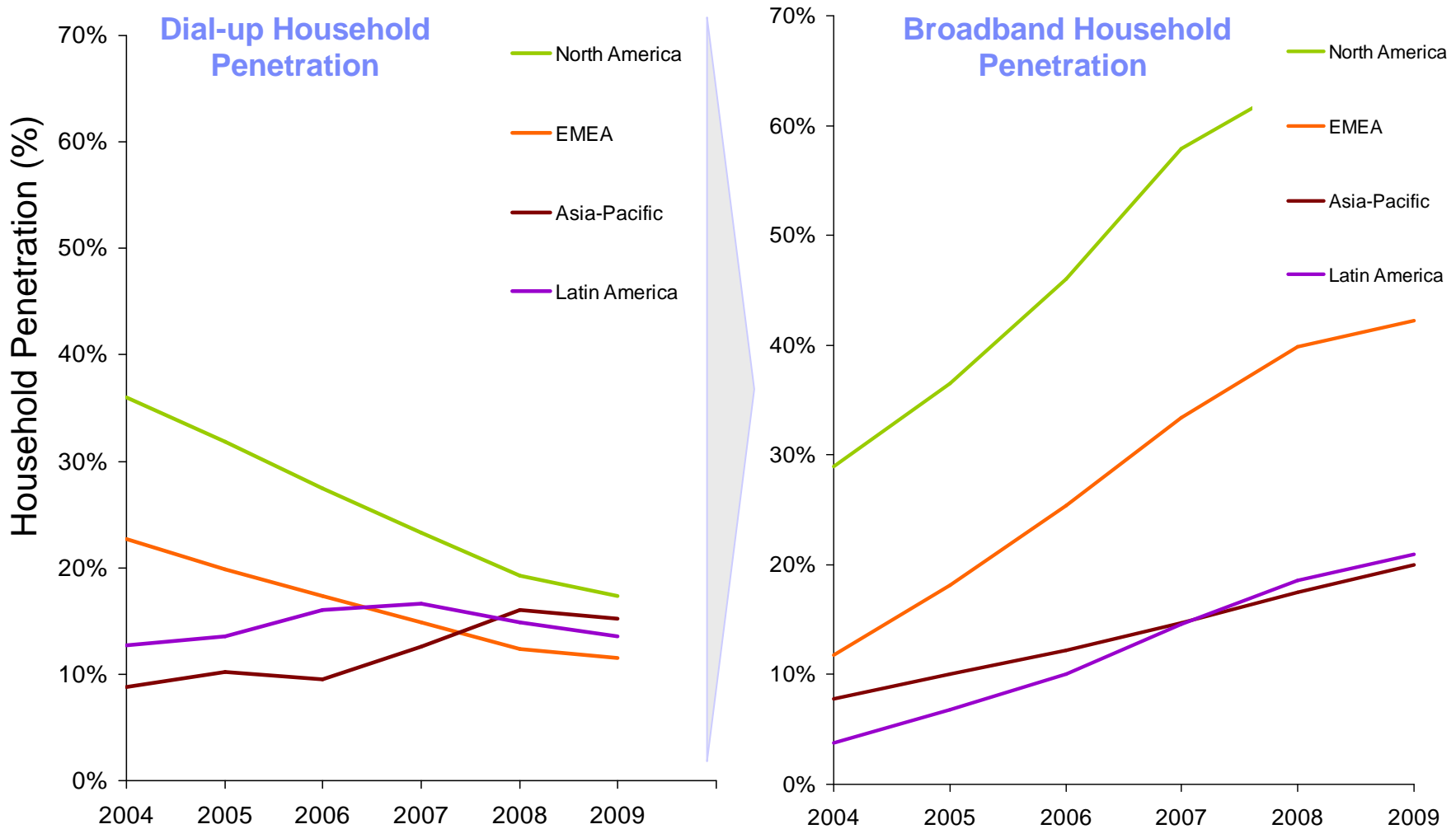
6 Source: IDATE; Federal Communications Commission, "Trends in Telephone Service", August 2008, Ofcom, UK, "Communications Market Report", August 2009 IBM Institute for Business Value (IBV) Analysis

Fixed-mobile substitution continues



Source: IDATE, National Regulatory Authorities' Reports, Federal Communications Commission, "Trends in Telephone Service", August 2008, Ofcom, UK, "Communications Market Report", August 2009 IBM Institute for Business Value (IBV) Analysis

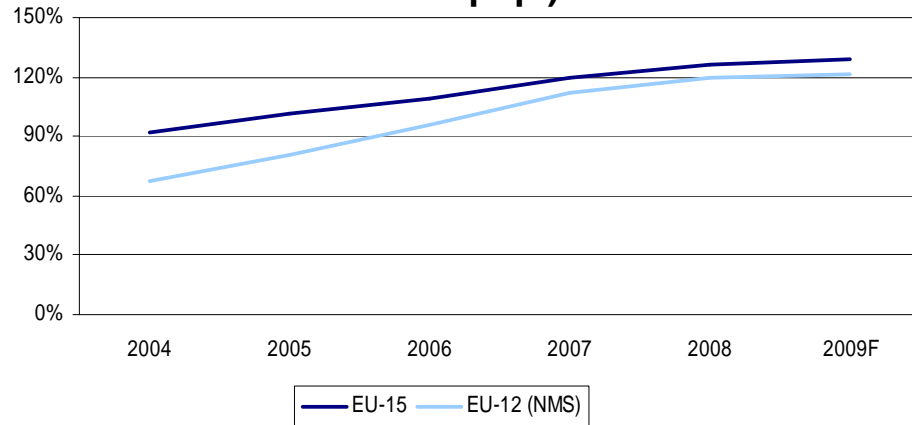
Dial-up access is in decline as connectivity shifts to broadband fuelled an expansion of xDSL, cable modem and FTTx



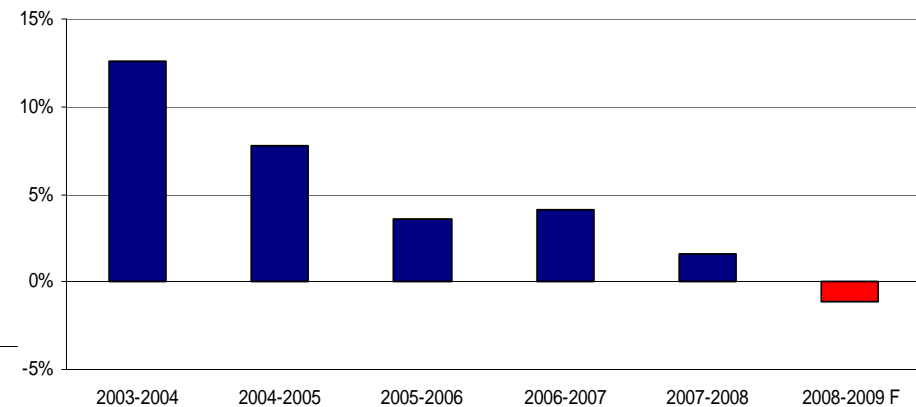
Source: PwC Media and Entertainment Outlook 2009-2013; IBM Institute for Business Value (IBV)

In markets with high mobile penetration, such as Europe, revenue growth and ARPU are declining

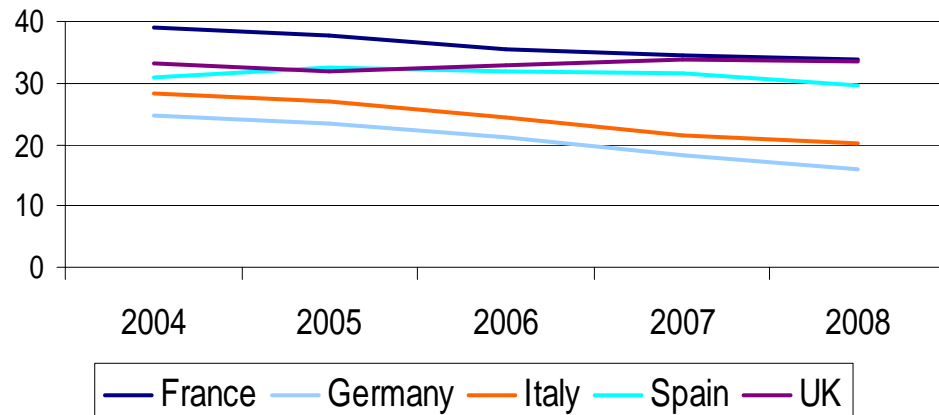
Mobile market penetration Europe (% pop.)



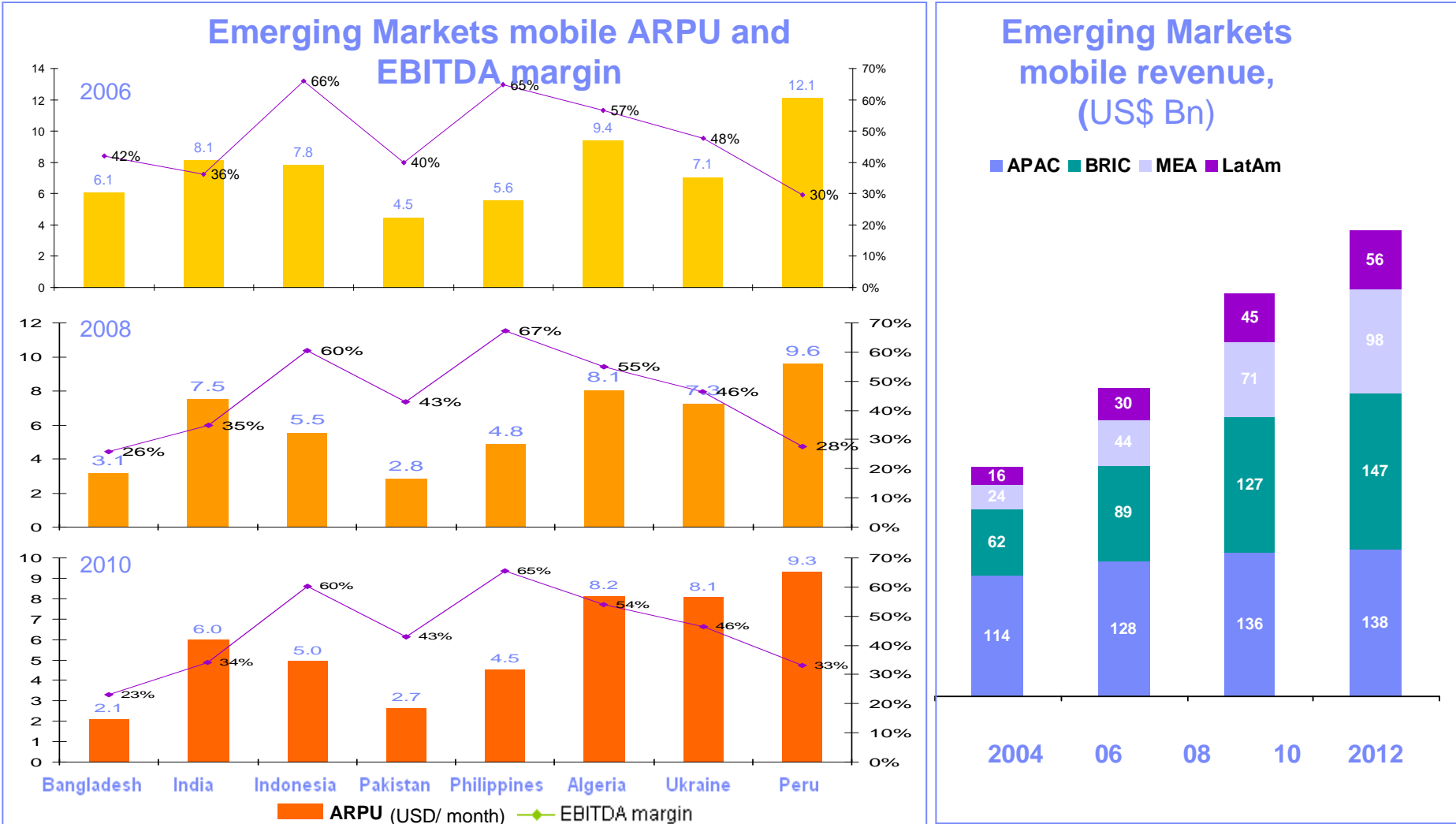
Mobile revenue Growth in EU 5



Mobile ARPU (€/month)



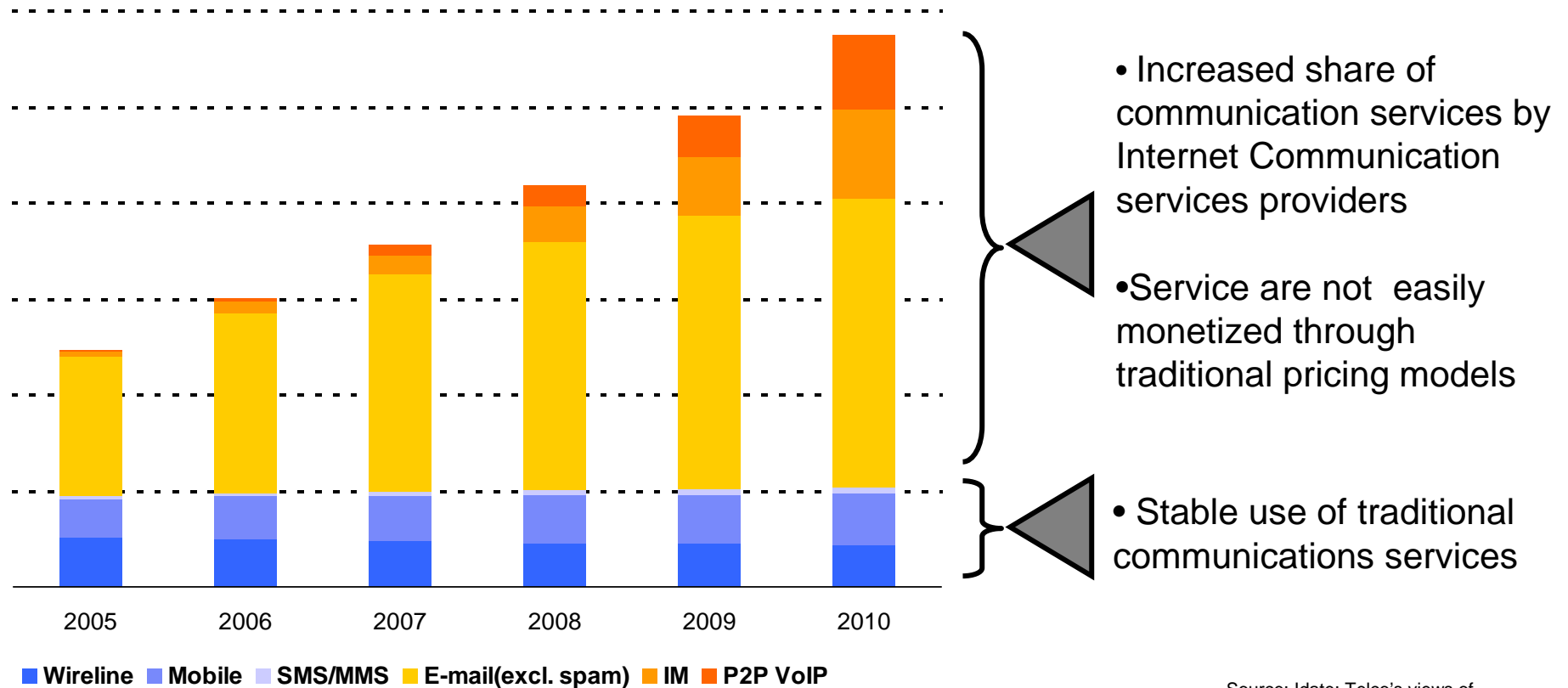
However emerging markets telecom providers continue to secure growth and profits from serving low ARPU customers



10 Source: IDATE, Bank of America/Merrill Lynch, Global Wireless Matrix 1Q09

Overall communications have increased but much of the growth in is over-the-top; traditional telco services share remain unchanged

**FRANCE TOTAL COMMUNICATIONS MARKET
(billions of call minutes and equivalents¹)**

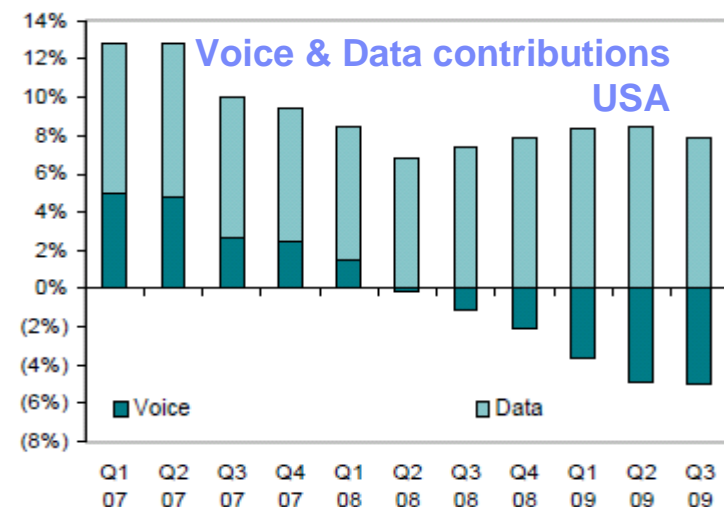
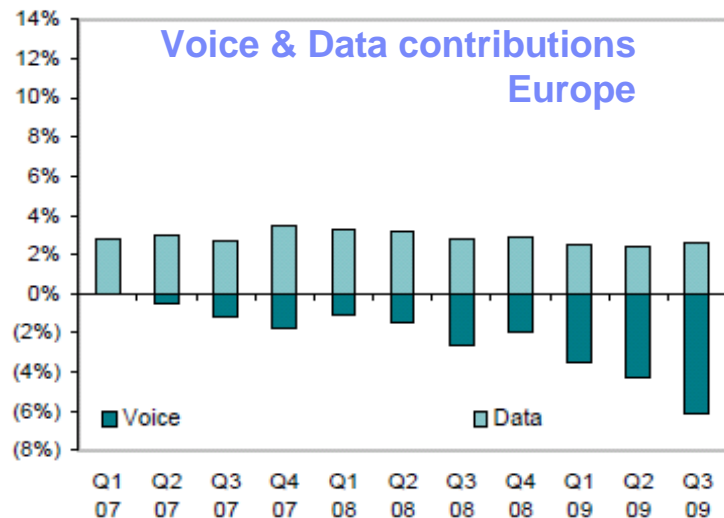


- Increased share of communication services by Internet Communication services providers
- Service are not easily monetized through traditional pricing models
- Stable use of traditional communications services

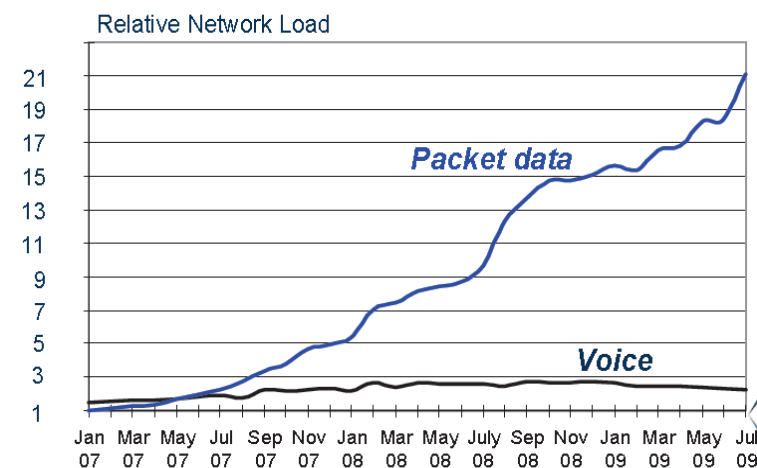
Notes: (1) An SMS/MMS or e-mail is considered as a 30 second call.

Source: Idate: Telco's views of Openess, Digiworld Summit 2009

A bright spot has been the phenomenal growth of mobile broadband with the rollout of High Speed Packet Access (HSPA) networks ...



HSPA traffic growth – World average



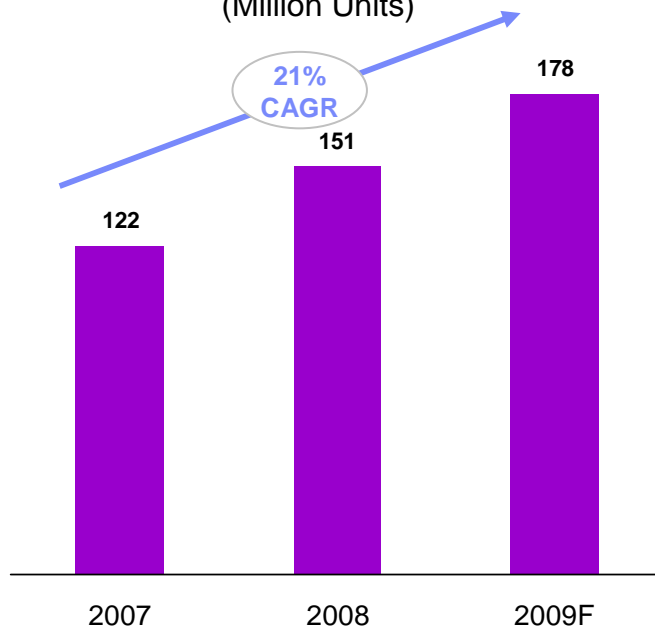
Source: Ericsson

Overall, global mobile traffic has more than doubled in the past year, reaching 33 Petabytes (PB) per month in 2008, and 85 PB per month in 2009

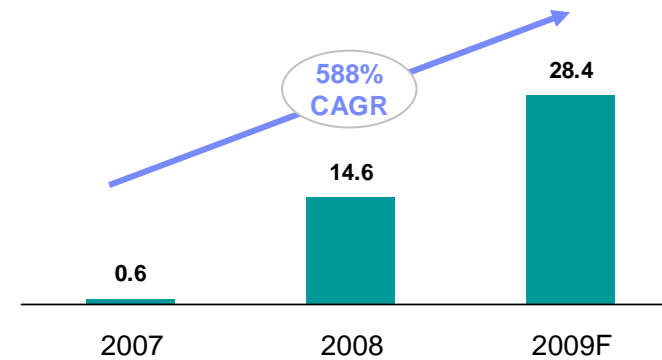
... driven in part by increased penetration of Smartphones and HSDPA-enabled USB keys and dongles for laptops / Netbooks



Smartphone Sales
2007 – 2009
(Million Units)



Netbook Sales
2007 – 2009
(Million Units)

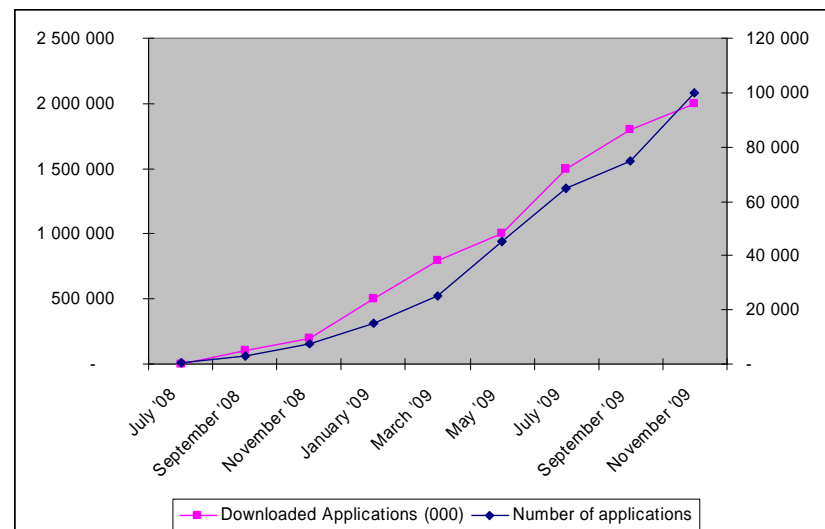


The explosion of mobile applications is driven by devices like iPhone and AppStores but the latter's revenue contributions are low

Mobile application stores



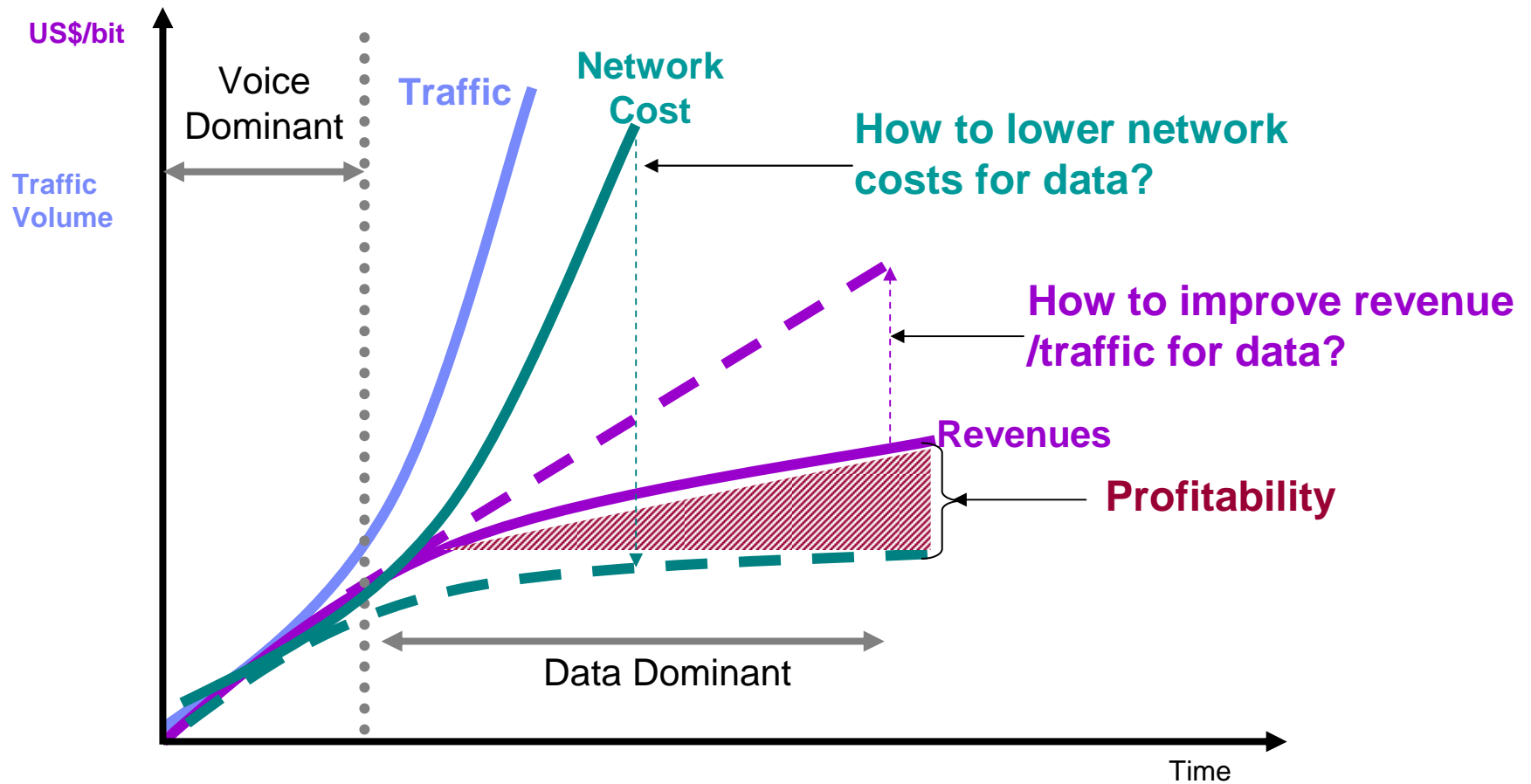
AppStore: Downloaded and available applications



iPhone AppStore: A success with low revenues

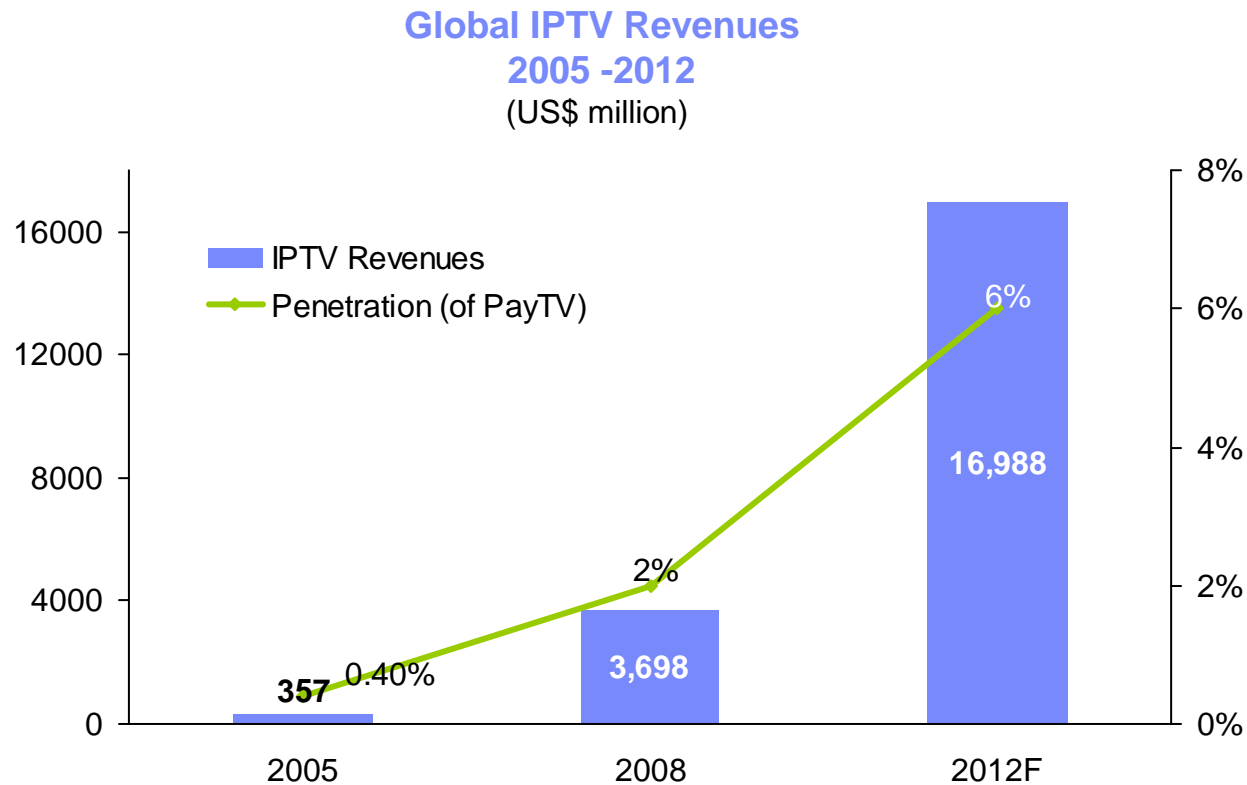
- Average Price of Application remains very low US\$2.5
- Revenues from AppStore estimated to US\$25m-45m
- Apple however sold 13.7m iPhones in 2008; 13% of all handsets shipped (16% in 1H of 2009)
- Apple is using the AppStore to drive demand for hardware and foster audience monetization

The cost of delivering data however is not matched by revenues as revenue and traffic volumes are decoupled in a data-dominant world



Source: Nokia-Siemens; IBM Institute for Business Value (IBV) Analysis

Telecom revenues from Telecom IPTV subscription and content services remain woefully low



Source: IBM Institute for Business Value (IBV) Analysis based on PwC Media and Entertainment Outlook 2009-2013. IPTV Revenues include subscriptions, VOD and multi-channel advertising based on penetration. Additionally assumes telcos secure of 5%,10% and 20% of multi-channel advertising inventory in 2005, 2008 and 2012 respectively

In emerging markets, however, there is growing adoption of SMS-based applications, notably public information and advisory services

India



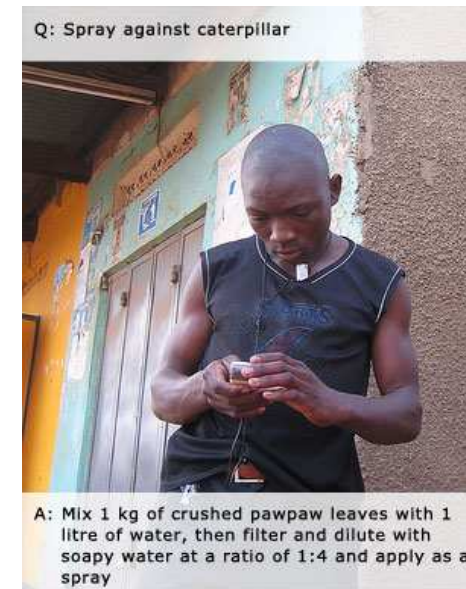
Indian operator Tata's service 'mKrishi' allows farmers to send queries and receive personalized services

China



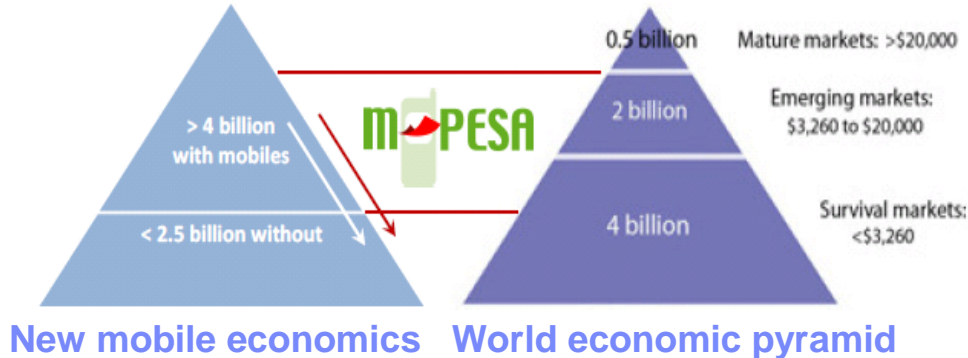
China Mobile offers 'Nong Xin Tong' for farmers to provide news, weather information and details of farming-related government policies (50 million users)

Uganda



SMS Services from Grameen, Google & MTN providing agricultural advice and targeted weather forecasts, health tips, clinic finder, and Google Trader matching buyers and sellers of agricultural produce and commodities

... as well as money transfer and mobile payment services



Philippines



South Africa



Zambia

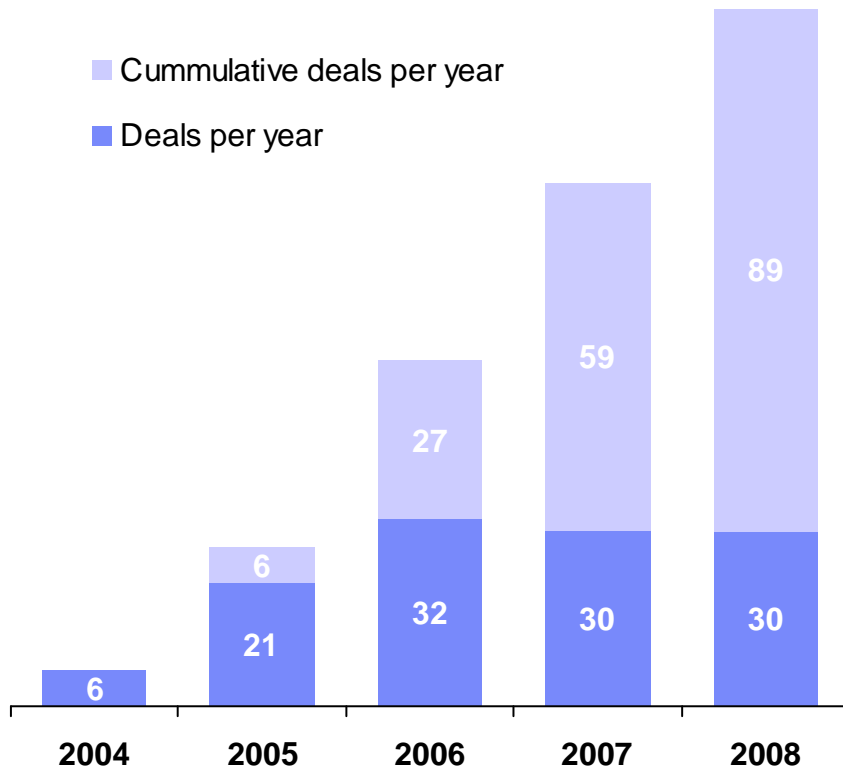


Ghana



Network outsourcing has gathered momentum in recent years and become mainstream even among tier 1s as part of cost restructuring

Network Outsourcing Deals



AT&T and France Telecom used to manufacture their own equipment but divested these to create Lucent and Alcatel. Now operators are giving up running their networks; what does this portend?

Outsourcing

Early 2009, Vodafone UK signed a 7-year agreement with Ericsson to take over maintenance and operational support for Vodafone UK's 2nd and 3rd generation radio access networks. Expects to achieve cost-efficiencies of 25% over the 7 year period.

Ericsson's operation center in Reading, UK, 2008

~25%

Nokia Siemens Networks

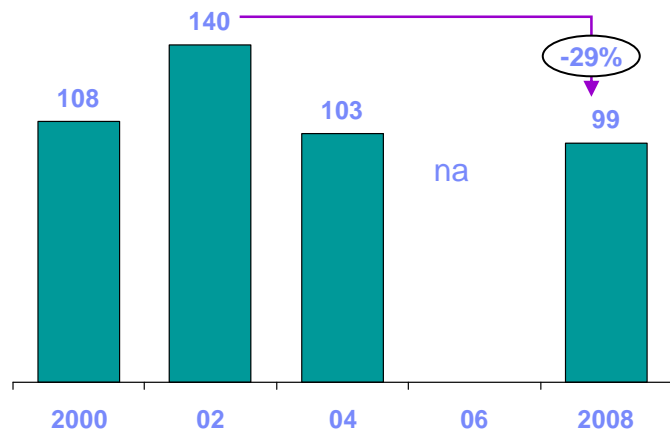
On March 18, 2009, France Telecom-owned Orange announced a 5-years deal to outsource the management of its networks in Britain and Spain to Nokia.

19 Source: IDATE, Kerry Capell, "Vodafone and Orange Outsource To Ericsson and Nokia", March 18th Business Week; downloaded at: http://www.businessweek.com/globalbiz/blog/europeinsight/archives/2009/03/vodafone_and_or.html

Consolidation of fixed and mobile markets continues in Europe...

Mobile networks operators EU27

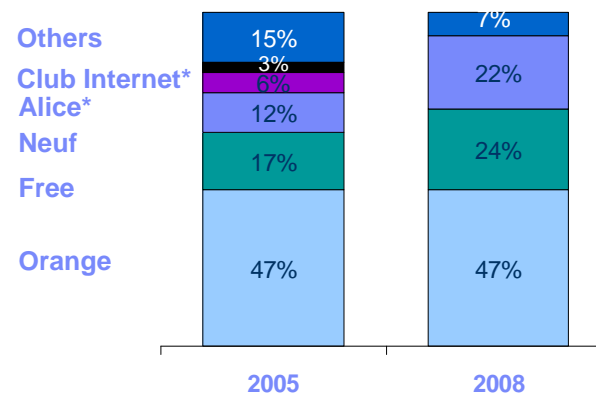
The number of mobile network operators peaked in 2002 after UMTS licenses had been issued. Since then, the number of MNOs decreased by almost one third



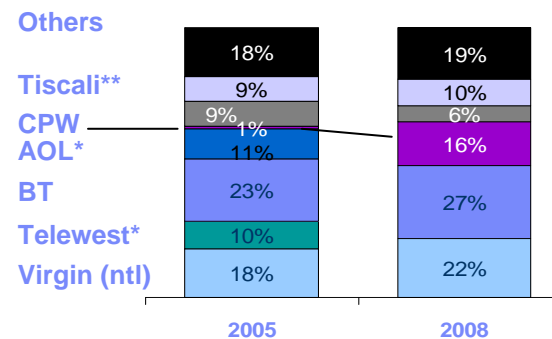
Proposed T-Mobile UK and Orange JV will drive further European consolidation



Fixed broadband market



France: The top three ISPs extended their subscriber market share from 76% to 93%, facing limited competition from cable



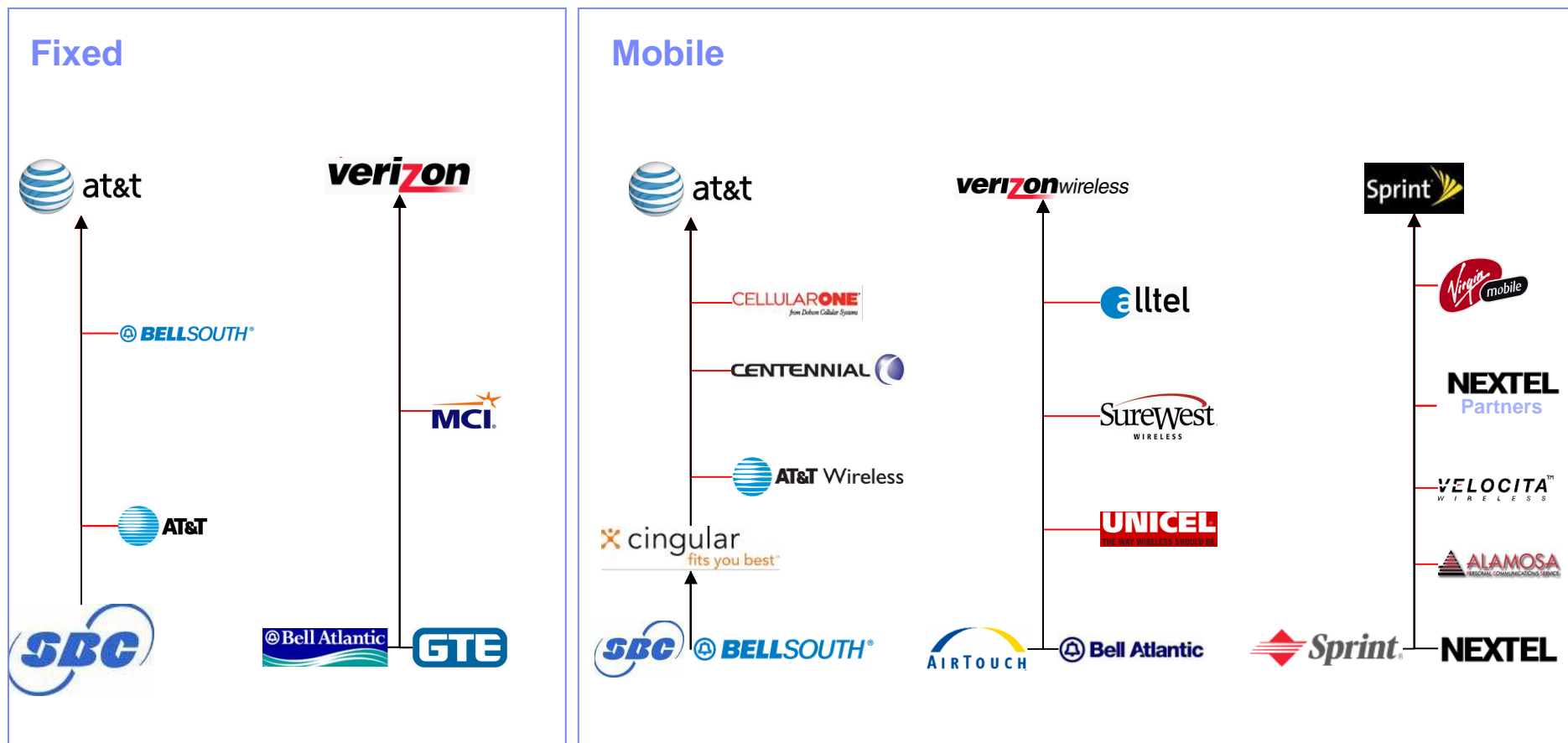
UK: Market consolidation still under way. CPW being a major consolidator expanded its market share from 1% to 16%.

| Target | 2006 | 2007 | 2009 |
|----------|--------|-------|---------|
| Be | Toucan | AOL | Pipex |
| Acquirer | O2 | Pipex | Tiscali |
| | Pipex | CPW | CPW |

Source: IDATE, Eurostat European Commission, Ofcom * Acquired between 2005 and 2008 ** acquired in 2009 or currently being sold

... and has gone a long way in the US already

Not exhaustive



The telecom industry has undergone significant structural change over the last decade; how will it evolve over the next 5 years?

- Phenomenal expansion in communications and industry growth driven by mobile and emerging markets over the past decade has begun to stall
- While long-term PSTN decline appears inevitable, mobile penetration is peaking in most mature markets, ARPU is falling and in some advanced markets mobile revenues have even started declining
- Migration from dial-up to fixed broadband continues and while global penetration remains low, adoption rates in advanced markets are increasing steadily though not enough to compensate for PSTN losses
- Rollout of HSPA networks have driven adoption of mobile broadband helped in part by the penetration of Smartphones and HSDPA-enabled USB keys /dongles for Netbooks and are somewhat mitigating the impact of voice revenue losses
- The cost of delivering data, however, is not matched by revenues as revenues and traffic are decoupled in data-dominant world
- Much expected revenues from both mobile and fixed content services such as IPTV remain woefully low
- ... although SMS-based data applications such as money transfer and mobile payment services have taken off in emerging markets
- For the first time, some telecom operators are handing over their networks to external providers (i.e. NEPs) to run/operate on their behalf
- Industry consolidation continues

 ***How will communications evolve over the next five years?***

Contents

A decade of structural change in Telecom

❖ **Forces shaping the future of Telecom**

Uncertainties and Scenarios for Telco 2015

Scenario Realization, Financials and Imperatives

Survivor Consolidation

Generative Bazaar

Clash of Giants

Generative Bazaar

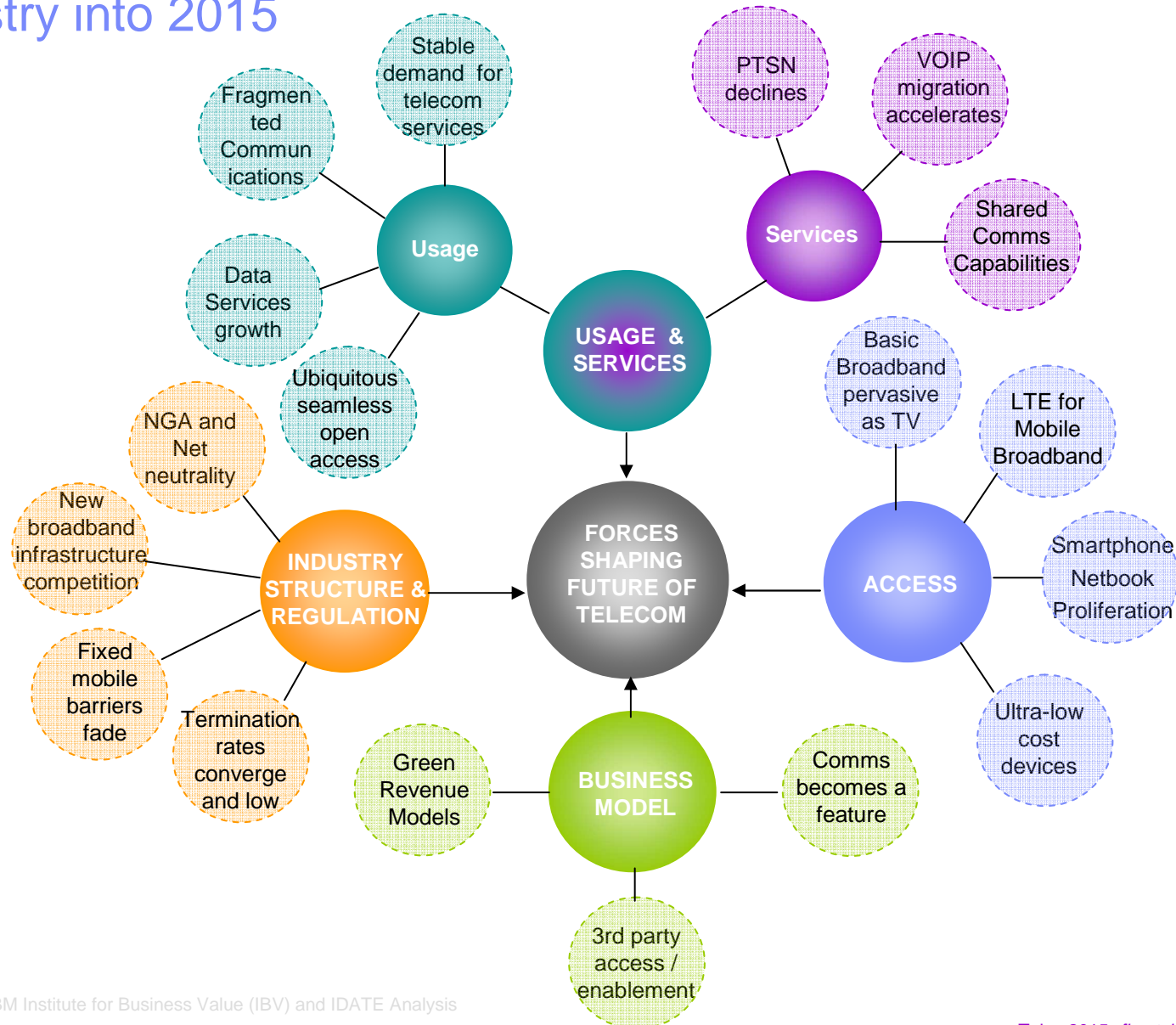
Summary and Conclusions

Forces shaping the future of telecommunications in 2015

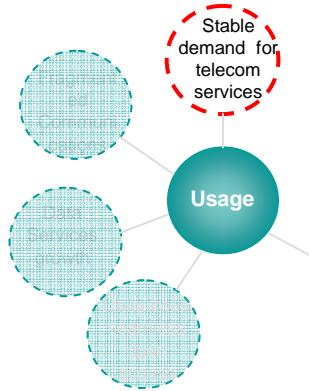
Definition:

- ▶ Describe underlying incontrovertible trends in the evolution of the communications industry
- ▶ In the absence of a major exogenous shock the degree of uncertainty about these trends is virtually nil
- ▶ These trends provide a common background and context for all scenarios

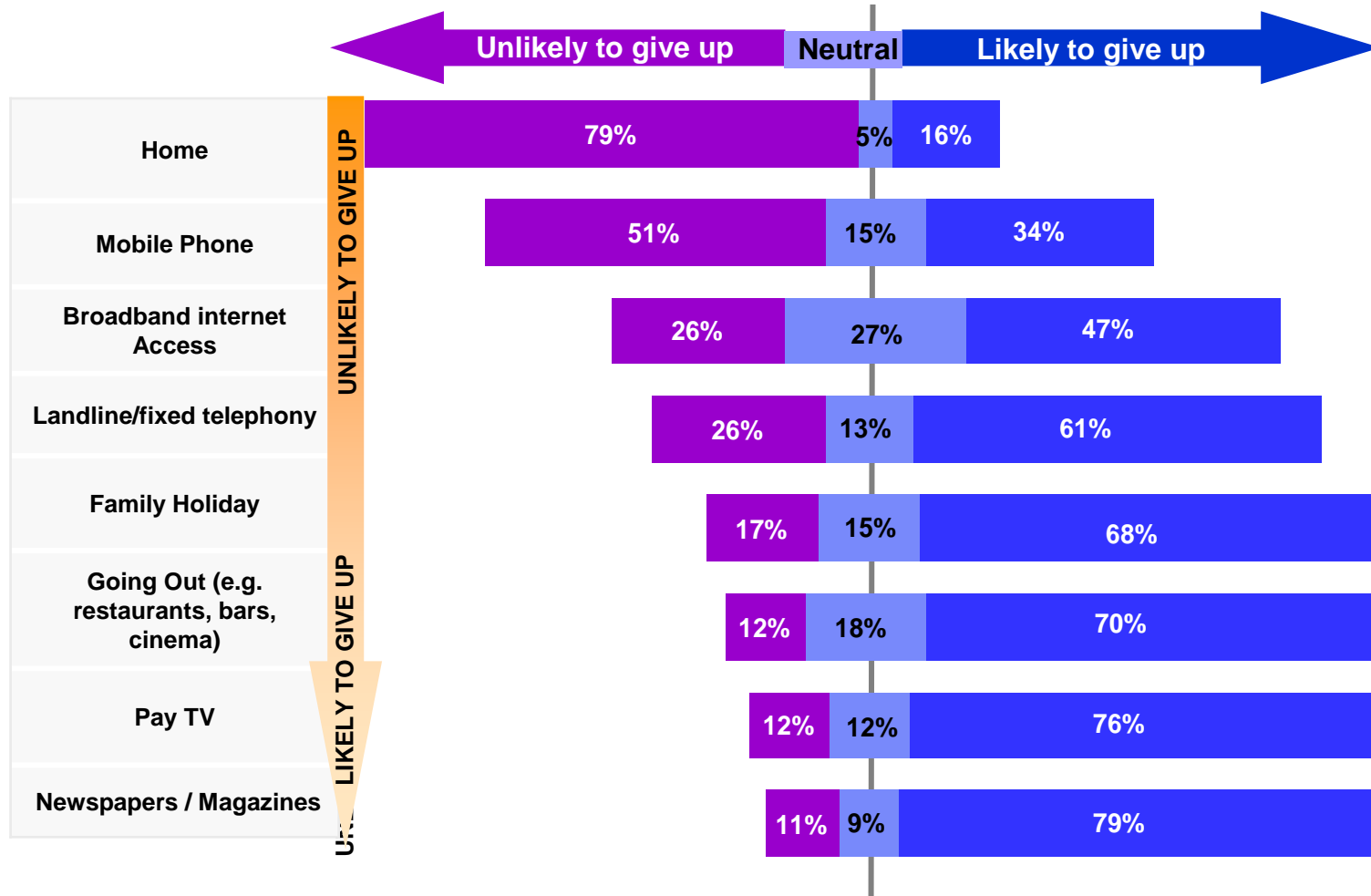
A number of forces are shaping the future of the telecommunications industry into 2015



Mobile and broadband are emerging as critical necessities and essentials consumers are most unlikely to give after their homes

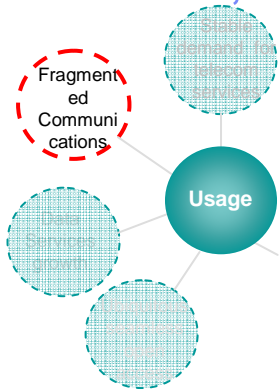


Q34: If the current economic downturn persists, which of the following are you least likely to give up?

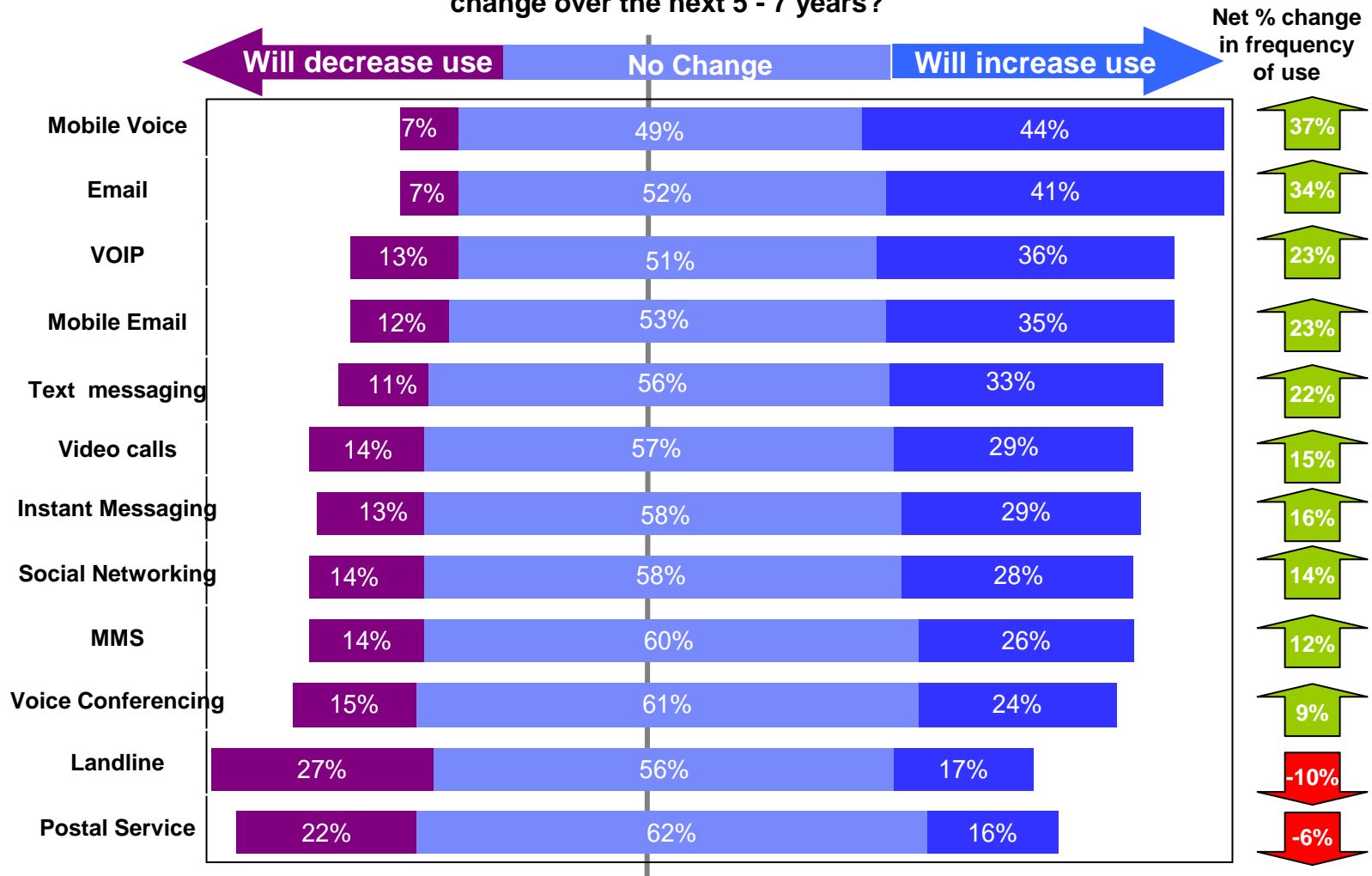


Source: IBM Institute for Business Value Global Telecom Consumer Survey, 2009; N= 7722
26

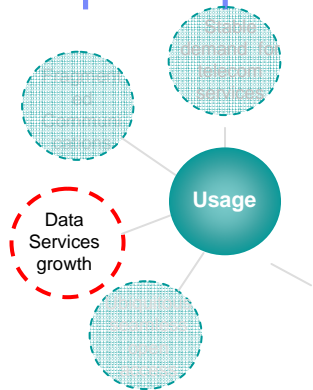
Communications are becoming increasingly fragmented across mobile, email, VoIP, text / instant messaging and social networks



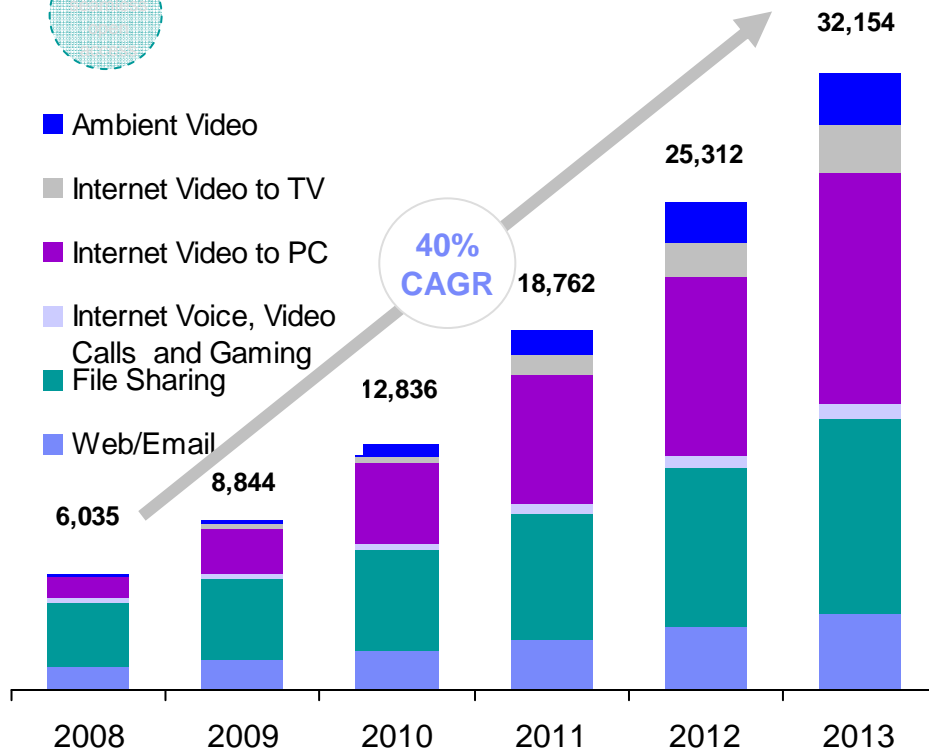
11. How do you anticipate your use of **COMMUNICATION** services will change over the next 5 - 7 years?



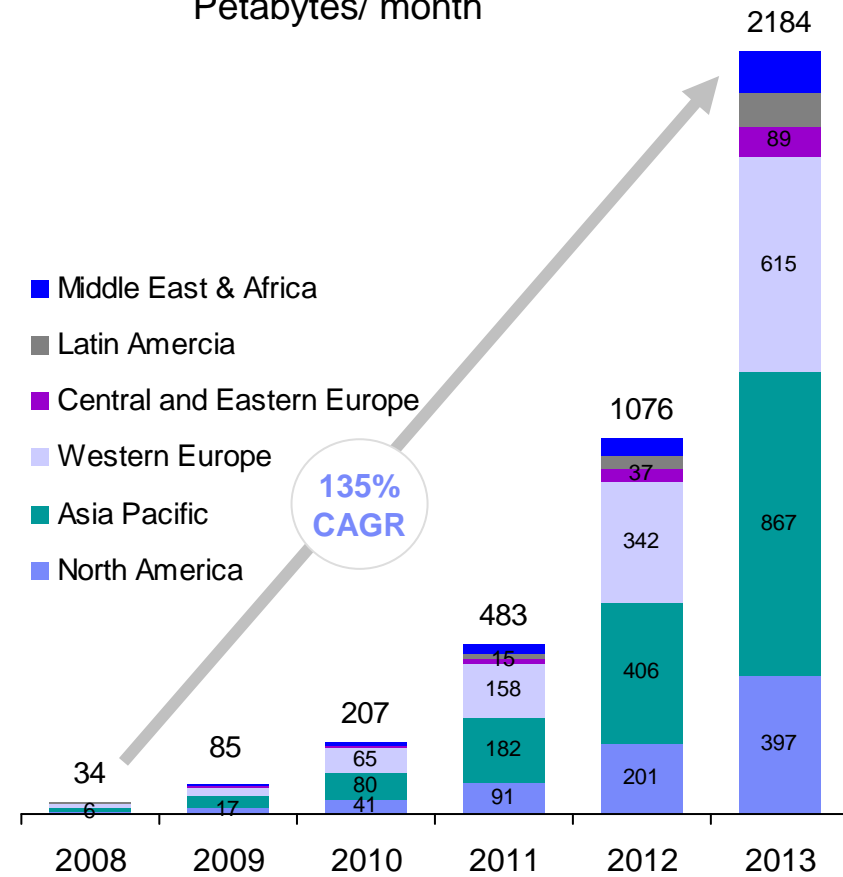
Use of video and other data services will grow as internet data traffic quintuples and mobile broadband consumptions soars



Global Consumer Internet Traffic, 2008–2013
Petabytes/ month

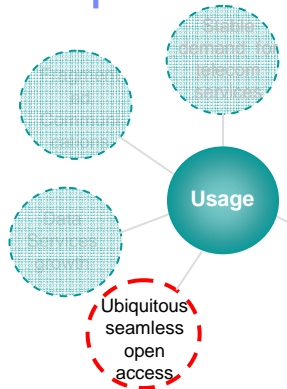


Mobile Internet /Data Traffic
Petabytes/ month

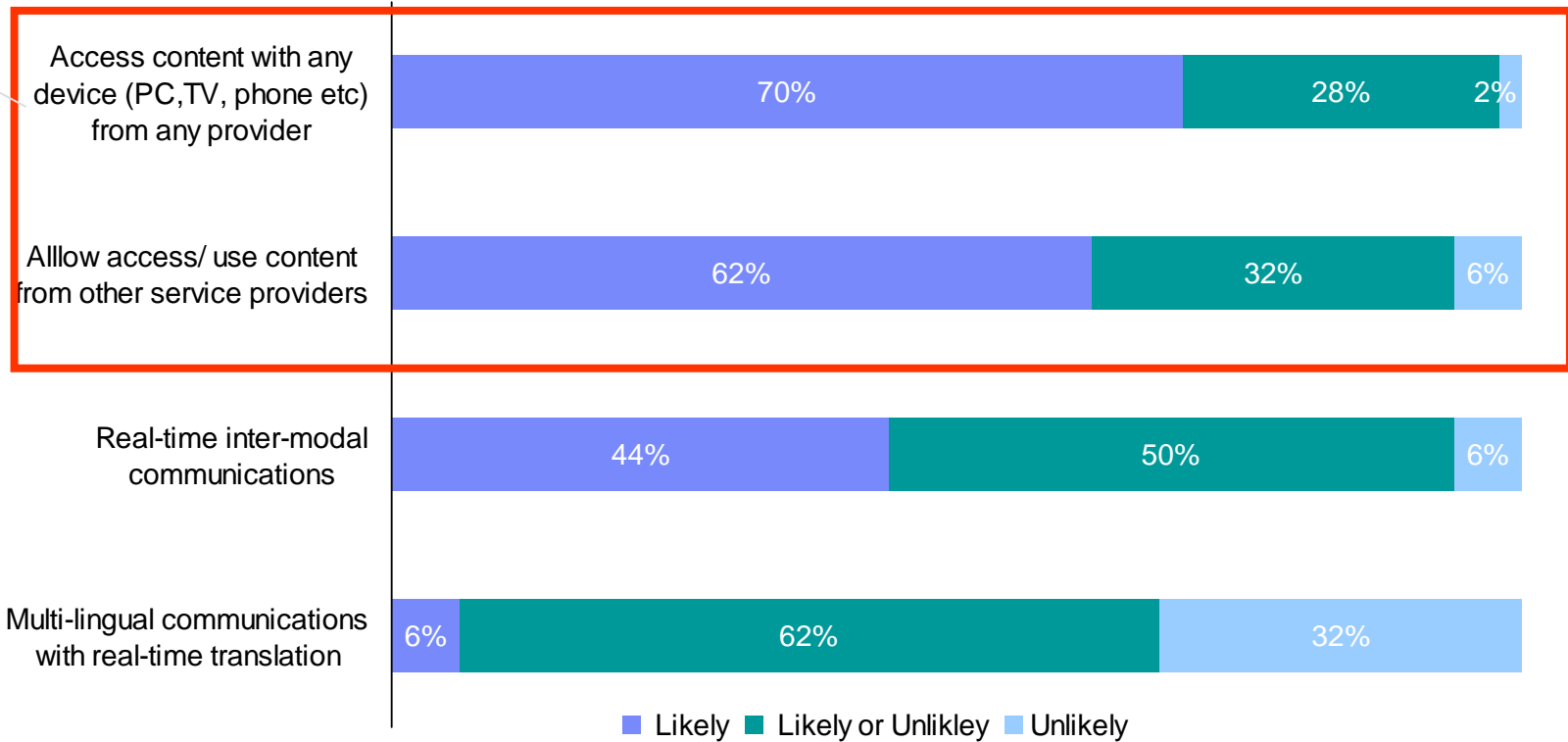


Source: Cisco Visual Networking Index, June 2009, http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf
IDATE, IBM institute for Business Value (IBV) Analysis

Communications and content will become more ubiquitous with open access enabling interaction with any device, service/provider



7. How likely are the following interaction models over the next 5 – 10 years?

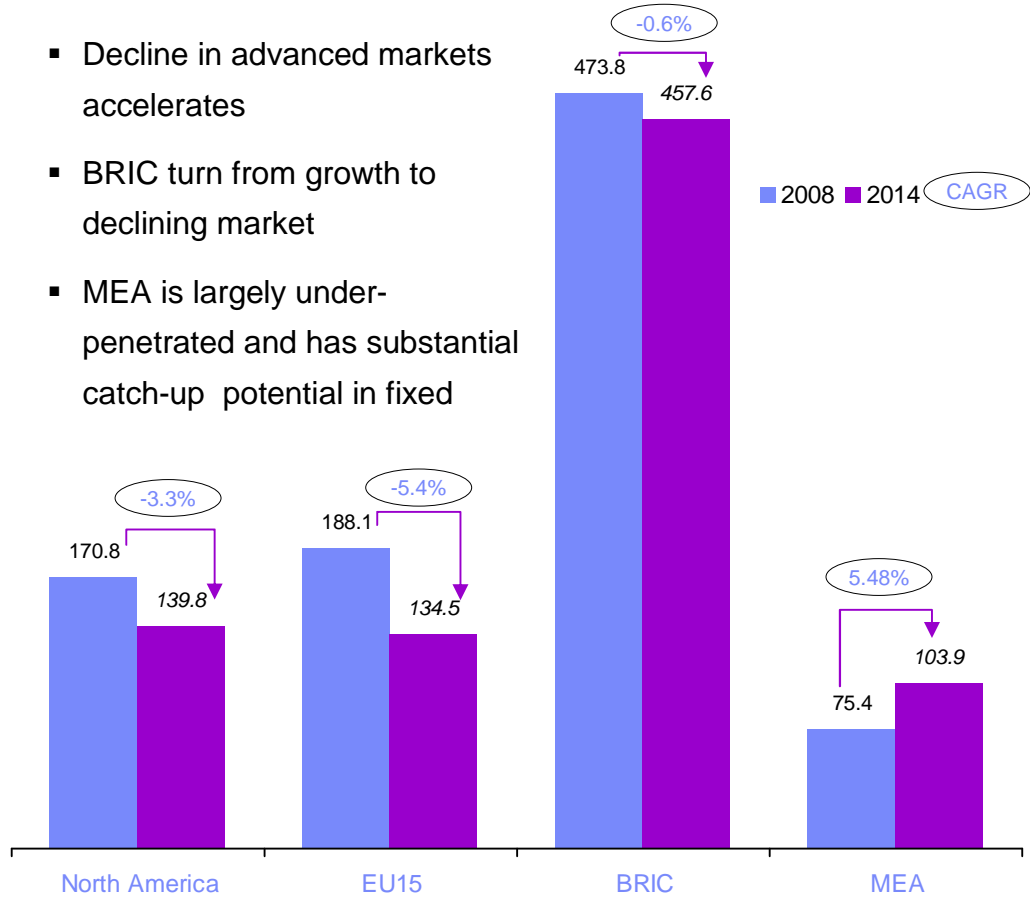


“For the first time we are moving from a voice world to a visual world of messaging, emailing, internet browsing and downloading, social networking and entertainment, all experienced on the move...Ubiquity is the key in the next decade. Anywhere, anytime, any device”

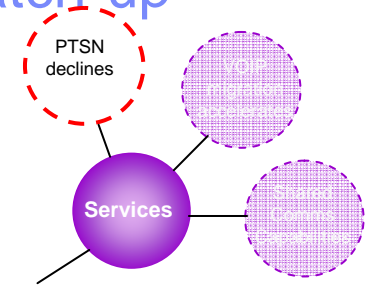
Chairman's Office, Global Telecom Provider, Europe

PSTN circuit switched lines will continue to decline although in some emerging countries there may be some growth as they catch-up

Global PSTN lines 2008 – 2014 (millions)

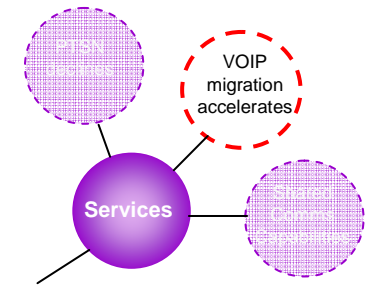
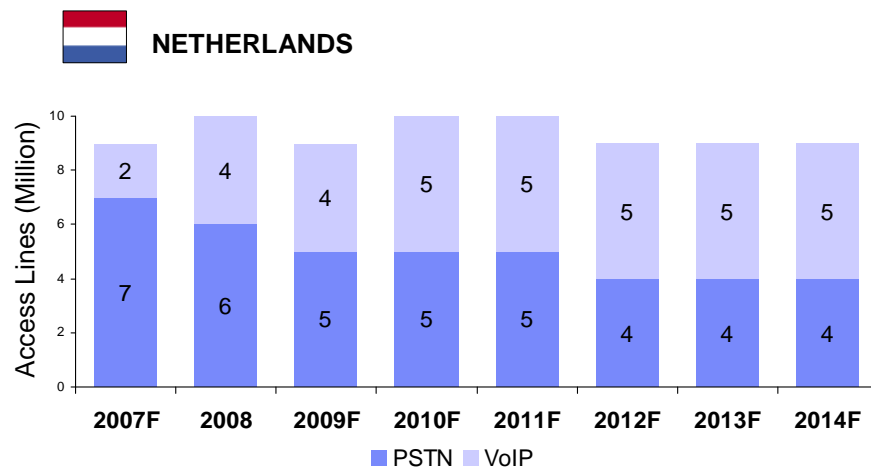
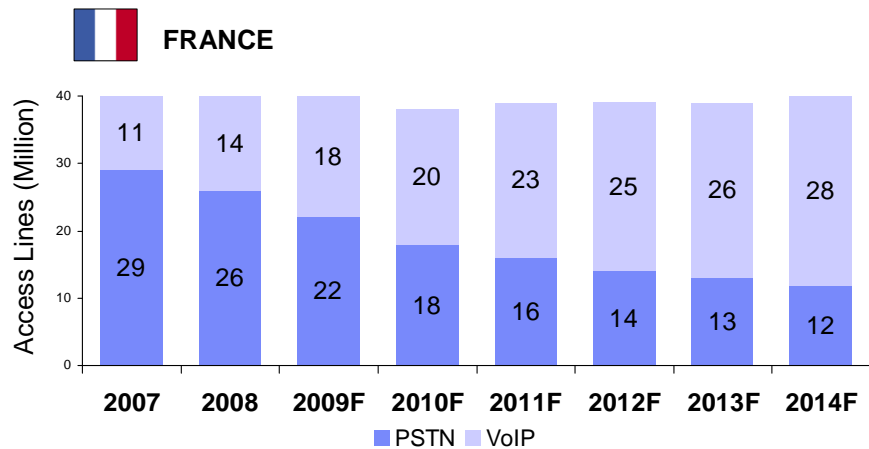


- Decline in advanced markets accelerates
- BRIC turn from growth to declining market
- MEA is largely under-penetrated and has substantial catch-up potential in fixed

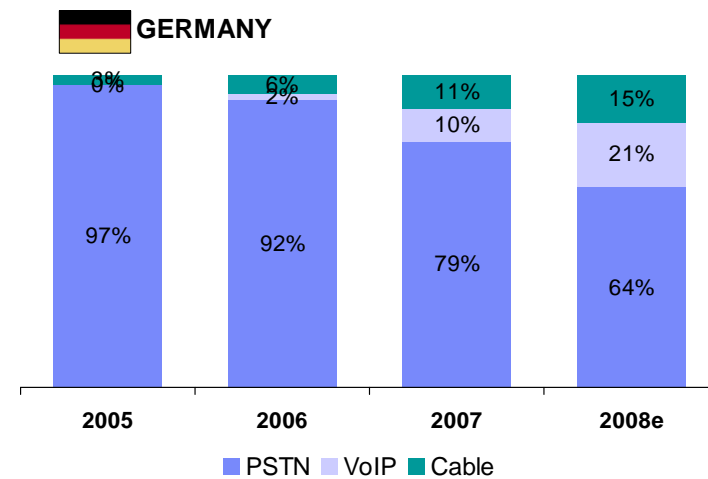


Increasingly VOIP is replacing fixed voice access lines...

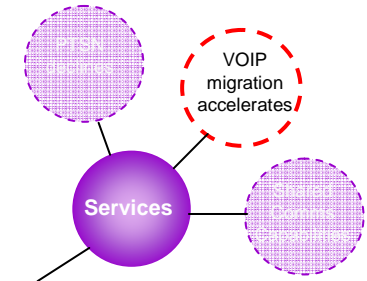
Voice Access Lines



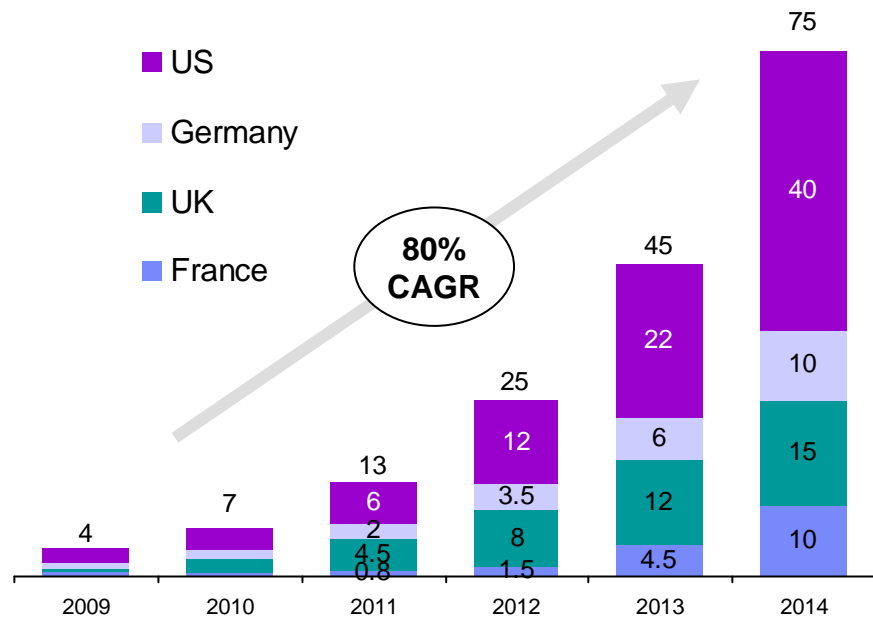
Share of Voice Access Lines



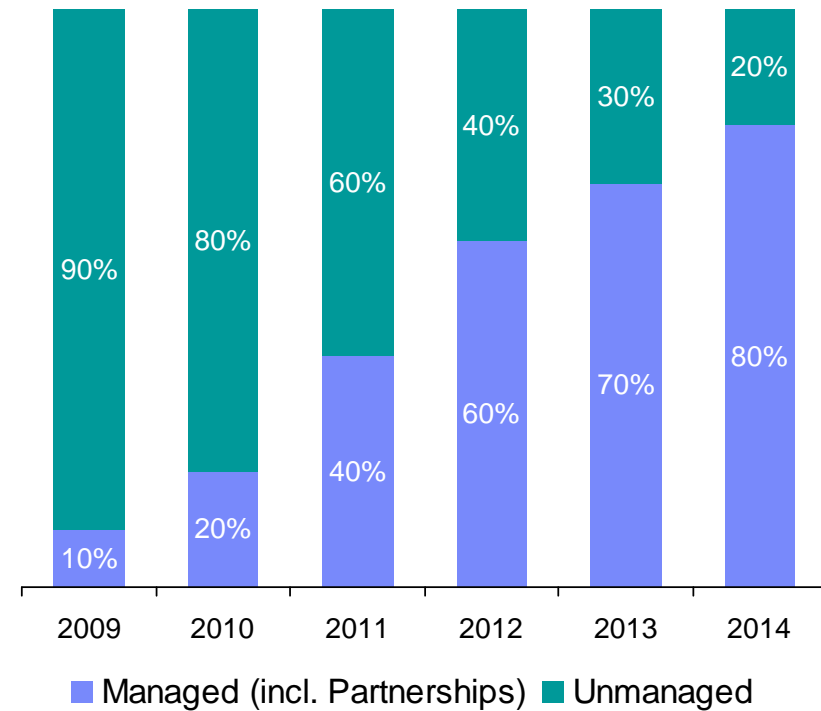
...and the proportion of operator managed mobile VOIP will increase as penetration of mobile VOIP accelerates



Mobile VoIP users
(million)

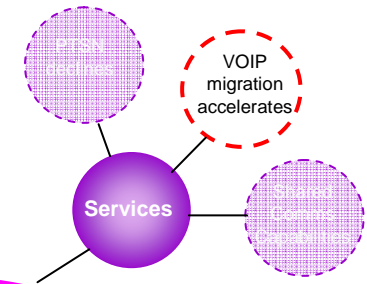


Ratio Managed /
Unmanaged VoIP users



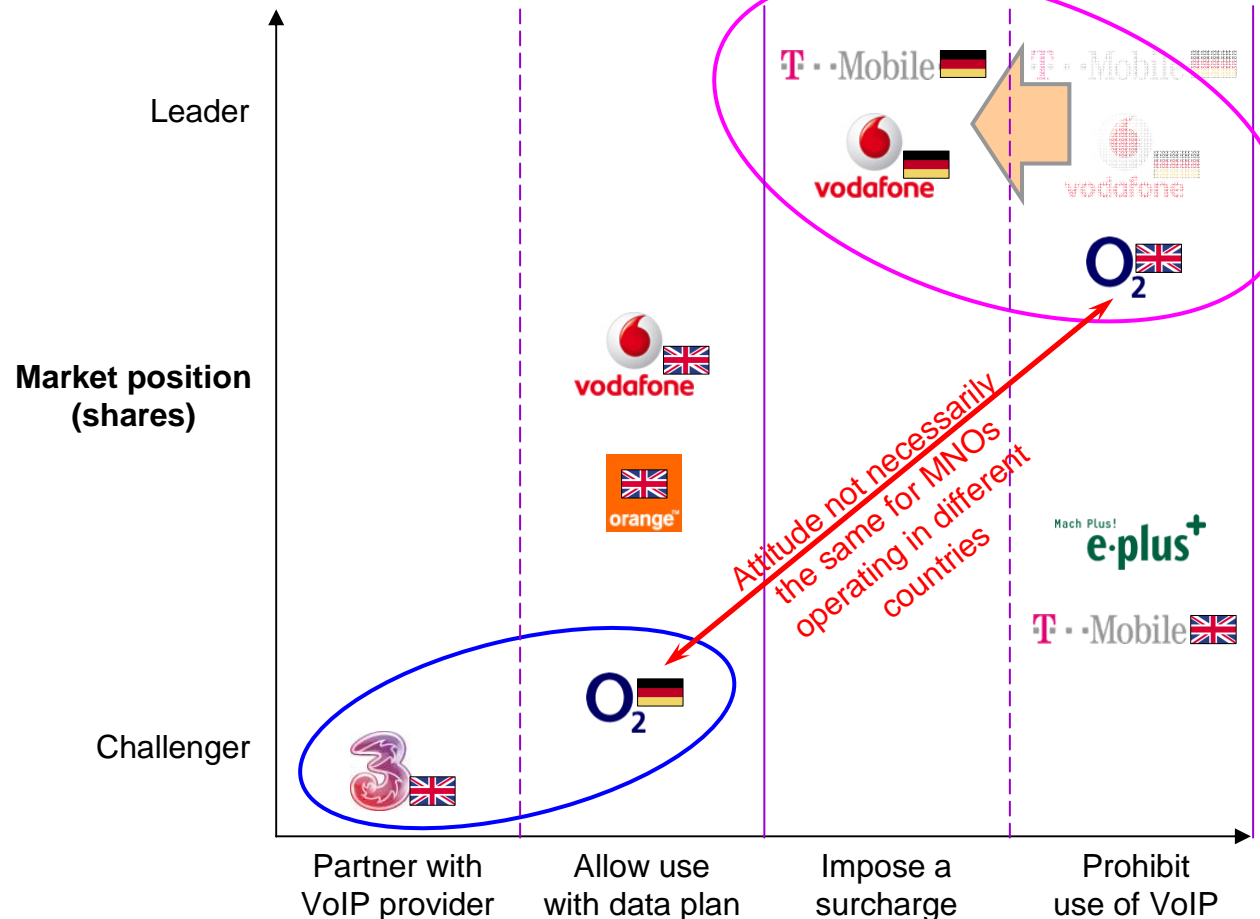
...and operators begin to relax their attitudes

Mobile VoIP: Strategies of leaders versus challengers



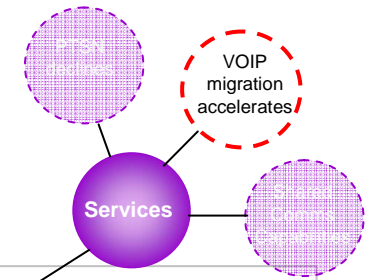
► Market leaders exploring possible revenue models:
T-Mobile / Vodafone (DE) have lifted the ban on VoIP and imposed a surcharge

► Market challengers using VoIP as a means of competitive differentiation:
3 partnering with Skype



Mass migration to mobile VOIP however is unlikely until HSPA and LTE are deployed widely to address known limitations

Obstacles to mass market adoption of (unmanaged) mobile VoIP on 3G networks



USABILITY ISSUES

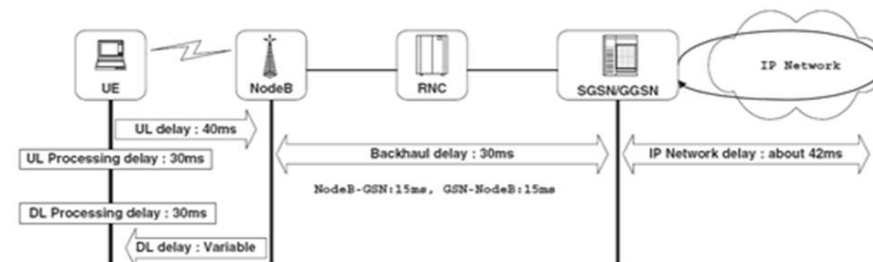
- **3G to 2.5G cell handover:** while cell handover within 3G coverage zone works reasonably well (although longer handover times are clearly perceived and reported by users), handover from a 3G to 2.5G cell site does not currently work in practice with dropped sessions in nearly all cases
- **Shortened battery duration:** current mobile VOIP solutions rely on particularly intensive processing within terminal both on call and always-on wait modes, resulting in substantially shortened battery duration

AVAILABILITY ISSUES

- **Device compatibility:** while all major mobile VoIP solutions are now available on major smartphone OS platforms (Symbian, iPhone, Blackberry and Android), all sorts of cross interference issues have been reported with other applications installed (particularly carrier-customised) by early adopters, limiting widespread adoption by non-geeks
- **Cellular network coverage and reach:** current mobile VOIP codecs at 28.8kps could theoretically work on EDGE network but user tests have shown unacceptable latency and jitter. So service availability remains confined to public Wifi and 3G network coverage areas.

QoS ISSUES

- Increased delays across all mouth to ear delay components
- Increased latency due to permanent packet retransmissions required

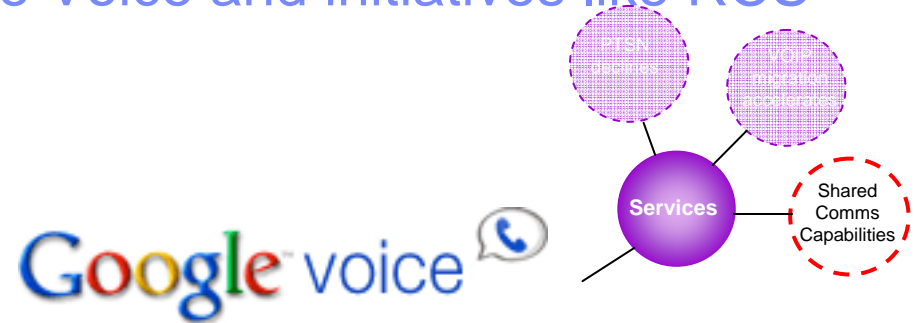


Shared capabilities enabling interoperability across fragmented tools will become standard through Google Voice and initiatives like RCS

Rich Communications Suite (RCS)



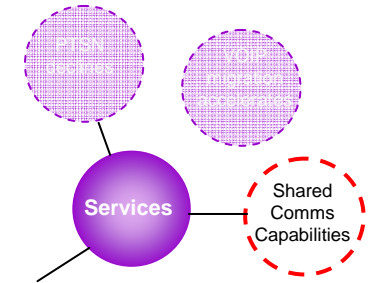
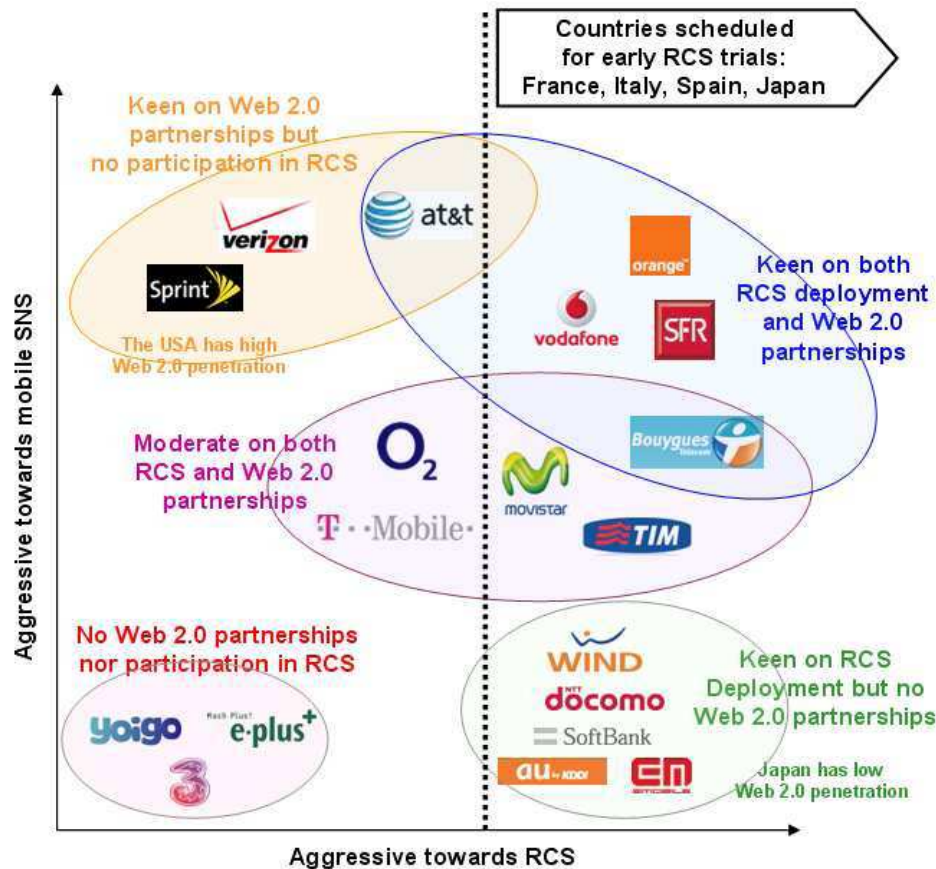
- **Interoperable** services between mobile devices and PC terminals, across different access networks
- The Enriched Call experience initially provides the capability to share multimedia content during a call.
- Enhance phone book service capabilities and presence-enhanced contacts in a network address book
- Enhance messaging expands on traditional instant messaging to simplify and unify multiple messaging mediums and provide a richer user experience



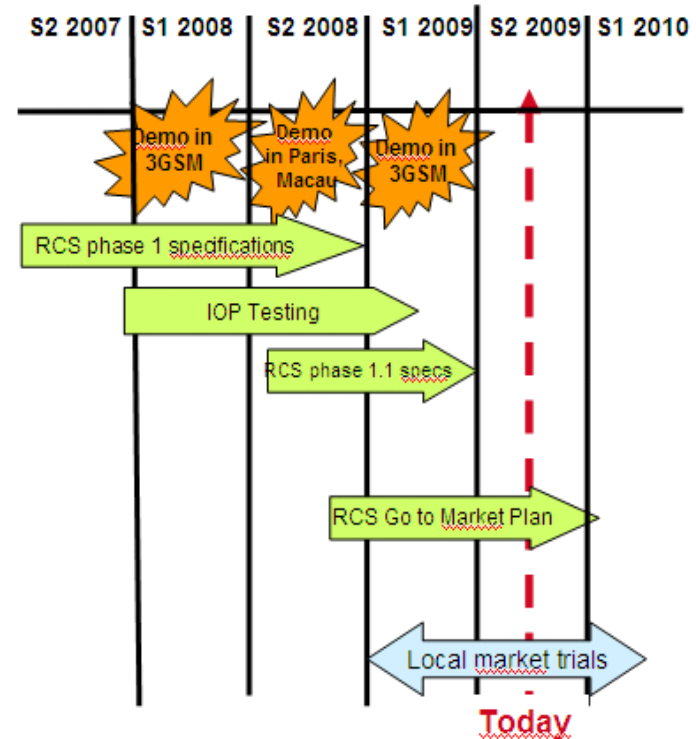
Google Voice also gives a user a Google Phone number that links all their phones together into one central communications network enabling

- **One number:** a single phone number that rings all your phones
- **Free SMS:** send, receive & store text messages online
- **Block calls:** send unwanted callers straight to voicemail
- **Record calls:** record phone calls and store them online
- **Conference calls:** join several people into a single call
- **Screen callers:** hear who is calling before you pick up
- **Google voicemail:** voicemail like email
- **Voicemail transcription:** read what your voicemail says
- **Custom greetings:** vary voicemail greetings by caller
- **International calling:** low cost calls to the world
- **Notifications:** read voicemail messages via email or SMS
- **Share voicemails:** forward, embed, or download voicemails

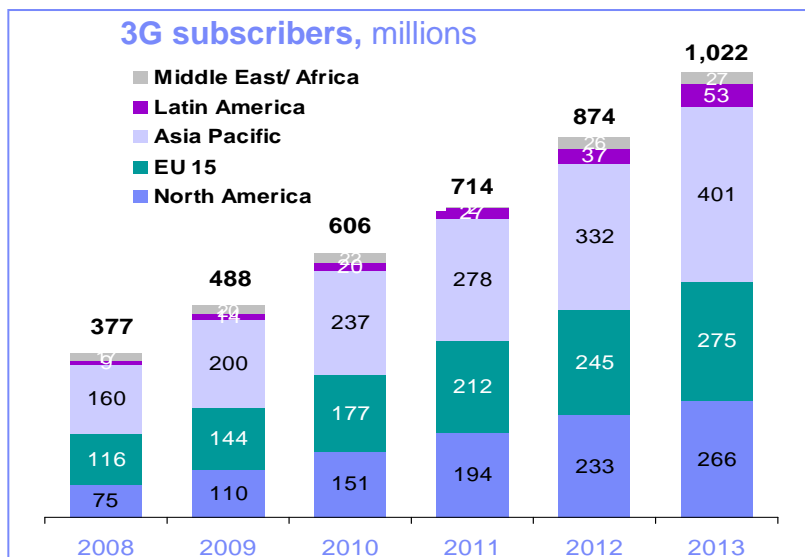
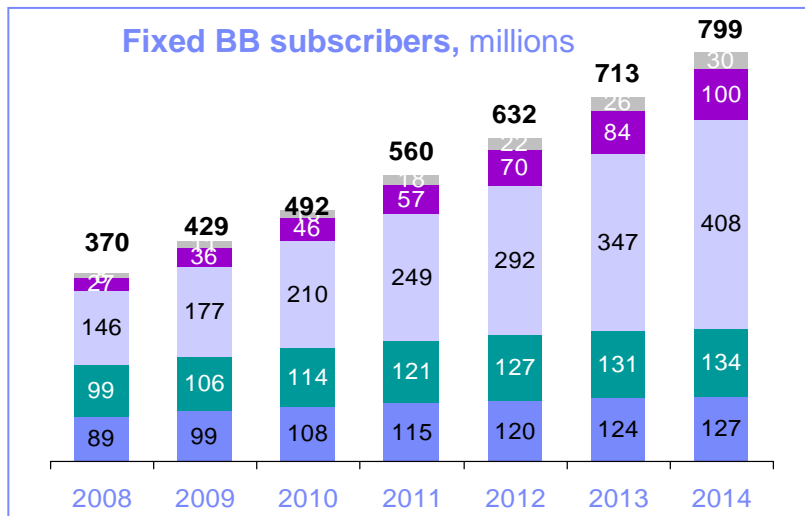
A number of telecom operators have RCS trials already underway



RCS Timeline

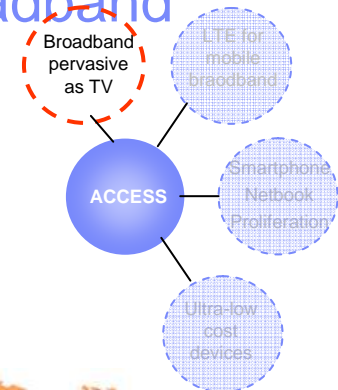
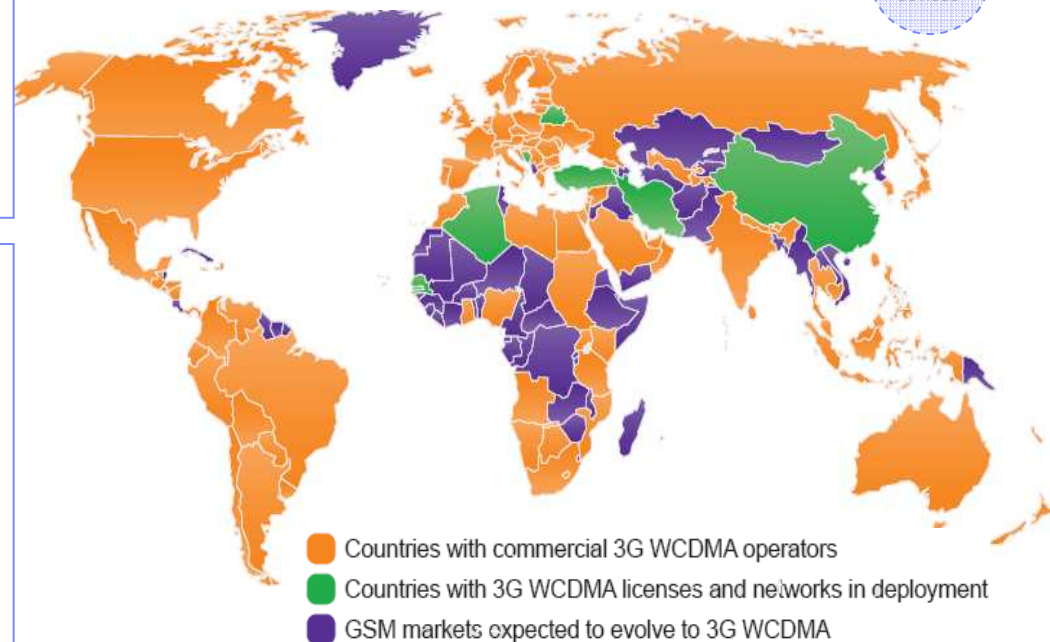


Majority of households in advanced markets and urban areas of most emerging markets will have access to 'basic' broadband



Source: IDATE

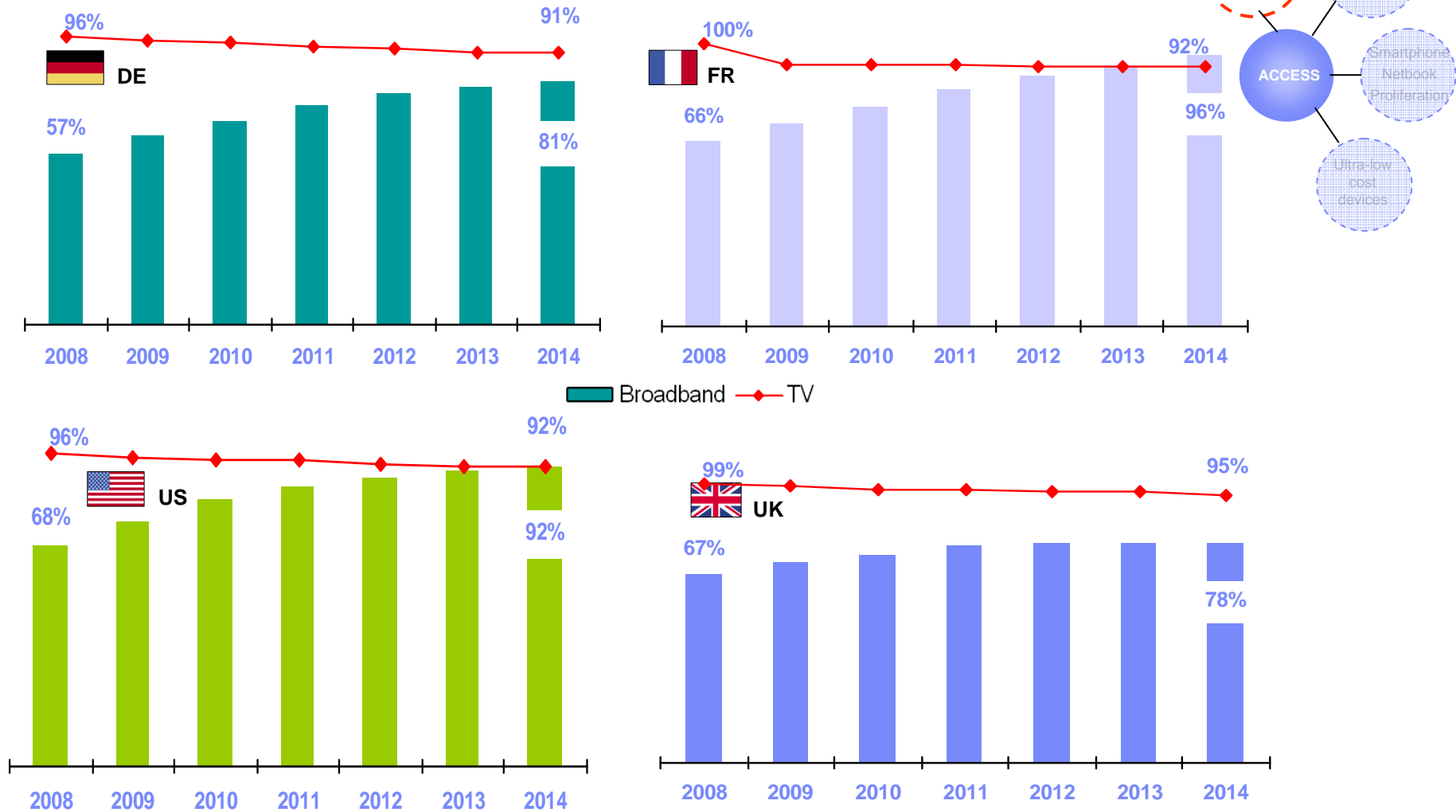
Global 3G Deployments



Satellite links from incumbent players and new players (e.g. Google-backed O3B) to eliminate most white spots

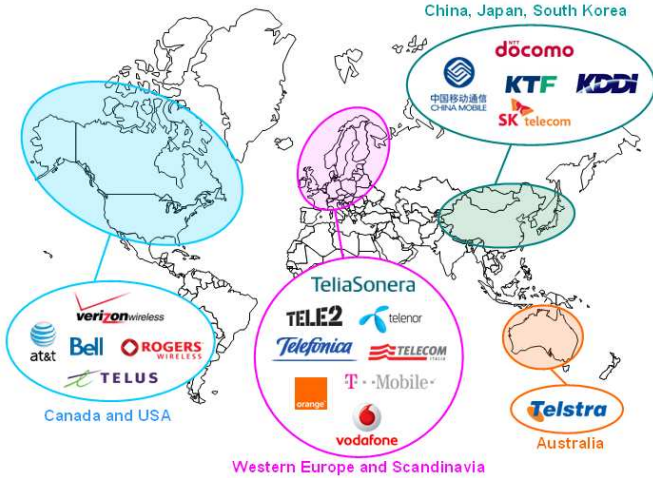
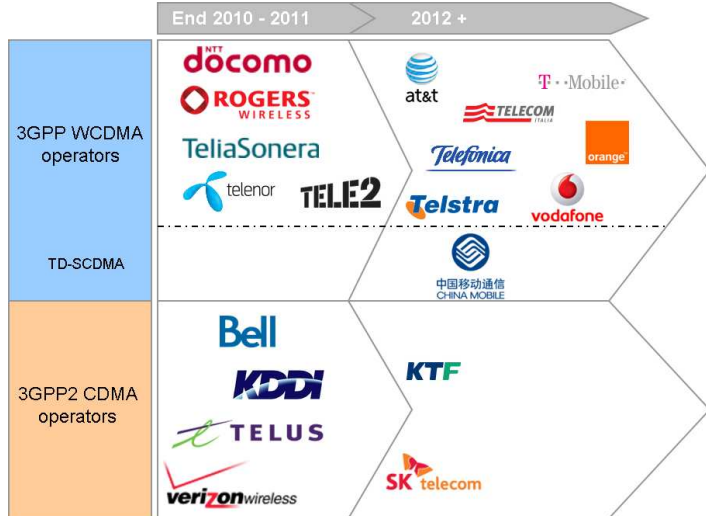
In many advanced markets, broadband will be generalised with household penetration levels similar to those of Television

Penetration of households (%)



The race for mobile broadband appears to have been decided in favour of LTE

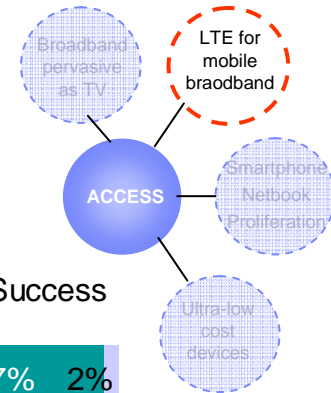
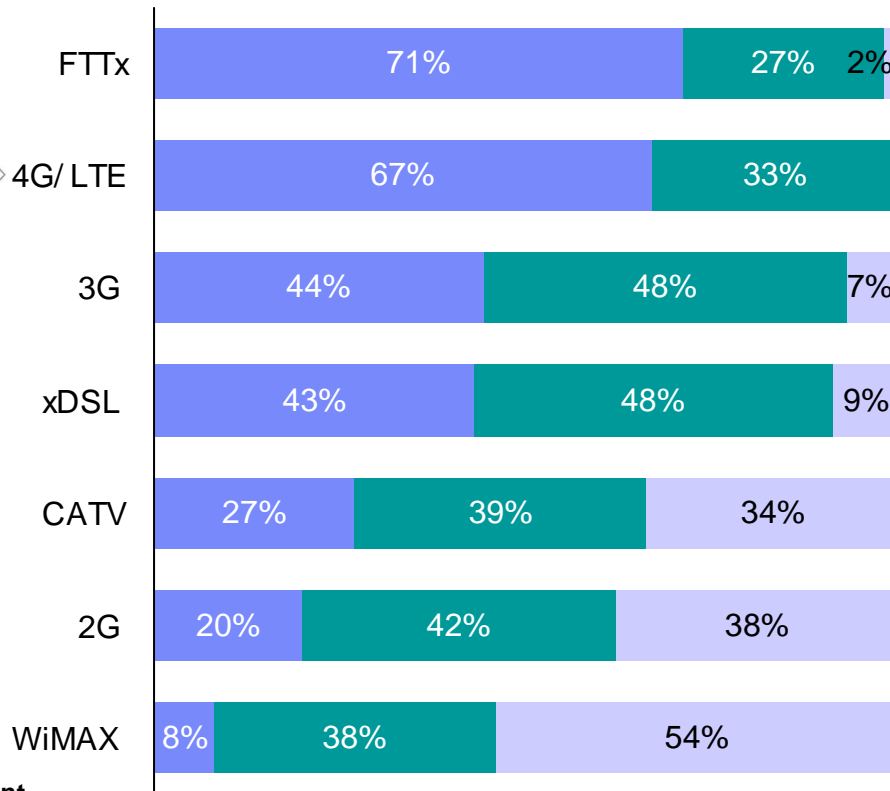
Major operators LTE commercial deployment schedule



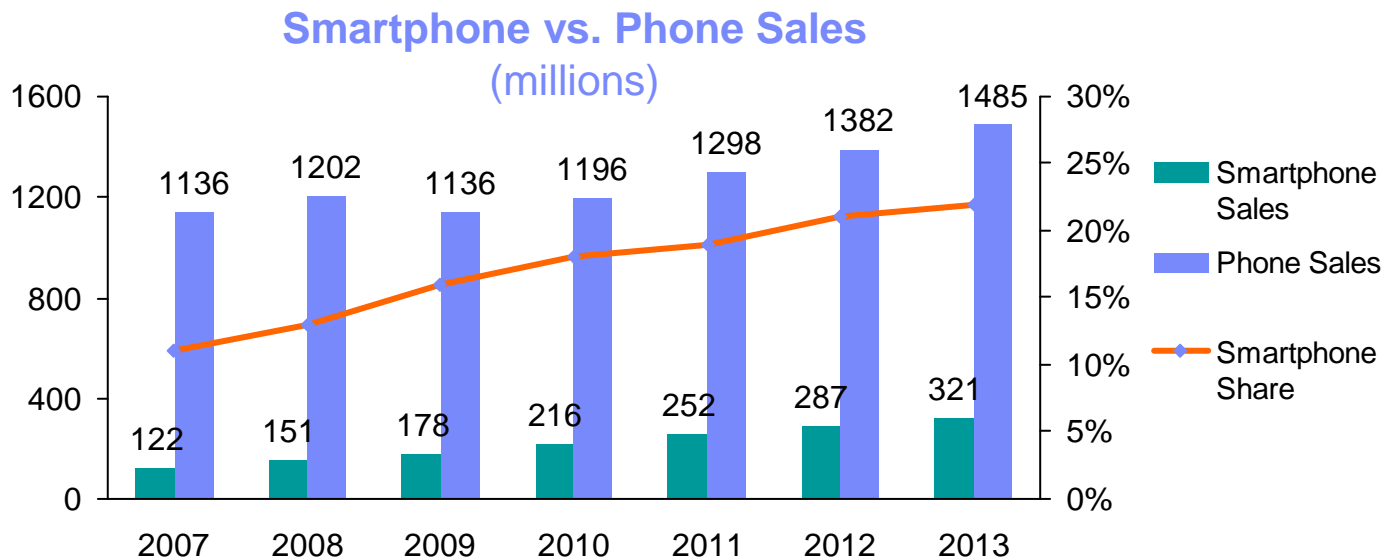
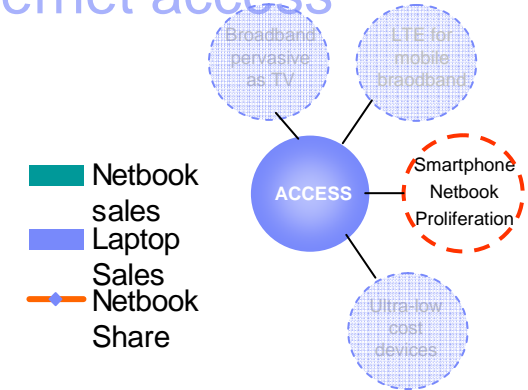
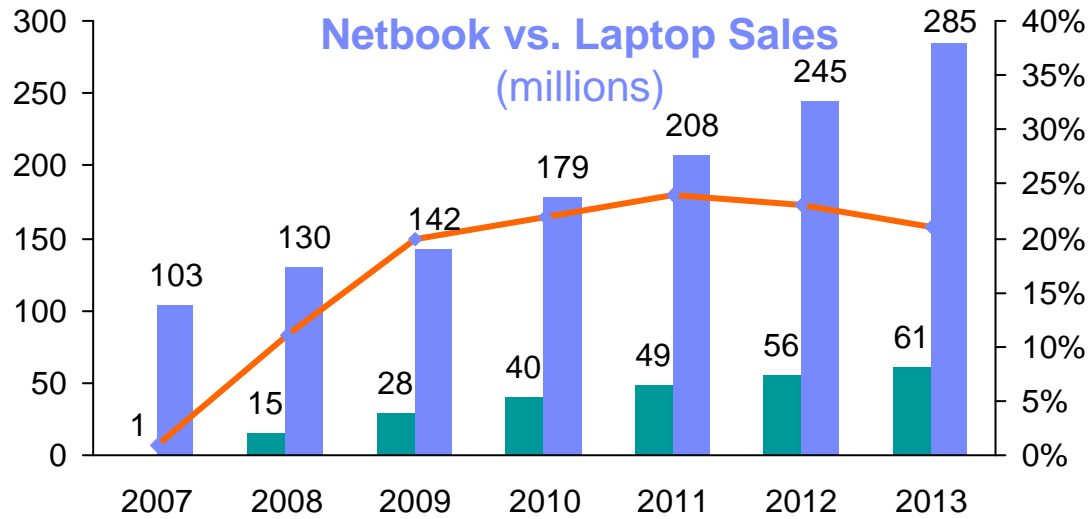
Geographical mapping of early LTE commercial deployment

Which of the following access technologies are going to be critically important to the success of your business over the next 5 -10 years?

■ Critical to Success ■ Neither ■ Not Critical to Success

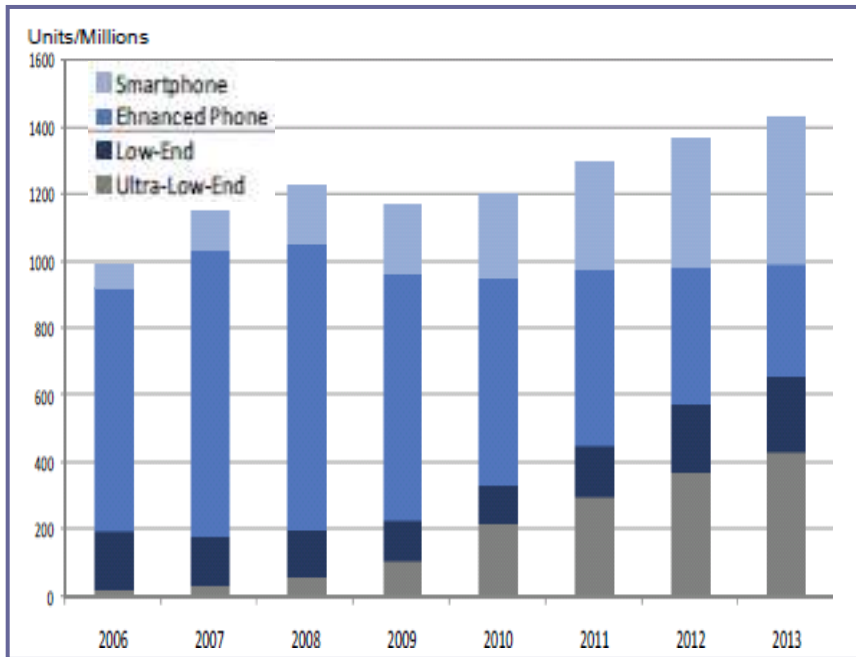
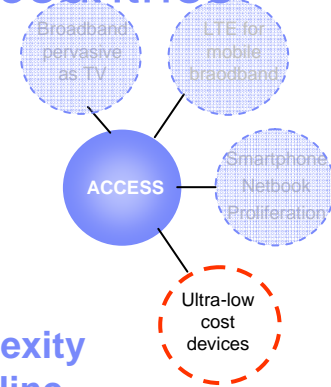


One in five phones and laptops sold will be a Smartphone and a Netbook respectively - i.e. devices with mobile internet access

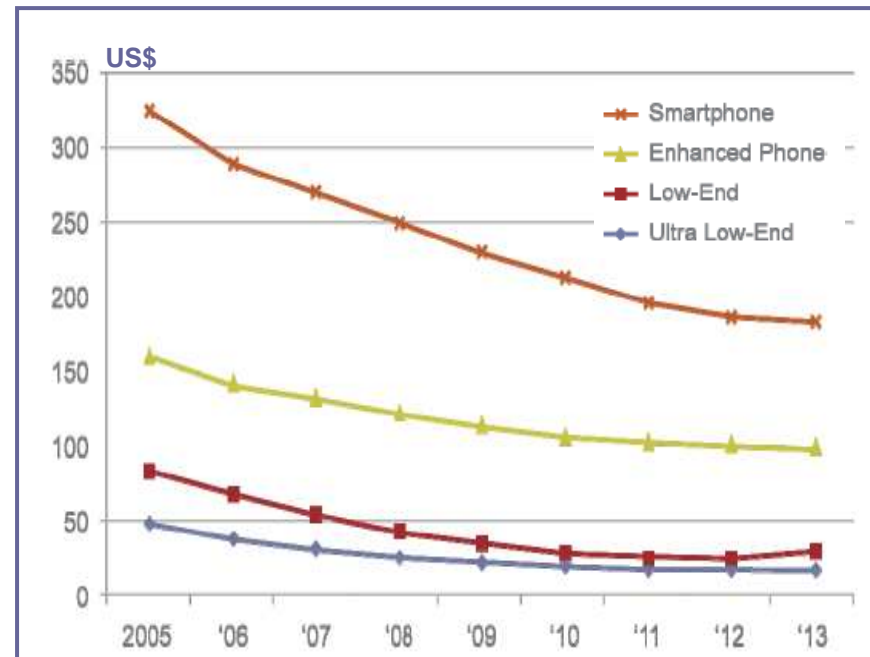


The market for ultralow-cost handsets is expected to grow quickly as more than 2/3 of new subscribers come from developing countries

Rapid growth of subscriber base and and forecasted ULC handsets in emerging markets



Handsets Increase in Complexity but Prices Continue to Decline

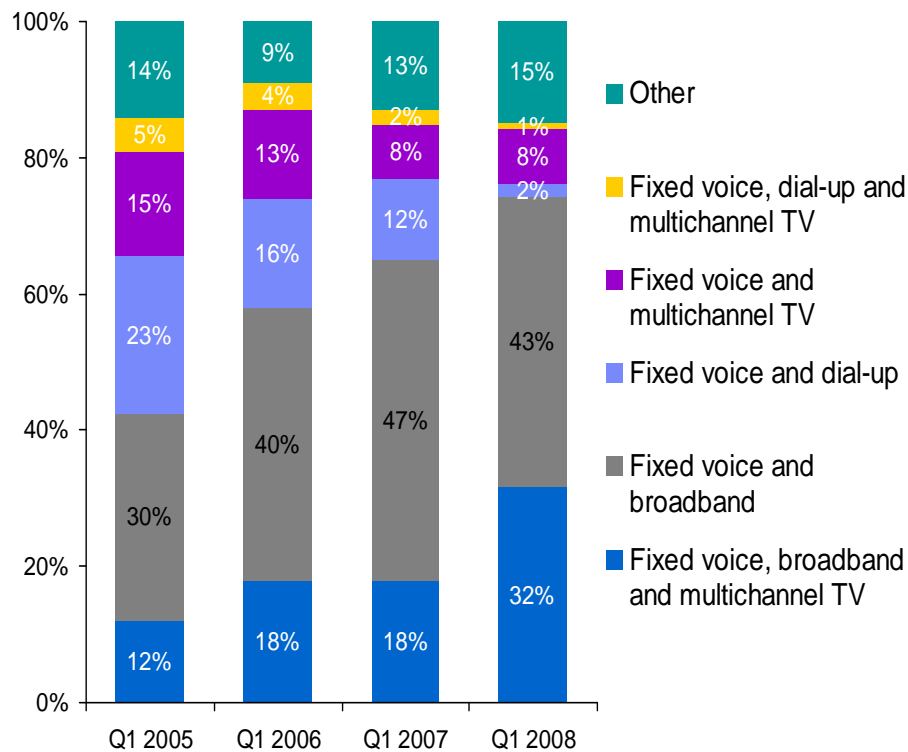


The mobile handset market is becoming increasingly polarised between low cost handsets for emerging markets and high-end smartphones for developed regions – with the mid-range handset market being squeezed.

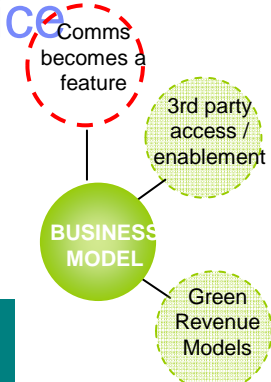
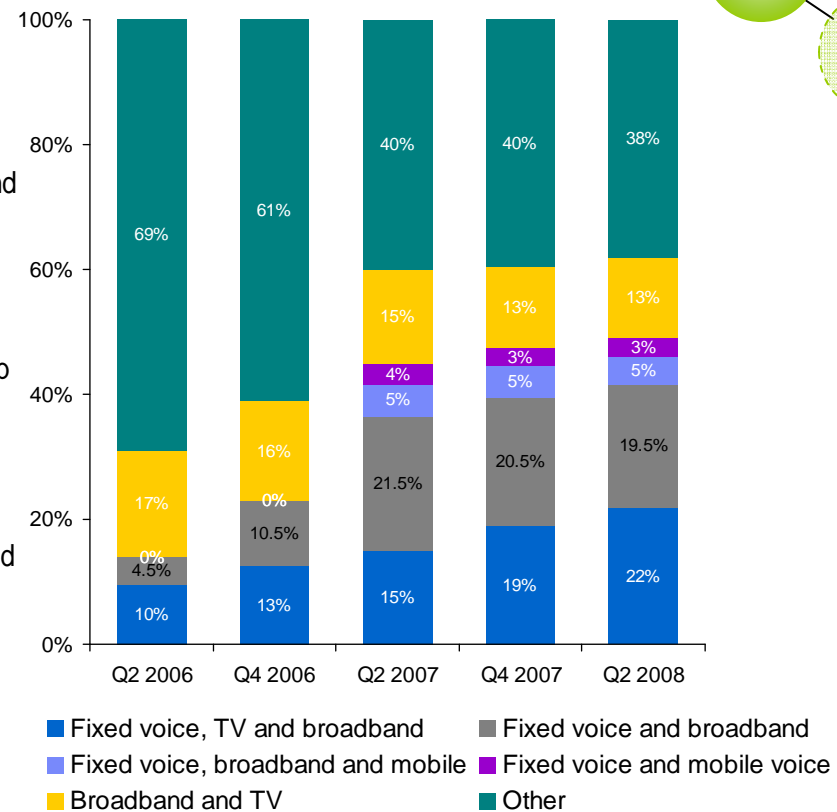


Fixed voice communications will be monetised largely as features of broader connectivity packages rather as a standalone service

Service bundles take-up in the UK



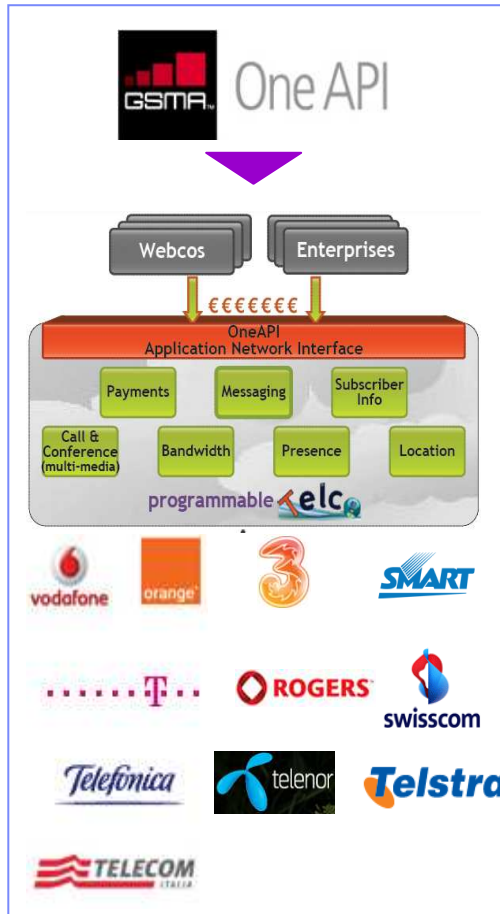
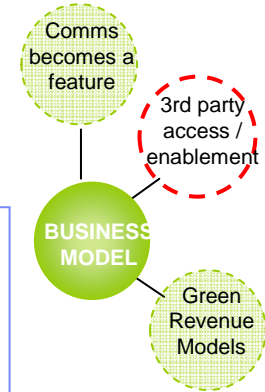
Service bundles take-up in the Netherlands



42 Source: Ofcom (2008), "Communications Marketing Report, Office of Communication, UK, IBM Institute for Business Value Analysis
OPTA market Monitor (2009) <http://www.opta.nl/nl/actueel/alle-publicaties/publicatie/?id=2926>

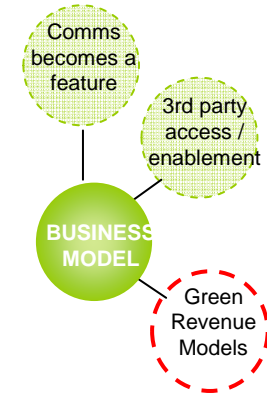
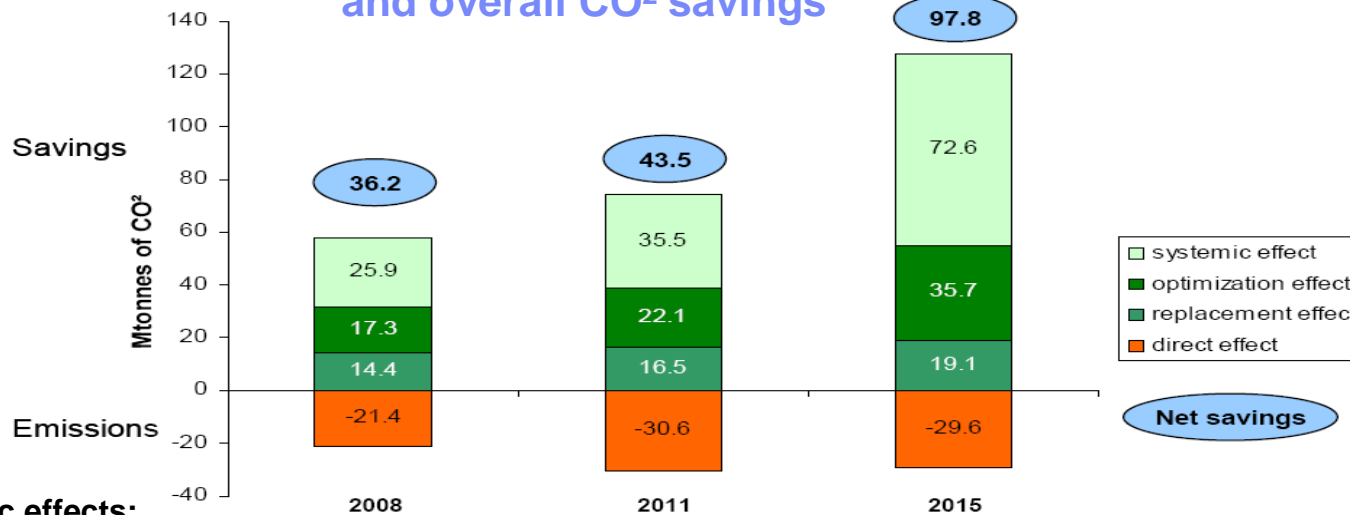
Operators will provide open wholesale interfaces to drive innovation on their networks

Major actors of the mobile industry are involved at different levels

Telcos will enable other industries to reduce their environmental impact and in the process generate additional revenues

Balance of telcos' internal CO2 emissions and overall CO2 savings



Systemic effects:

- Online shopping will save 6.2 million tonnes of CO2 in 2008, and will continue to grow and improve its efficiency
- Dematerialisation of products will continue to increase, as more and more delivery channels migrate Online
- Virtualized interactions will become the most significant CO2 savings contributor

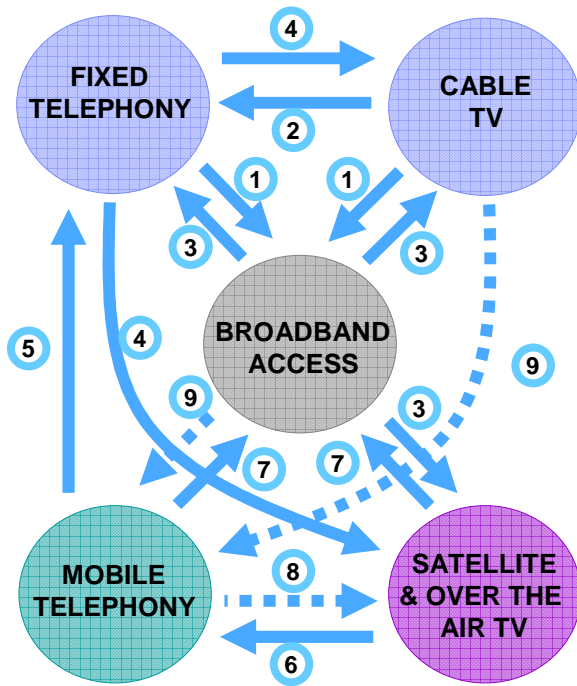
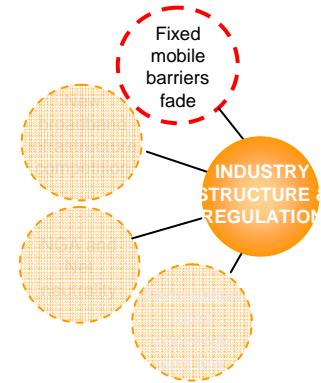
Optimisation

- Telecommunications significantly reduce the carbon emissions of many industrial and logistical activities
- Paper and physical delivery are replaced by online information
- Smart power management will become an important source of savings over the period

Replacement

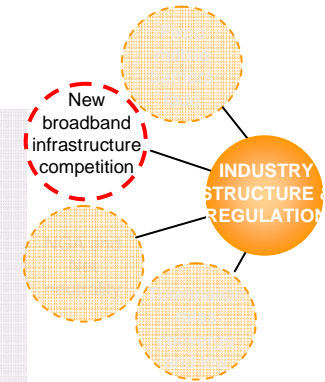
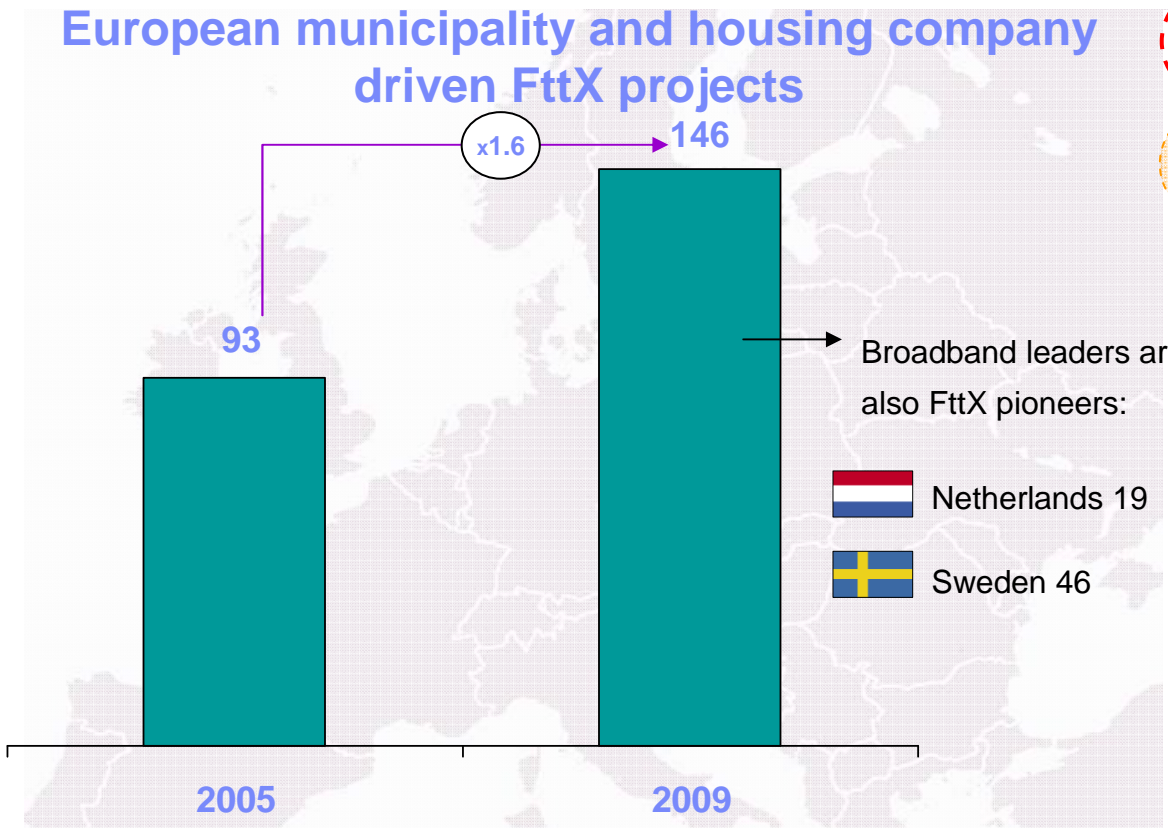
- Conference calls, videoconferencing and telecommuting are directly responsible for 12.6 million tonnes of saved carbon in 2008
- Videoconferencing will continue to grow its impact as solutions become more widespread within businesses and usage increases
- Telecommuting has an exponential impact on the environment allowing reduction of vehicle emissions

The boundaries between fixed and mobile will blur as an increasing number of players offer a combination of products.



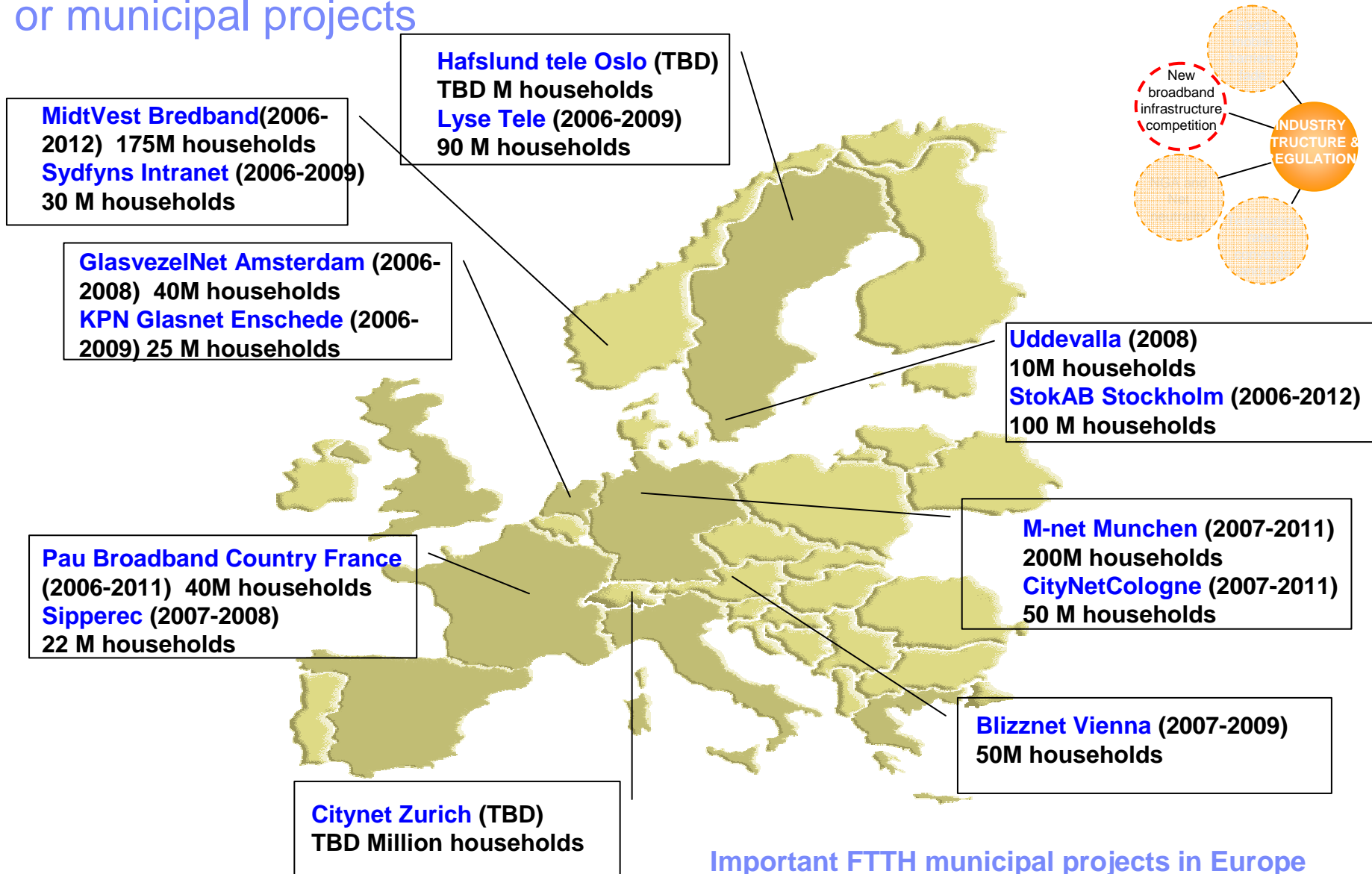
| | Description | Examples |
|---|---|----------|
| 1 | • DSL and cable modem internet access | |
| 2 | • Phone service of cable companies | |
| 3 | • Dual and triple play offerings of unbundled carriers | |
| 4 | • IPTV and TV content rights acquisition by telecom carriers | |
| 5 | • Fixed Mobile Substitution (« Homezone ») offerings | |
| 6 | • MVNO service of TV channels | |
| 7 | • Unbundled or wholesale DSL offerings of mobile and satellite TV providers | |
| 8 | • Mobile TV offerings | |
| 9 | • Cable TV and DSL quad play offerings through MVNO agreements | |

Increasingly new infrastructure competition will come from government, municipality and local initiatives



- Where incumbents and other telcos fail to build out fiber networks non-traditional players will step in
- Local FttX networks driven by local players, including communities, typically adopt an open access approach

Across Europe a significant portion of FTTH deployments are local or municipal projects

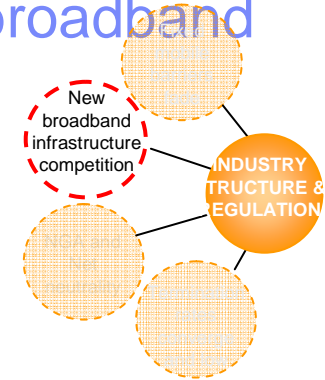


Important FTTH municipal projects in Europe

In the United States the Federal Government is providing stimulus funds to local communities and organisations to expand broadband

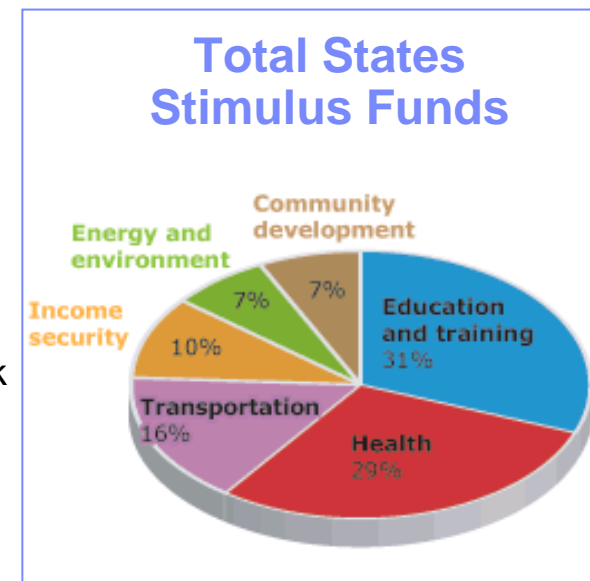


U.S. VP Biden lists \$182 million in awards for 18 projects. The projects are the first to receive part of the \$7.2 billion in funds dedicated to expanding broadband access -- which includes high speed Internet connections -- into rural areas, poor neighborhoods and Native American communities

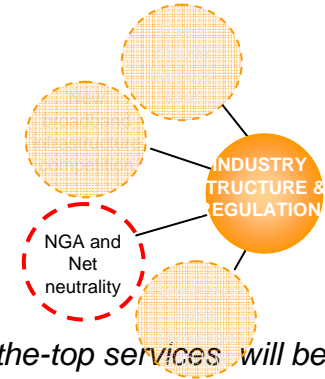


Awardees include:

- the North Georgia Network Cooperative, which will receive a \$33.5 million grant
- the Biddleford Internet Corp. which is to receive a \$24.5 million grant
- North central Ohio's Consolidated Electric Cooperative, which will receive a combined grant and loan of \$2.4 million
- Alaska Native Corporation, which will build out a 4G wireless network in southwestern Alaska
- a New Hampshire FTTH project
- an Arizona project to build computer centers for 84 libraries in that state.



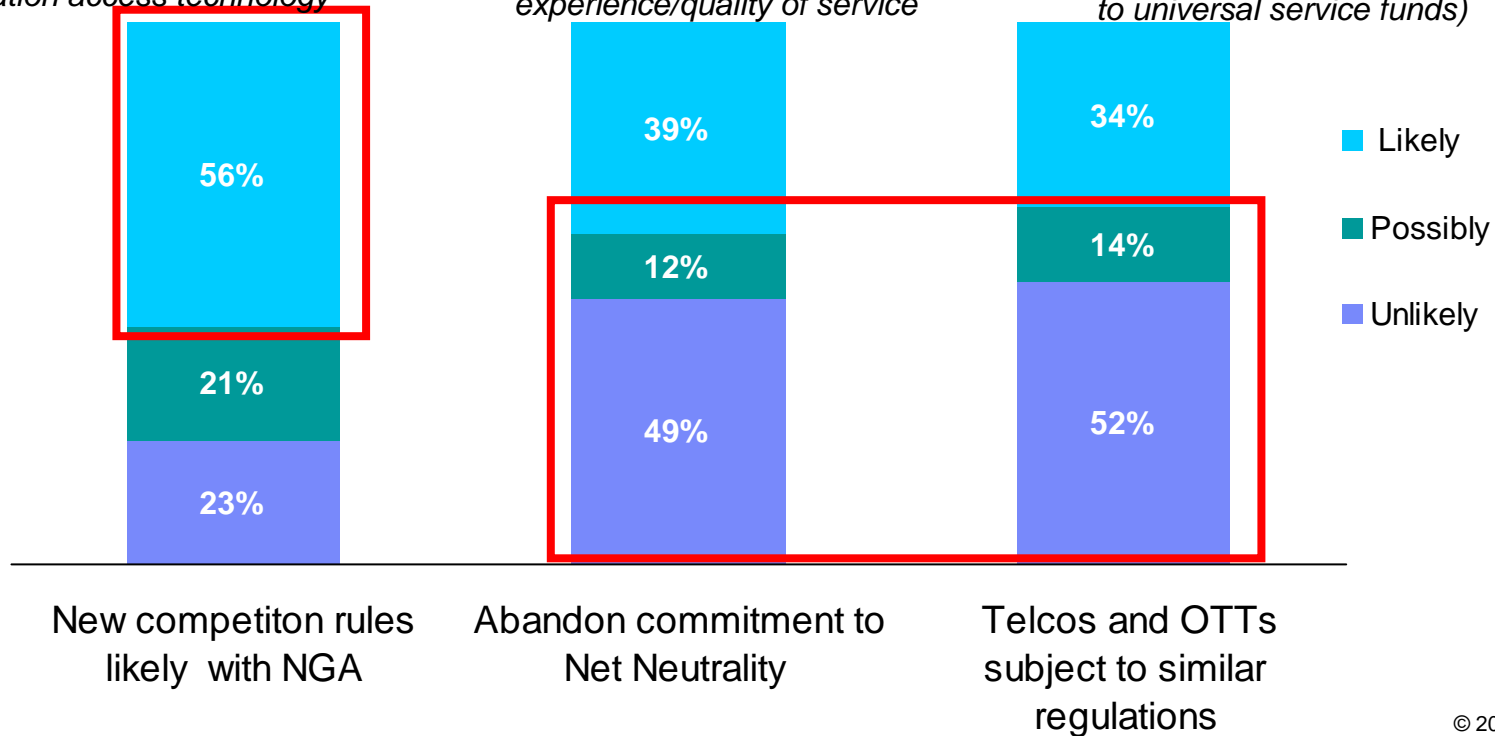
There will be new local access competition rules as NGA is deployed but commitment to net neutrality will remain




Existing remedies for enforcing competition in the local loop will be replaced with the deployment of next generation access technology

Regulators will abandon commitment to net neutrality in order to stimulate investment and improve customer experience/quality of service

Unregulated over-the-top services will be subject to the same regulatory obligations as traditional services (e.g. contributions to universal service funds)



In developed markets mobile and fixed termination rates will converge to symmetric, low levels

 **EU**

From appeals...


- The EU put pressure on the mobile industry to significantly cut termination rates
- The Commissioner's long term vision is to bring down mobile termination rates to levels comparable to fixed termination, i.e. ~ EUR 0.01 – 0.015 per minute

Call termination markets in the E.U. need a regulatory plumber. Over the next 3 years, I expect [...] to bring the costs for mobile phone calls down by around 70 %
—V. Reding, EU Commissioner

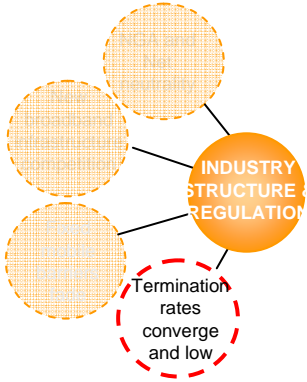


... to regulation

- Unsatisfied with the absolute levels and discrepancies of MTR between EU member states, the Commission presented a recommendation for voice call termination
- The Commission aims at harmonising the approaches used to fix MTR
- The Commission aims at enabling lower retail charges and putting an end to de facto subsidies from fixed to mobile operators

 **US**

- MTR are generally lower than in the EU
- Operators free to negotiate rates as long as rate is symmetric
- Fixed incumbent operators typically required to set cost-based termination rates (typically less than one US cent/minute)
- Frequently no MTR charged between mobile operators and new entrant fixed operators
- RPP scheme applied for mobile users

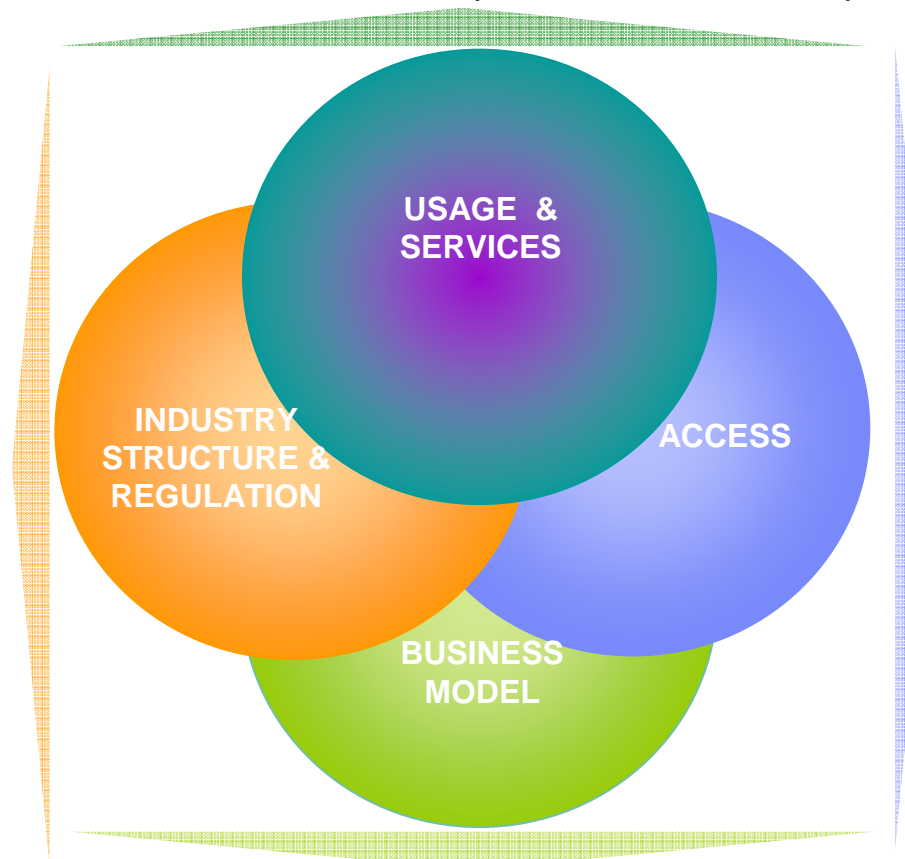


Source: IDATE, European Commission

The world in 2015

PSTN decline accelerates and VOIP grows. Ubiquitous and seamless access models prevail with high levels of rich digital content consumption accessible from any device, platform or network. Communications remain fragmented across several tools but shared capabilities enable interoperability

New infrastructure competition come from government, municipality and local initiatives, will new rules as NGA is deployed. Mobile and fixed termination rates disappear and boundaries among fixed, mobile and internet fade



Mobile and fixed broadband become as pervasive as TV in advanced markets. The battle of mobile broadband now favors LTE. 3G penetration increases in emerging markets. A bifurcated market of devices emerges with high penetration of ultra low-cost devices in emerging markets. One in three devices in advanced markets is a high-end internet-enabled smartphone, MID or, Laptop/Netbook.

Voice is monetized as a feature of connectivity. Operators provide open wholesale access and interfaces to a wide range of capabilities including connectivity, customer information and billing services, to drive traffic on networks.

Communication providers benefit from environmental mitigation programs.

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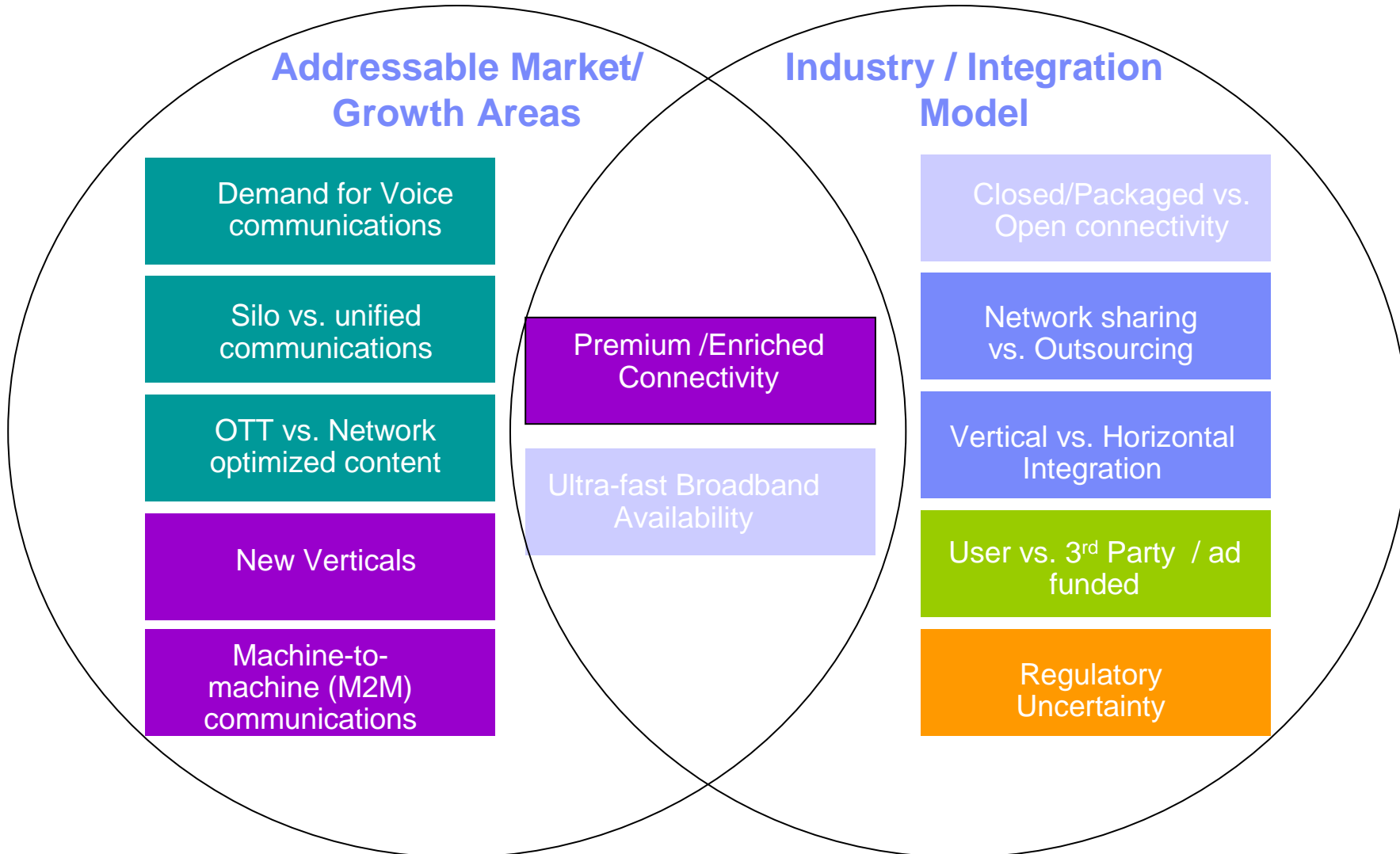
Generative Bazaar

Clash of Giants

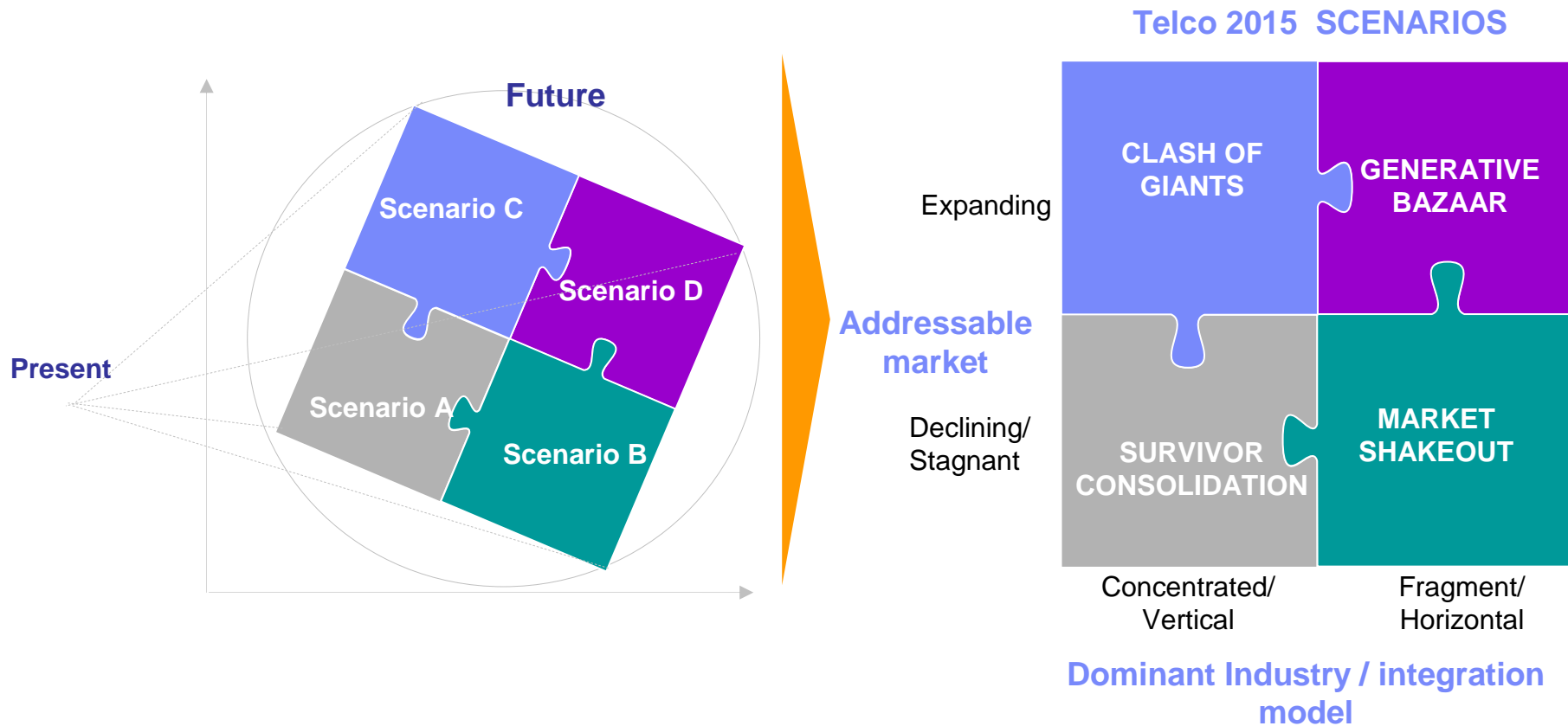
Generative Bazaar

Summary and Conclusions

Dominant themes across selected critical variables - addressable market growth and the dominant industry model ...

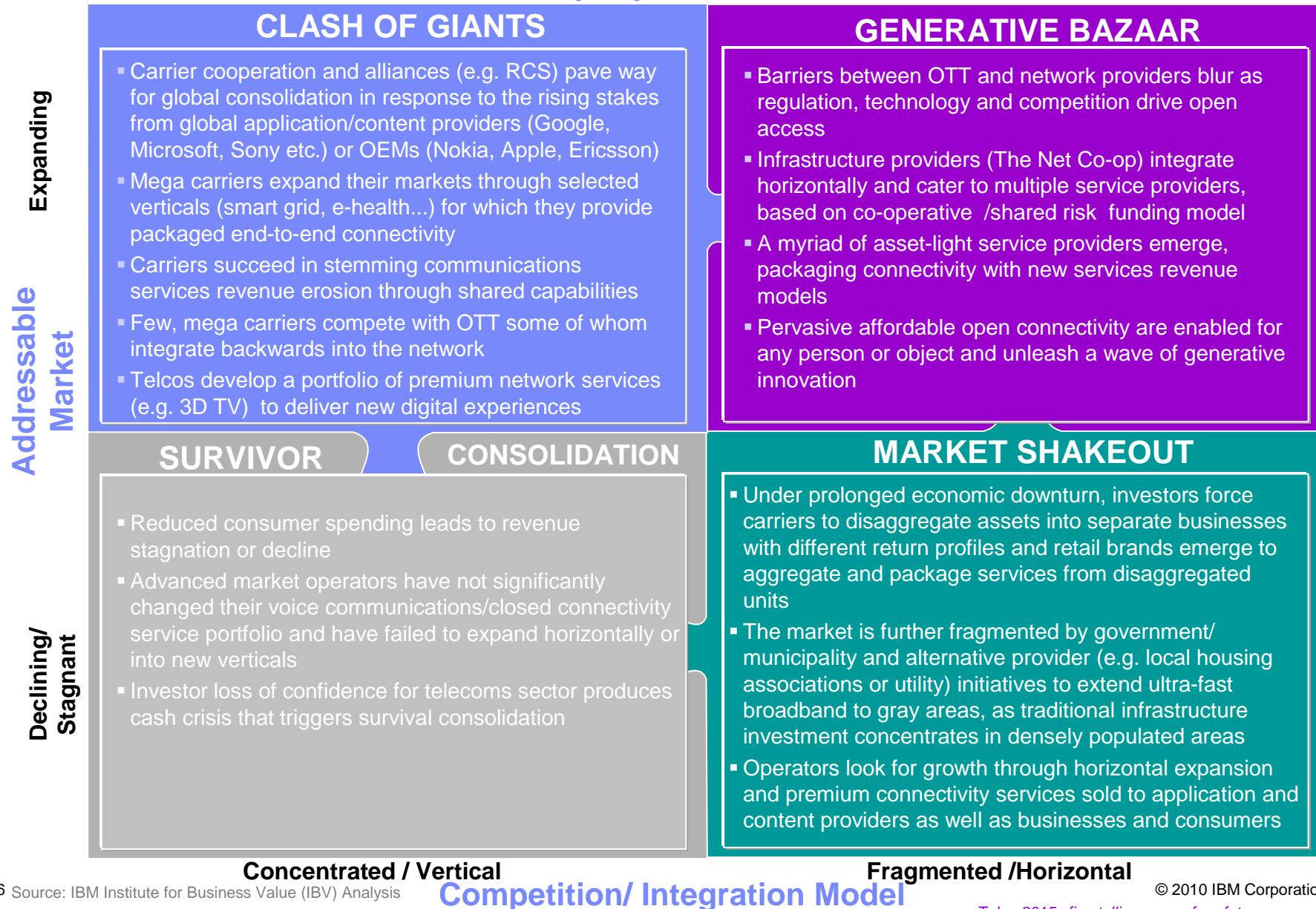


...provide the dimensions that define four corner scenarios within the sphere of possible futures for telecom in 2015



The major dimensions for our scenario construction are addressable market and dominant industry structure/ integration model

...each with contrasted industry dynamics ...



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- ***Scenario Characteristics***
- ***Scenario Triggers / Realization Path***
- ***Financial Assumptions***
- ***Revenue and Profitability Implications***
- ***Critical Success Attributes***

Packaged communications and connectivity services dominate with minimal service innovation based on traditional revenue models

SCENARIO CHARACTERISTICS

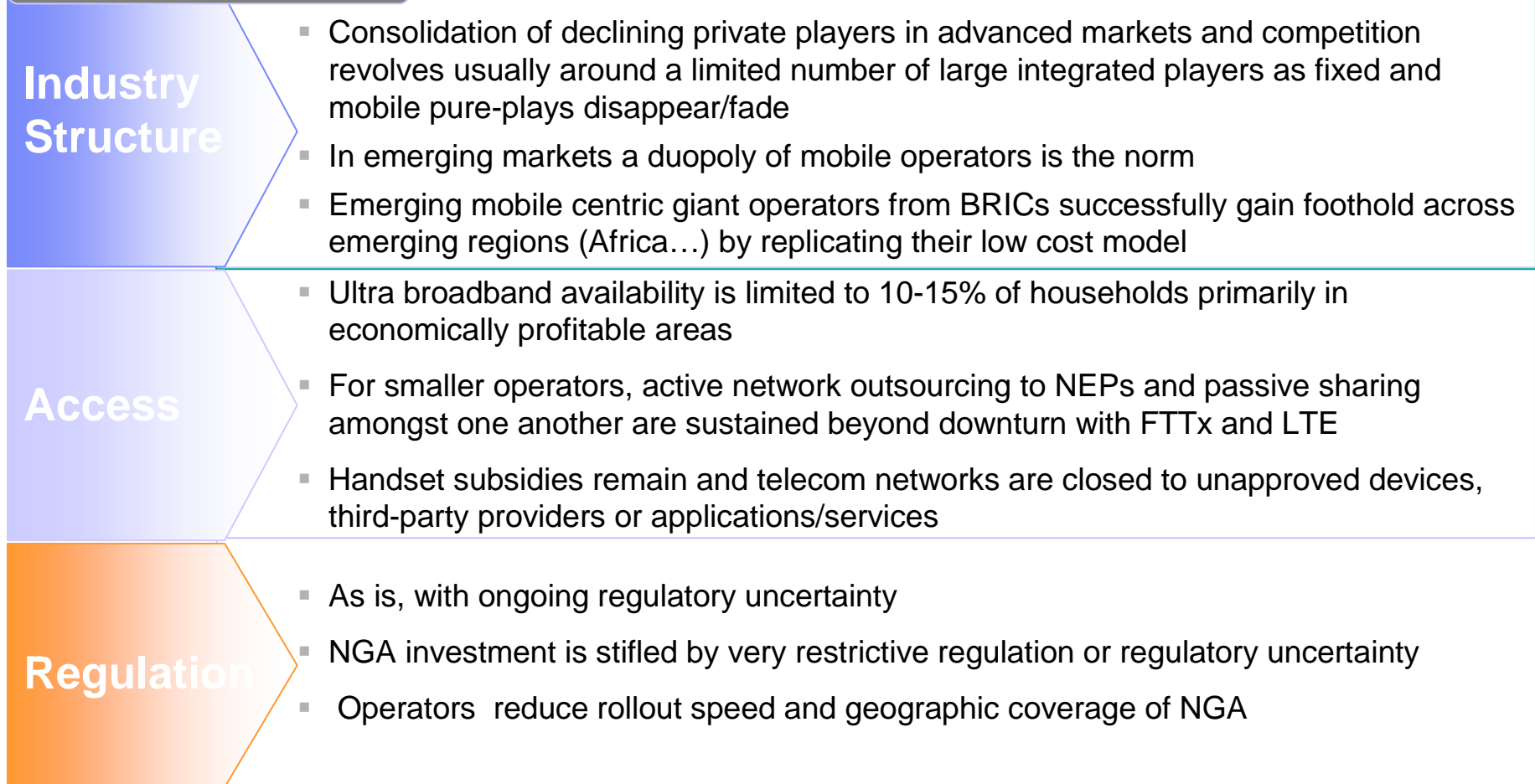
Survivor Consolidation



Economies of scale drive integrated (fixed and mobile) model dominance and network investments are curtailed

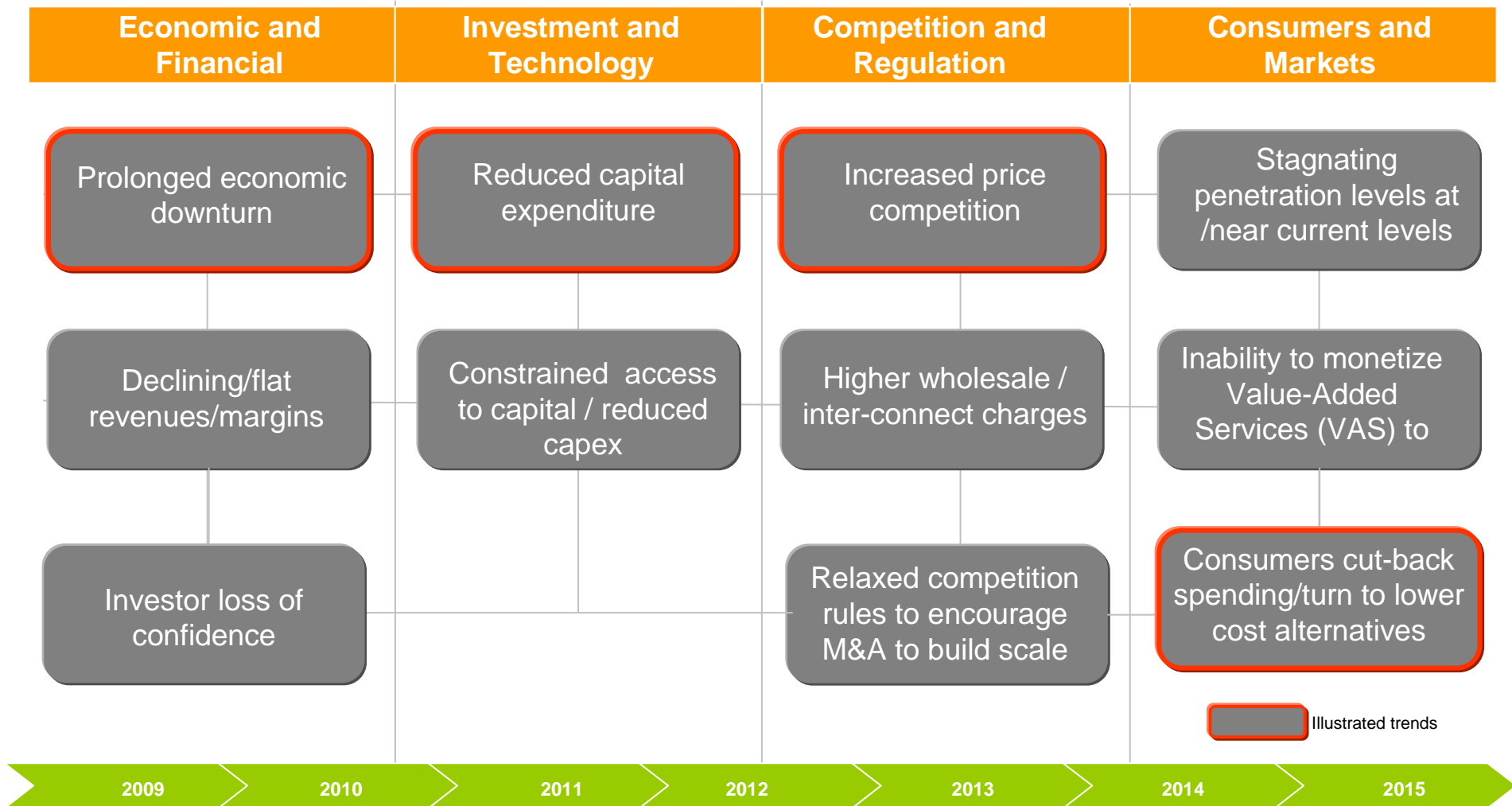
SCENARIO CHARACTERISTICS

Survivor Consolidation



Stagnating penetration and lack of growth/capital investment lead to investor loss of confidence and triggers survivor consolidation

TRIGGER EVENTS / REALIZATION PATH FOR SCENARIO



Critical success attributes for Survivor Consolidation

How well operators are positioned Weak Moderate Competitive Strong

| Critical Success Attributes SURVIVOR CONSOLIDATION | Current Capability Assessment | | | RECOMMENDATIONS |
|--|-------------------------------|------------------|-----------------|---|
| | Integrated Operators | Mobile Operators | Fixed Operators | |
| Exploit fixed–mobile substitution to increase revenues /growth | | | | <ul style="list-style-type: none"> Stimulate mobile voice usage through competitive commercial packages with fixed alternatives Fixed operators acquire/partner for mobile capability Invest in fixed mobile convergence with cost synergies |
| Contain voice ARPU erosion | | | | <ul style="list-style-type: none"> Move to flat rate/ all-you-can-eat packages and bundle with other services (e.g. content / Broadband) Integrate voice with popular OTT communications services e.g. IM, social networking |
| Reduce cost to serve and preserve/ increase operation margins | | | | <ul style="list-style-type: none"> Optimize cost structures through process simplification, automation and transition to self-service Accelerate migration to converged/single core network Leverage global delivery for non-core functions |
| Secure significant fixed / mobile broadband market share | | | | <ul style="list-style-type: none"> Use handset/Netbook subsidies and long-term contracts to acquire / lock-in mobile internet customers Bundle fixed broadband with content and voice offers at attractive prices |
| Scale (across access types and regions) | | | | <ul style="list-style-type: none"> Actively pursue in-country and regional consolidation opportunities to build scale Enhance M&A integration capability to enable rapid integration of IT, business processes and systems |

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- **Scenario Characteristics**
- **Scenario Triggers / Realization Path**
- **Financial Assumptions**
- **Revenue and Profitability Implications**
- **Critical Success Attributes**

Consumers have greater choice from a variety of providers /brands some of who leverage premium connectivity for new services ...

SCENARIO CHARACTERISTICS

Market Shakeout

Usage

- Communications are “silo’d” and fragmented from a wide range of suppliers and aggregators across the value chain leveraging premium connectivity
- Users have greater choice of device/handset, services and service providers with more *ala carte* packages and online/OTT video/TV consumption increases
- In emerging markets mobile money paves the way for other simple data applications catering to specific needs of emerging markets

Services

- Multiplicity of tariff packages including metered and bundles that appeal to different segments supplied under a variety of market brands
- Greater focus on wholesale backbone business as well as ICT services as...
- ...telcos expand horizontally to offer premium connectivity to enable content /application providers to offer own OTT content services with QoS and SLAs
- Emerging market operators focus on growing mobile data usage

Business Model

- User funded but wholesale driven in parts as device OEMs and application content providers leverage premium connectivity to deliver customized and vertical solutions
- Ultra-fast broadband (FTTH and LTE) offers are priced at levels comparable to broadband connectivity, encouraging rapid migration
- Open access models financed by government/ municipalities in gray/sparse populated areas

...in a more fragmented market as governments/municipality and alternative providers extend ultra-fast broadband to gray areas

SCENARIO CHARACTERISTICS

Market Shakeout

Industry Structure

- Some tier-2 operators divest network / assets and focus on customers and brand
- Multiple service provider brands emerge to package and bundle low-cost no frills services targeted at specific consumer segments
- Major device manufacturers enter communications service provision as MVNOs in major markets
- A handful of NEPs manage networks for 50% of global telecom providers

Access

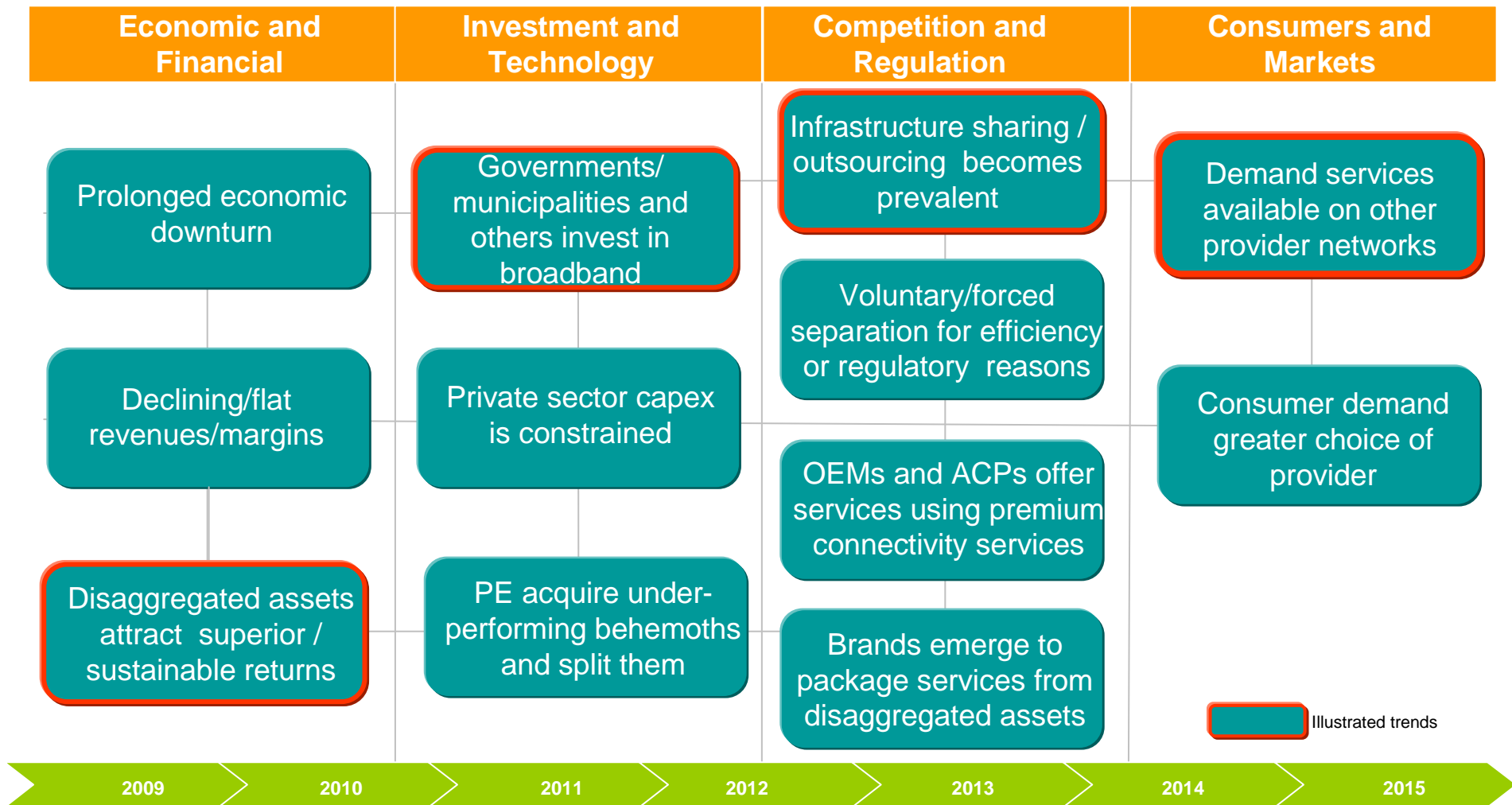
- Government, municipality and alternative provider (e.g. local housing associations, Utilities) broadband initiatives increase household coverage to 20-25%
- Passive infrastructure sharing becomes the norm for most operators for FTTx deployment and for 2G/3G mobile infra optimization
- Low end SIM-only, open devices and high-end devices based on exclusivity periods and strategic partnerships with OEMs, co-exist

Regulation

- Strong access obligations on infrastructure and strong net neutrality stance undermine investment incentives.
- Local not-for profit network initiatives provide open access

Break-up of the vertically integrated model and alternative provider, government / municipality initiatives trigger market shake-out

TRIGGER EVENTS / REALIZATION PATH FOR SCENARIO



Critical success attributes for Market Shakeout

How well operators are positioned Weak Moderate Competitive Strong

| Critical Success Attributes MARKET SHAKEOUT | Potential Capability Assessment | | | RECOMMENDATIONS |
|--|---------------------------------|------------------|-----------------|--|
| | Integrated Operators | Mobile Operators | Fixed Operators | |
| Powerful brand(s) plus strategic asset (e.g. excl. device partnership, network) | | | | <ul style="list-style-type: none"> Leverage capabilities (e.g. devices partnerships, network quality, service innovation, no frills) to establish a distinctive reputation in market place Target specific brands at key customer segments |
| Ultra-fast broadband coverage and optimized network delivery | | | | <ul style="list-style-type: none"> Establish partnerships with municipalities and owners of multi-dwelling units to extend and share BB costs Develop deep insights into network and data usage to optimize core and access networks to reduce costs |
| Collaboration with device OEM and application /content providers | | | | <ul style="list-style-type: none"> Define and implement common / interoperable standards and processes for collaboration Develop a shared platform capability to enable collaboration |
| Open API propositions with low-priced tariffs for 3 rd party services | | | | <ul style="list-style-type: none"> Provide standard connectivity interfaces to enable 3rd parties to leverage premium connectivity capabilities Develop low-cost tariff packages to enable affordable machine-to-machine connectivity across many devices |
| Agile, flexible and reconfigurable processes and infrastructure | | | | <ul style="list-style-type: none"> Develop common platforms integrating technology, processes for rapid business/operating model innovation Leverage global delivery skills |

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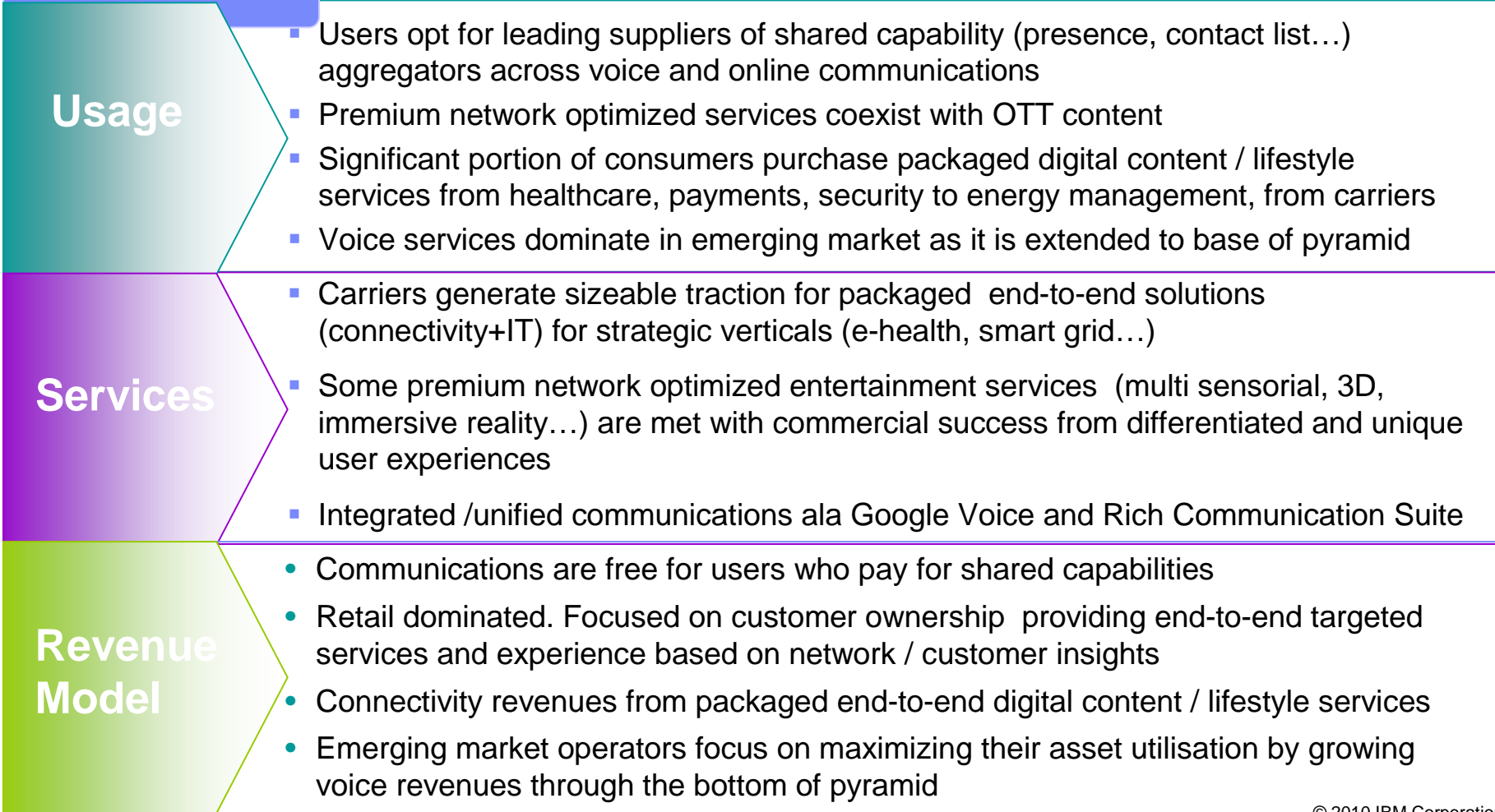


- **Scenario Characteristics**
- **Scenario Triggers / Realization Path**
- **Financial Assumptions**
- **Revenue and Profitability Implications**
- **Critical Success Attributes**

Users opt for packaged integrated communication services as end-to-end OTT and network optimized digital lifestyle services co-exist

SCENARIO CHARACTERISTICS

Clash of Giants



The vertical integration model prevails and some OTT players integrate backwards in a light-touch regulatory environment

SCENARIO CHARACTERISTICS

Clash of Giants

Industry Structure

- Market expansion gives rise to global carrier consolidation in response to rising stakes as OTT players integrated backwards
- Following the example of emerging region carriers, European and North American operators consolidate at regional level (e.g. 2 or 3 pan European operators)
- Some emerging market operators enter mature markets
- Active global industry alliances and standards for shared communications capabilities

Access

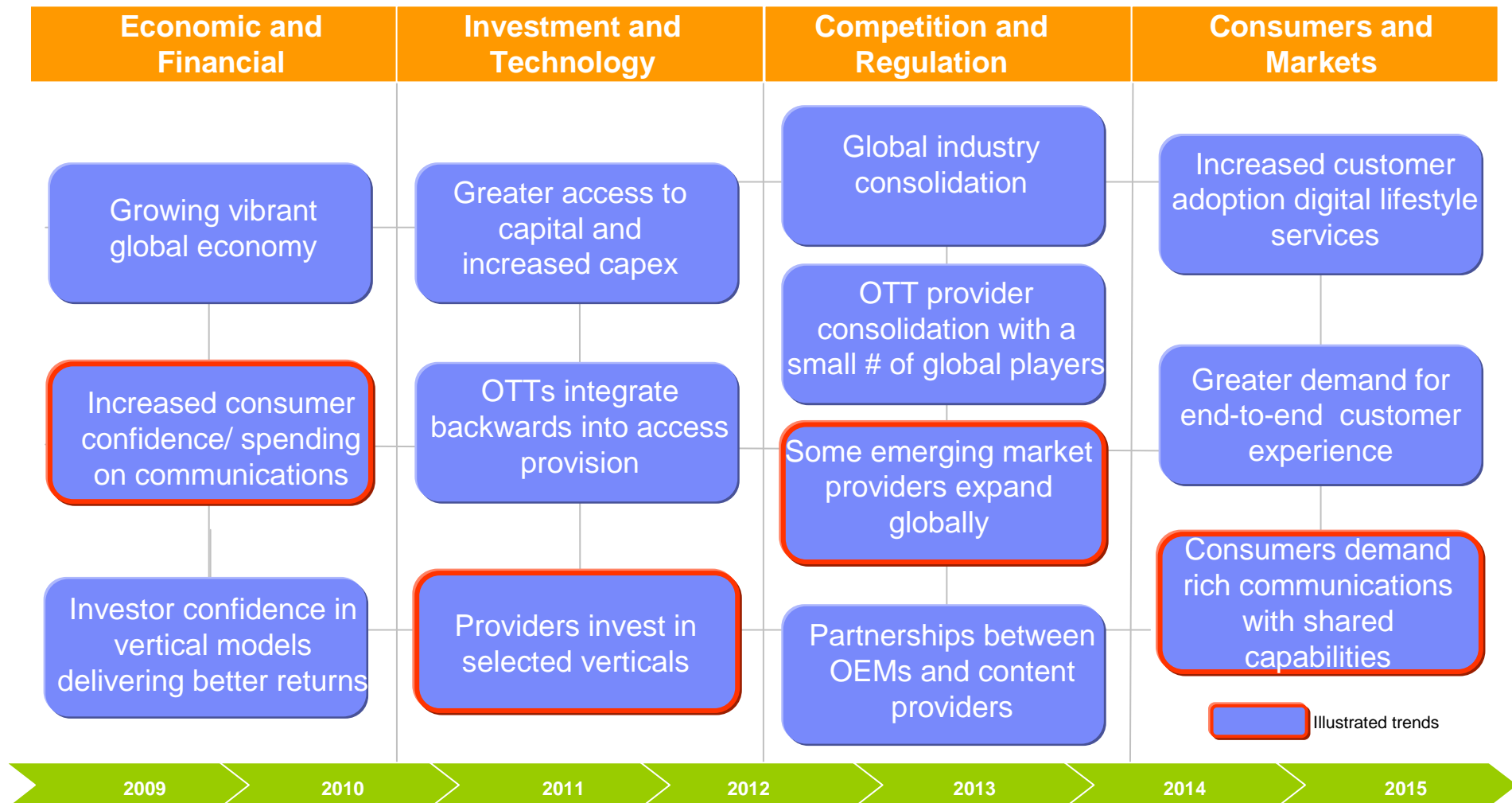
- Operator infrastructure sharing Next Generation Access (NGA)
- ...enabling coverage of 40%-50% of households. No more than 3-4 players in market
- Operators enter strategic partnerships with selected OEMs for devices that conform to their platform architectures and standards
- Custom closed devices to support shared communications capabilities and RCS

Regulation

- Light-touch regulation on infrastructure to encourage infrastructure competition. No endorsement of strong net neutrality positions
- Fewer, big carriers compete with OTT.
- Telcos develop a portfolio of premium services (3D TV) but have to carry competing OTT services

Carrier cooperation and alliances (e.g. RCS) pave way for global consolidation in response to rising stakes from OTT providers ...

TRIGGER EVENTS / REALIZATION PATH FOR SCENARIO



Critical success attributes for Market Shakeout

How well operators are positioned Weak Moderate Competitive Strong

| Critical Success Attributes CLASH OF GIANTS | Potential Capability Assessment | | | RECOMMENDATIONS |
|---|---------------------------------|------------------|-----------------|--|
| | Integrated Operators | Mobile Operators | Fixed Operators | |
| Scale (across access types and regions) | | | | <ul style="list-style-type: none"> Actively pursue in-country and regional consolidation opportunities to build scale Enhance M&A integration capability to enable rapid integration of IT, business processes and systems |
| Deliver end-to-end network-enabled digital experiences OTT cannot replicate easily | | | | <ul style="list-style-type: none"> Leverage real-time network and customer analytics to deliver personalized experiences Enable seamless interactions across access types and devices and new content experiences (e.g. 3D) |
| Vertical Industry solutions and expertise | | | | <ul style="list-style-type: none"> Build partnerships with domain expertise for selected verticals to develop and deliver solutions Focus on delivering customer experience measurable by SLAs commensurate with industry expectations |
| Seamless interoperability between telecom and online communications | | | | <ul style="list-style-type: none"> Actively participate and drive inter and intra industry alliances to deploy shared communications capabilities Collaborate with other providers to build common infrastructure for shared communications capabilities |
| Global Integrated Enterprise | | | | <ul style="list-style-type: none"> Build global “centers of excellence” to optimize capability and delivery Develop common platforms integrating technology, processes for rapid business/operating model innovation |

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Generative Bazaar

Summary and Conclusions

- **Scenario Characteristics**
- **Scenario Triggers / Realization Path**
- **Financial Assumptions**
- **Revenue and Profitability Implications**
- **Critical Success Attributes**

Pervasive affordable open connectivity are enabled for any person or object, unleashing a wave of generative innovation...

SCENARIO CHARACTERISTICS

Generative Bazaar

| | |
|-----------------------------|---|
| <p>Usage</p> | <ul style="list-style-type: none"> ▪ Advanced users mix and match silo'd communication tools; most adopt open source shared capabilities (presence, contact list...) across voice and online communication ▪ Voice services continue to be paid-for on mobile but fixed communications become an embedded feature of connectivity ▪ Open "do it yourself" connectivity integrated/ packaged by individuals/organizations ▪ On demand consumption of OTT digital content/ services with delinearisation |
| <p>Services</p> | <ul style="list-style-type: none"> ▪ Carriers cater to enhanced connectivity for OTT providers that deliver industry-specific solutions e.g. wellness services, energy management ▪ Premium connectivity (e.g. guaranteed low latency, security, CDN...) for OTT ▪ Local applications that meet emerging markets specificities boom ▪ New voice usages (e.g. human to machine for mobile internet)) lead to voice-rebirth |
| <p>Revenue Model</p> | <ul style="list-style-type: none"> ▪ Wholesale driven with premium connectivity a key feature for revenue generation Carriers are able to generate premium prices for ultra broadband (FTTX, LTE) ▪ OTTs co-operate with network providers and pay carriage fees or share revenues in return for network optimized delivery that enhance end-user experience ▪ Carriers are successful in ramping M2M models to generate low ARPU on an infinite number of connected objects ▪ Net Co-ops leverage analytics for service providers and for cross-access and platform advertising. |

... in a netco / servco separation model with open devices, platforms based on open network access

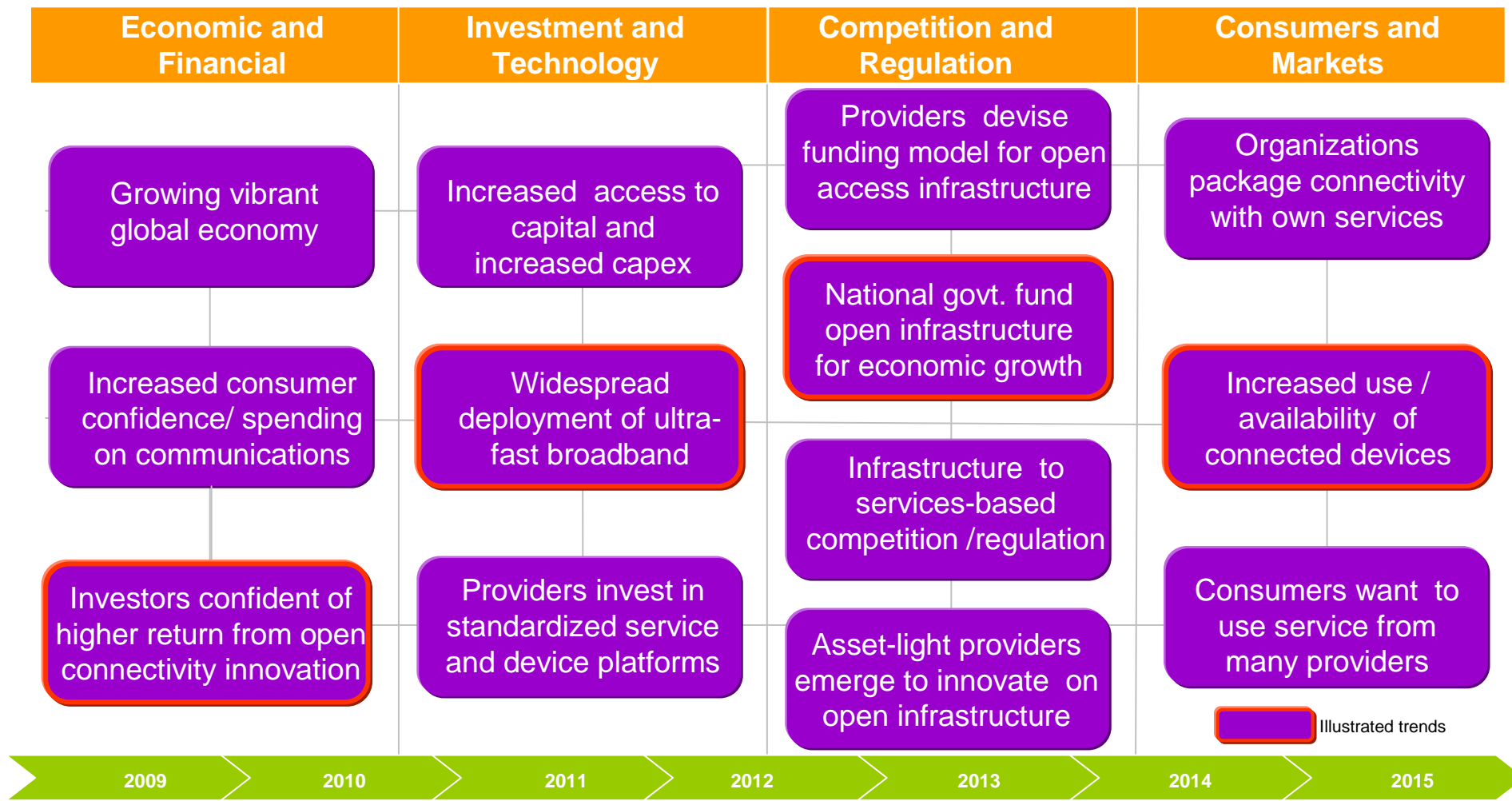
SCENARIO CHARACTERISTICS

Generative Bazaar

| | |
|----------------------------------|---|
| <p>Industry Structure</p> | <ul style="list-style-type: none"> ▪ A co-operative of horizontally integrated infrastructure providers catering to a myriad of asset-light service providers such as VNOs, OTTs, Banks, Utilities, Governments etc. ▪ Horizontal model (Netco/Servco separation) and passive infrastructure sharing but no network outsourcing |
| <p>Access</p> | <ul style="list-style-type: none"> ▪ Widespread fixed and/or mobile ultra-broadband availability with access to 60% - 80% of households ▪ Open devices (unlocked phones, netbooks...) dominate market as carriers retreat on handset subsidisation ▪ Open and standardized devices platforms supported by Net Co-ops and device manufacturers |
| <p>Regulation</p> | <ul style="list-style-type: none"> ▪ Evolution to internet-style model with light-touch regulatory approach towards telcos. ▪ Abolition of the majority of sector-specific regulations, forcing telcos upwards the investment ladder ▪ Structural separation of access networks. Wholesale access to essential services (HDTV, search algorithms) ▪ Open Access becomes the norm. |

Barriers between OTT and network providers blur as regulation technology and competition drive open access models enabled by...

TRIGGER EVENTS / REALIZATION PATH FOR SCENARIO



Critical success attributes for Generative Bazaar

How well operators are positioned Weak Moderate Competitive Strong

| Critical Success Attributes GENERATIEV BAZAAR | Potential Capability Assessment | | | RECOMMENDATIONS |
|---|---------------------------------|------------------|-----------------|---|
| | Integrated Operators | Mobile Operators | Fixed Operators | |
| Funding model for Net Co-op / open access network infrastructure | | | | <ul style="list-style-type: none"> Partner with other infrastructure providers including municipalities extend ultra-fast broadband coverage Agree to shared/co-operative funding model for open network access |
| 3rd-Party connectivity / capabilities access and developer communities | | | | <ul style="list-style-type: none"> Enable 3rd party access to premium connectivity based on open APIs Enable access to common capabilities (Billing, SDP) Stimulate and support vibrant developer communities |
| Dynamic Business Design | | | | <ul style="list-style-type: none"> Infrastructure / processes to facilitate connectivity of a multitude of objects, sensors, devices and applications Build modular business architectures based on standards and flexible, common technology platforms |
| Leverage insights from connectivity, data, ecosystem to enable 3 rd Party innovation | | | | <ul style="list-style-type: none"> Enable applications/service providers access to insights from network, data and users for innovation Develop deep insights into network and data usage to optimize core and access and reduce costs |
| Structurally separated network and services operations | | | | <ul style="list-style-type: none"> Create new operating model and organization to support structural separation Deploy systems, processes to support differentiated and dynamic wholesale pricing for various SLAs |

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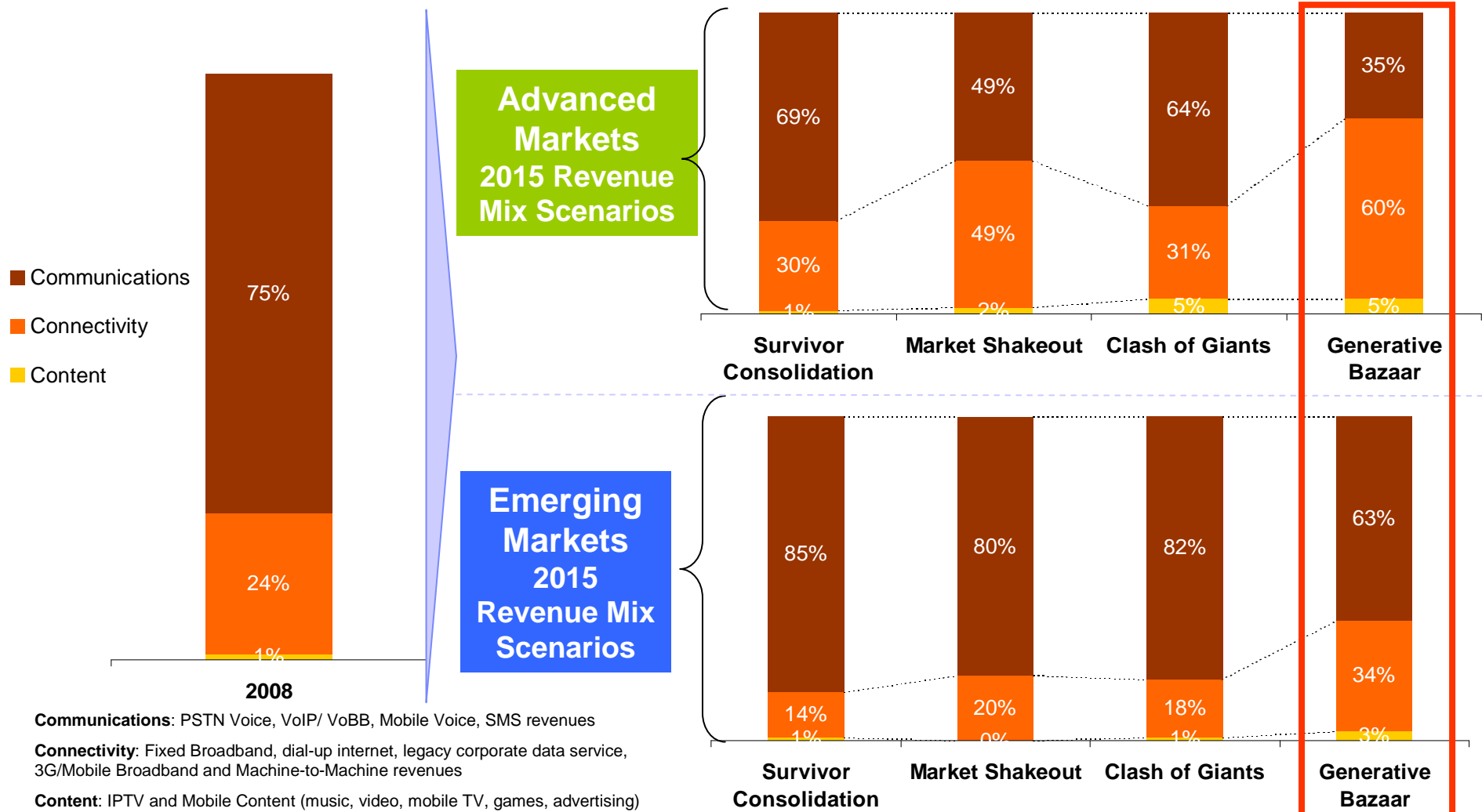
Clash of Giants

Generative Bazaar

Summary and Conclusions

Communications-connectivity substitution will increase over the next 5 years regardless but dominates revenue mix in Generative Bazaar

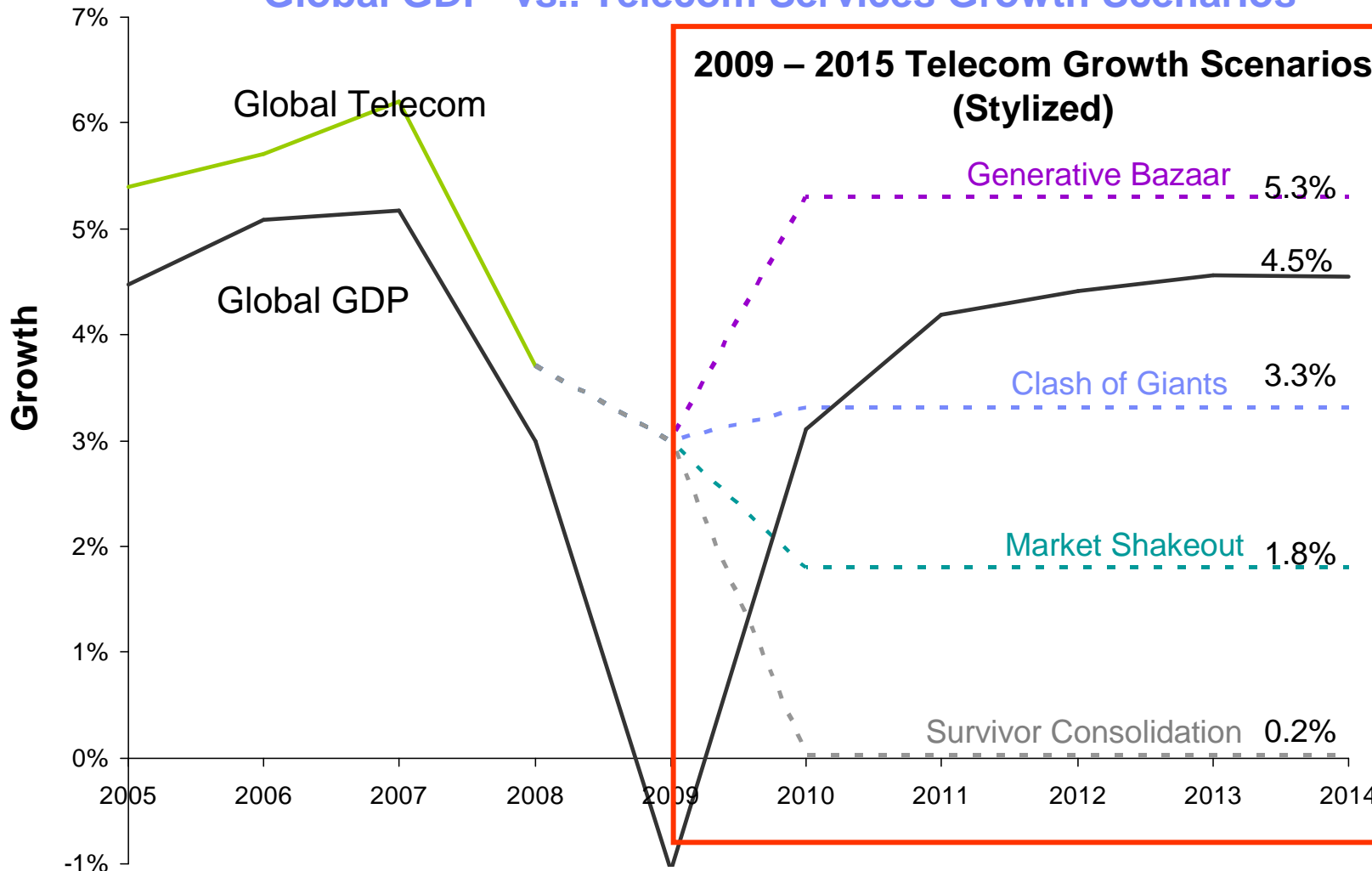
2008 – 2015 Changes to Segment Revenue Mix by Scenario



Communications: PSTN Voice, VoIP/ VoBB, Mobile Voice, SMS revenues
Connectivity: Fixed Broadband, dial-up internet, legacy corporate data service, 3G/Mobile Broadband and Machine-to-Machine revenues
Content: IPTV and Mobile Content (music, video, mobile TV, games, advertising)

... that represents the most optimistic outlook for telecoms, relative to the IMF's global GDP forecast fro 2010 - 2014

Global GDP vs.. Telecom Services Growth Scenarios



Source: International Monetary Fund (IMF), World Economic Outlook Database, October 2009; <http://imf.org/external/pubs/ft/weo/2009/01/weodata/index.aspx>, IBM Institute for Business Value (IBV) and IDATE Analysis, 2004 - 2009 growth forecasts are based on IDATE "World Telecom Service Market", 2008 Edition - © 2010 IBM Corporation January 2009, revision in July 2009. 2010 -2015 are IBM Telecom 2015 scenario forecasts

Telco 2015- five telling years, four future scenarios