

**INTERNATIONAL TELECOMMUNICATION UNION
WORKSHOP ON UBIQUITOUS NETWORK SOCIETIES**

**ITU NEW INITIATIVES PROGRAMME
6-8 APRIL 2005**



Convergence Towards Ubiquitous Network Societies

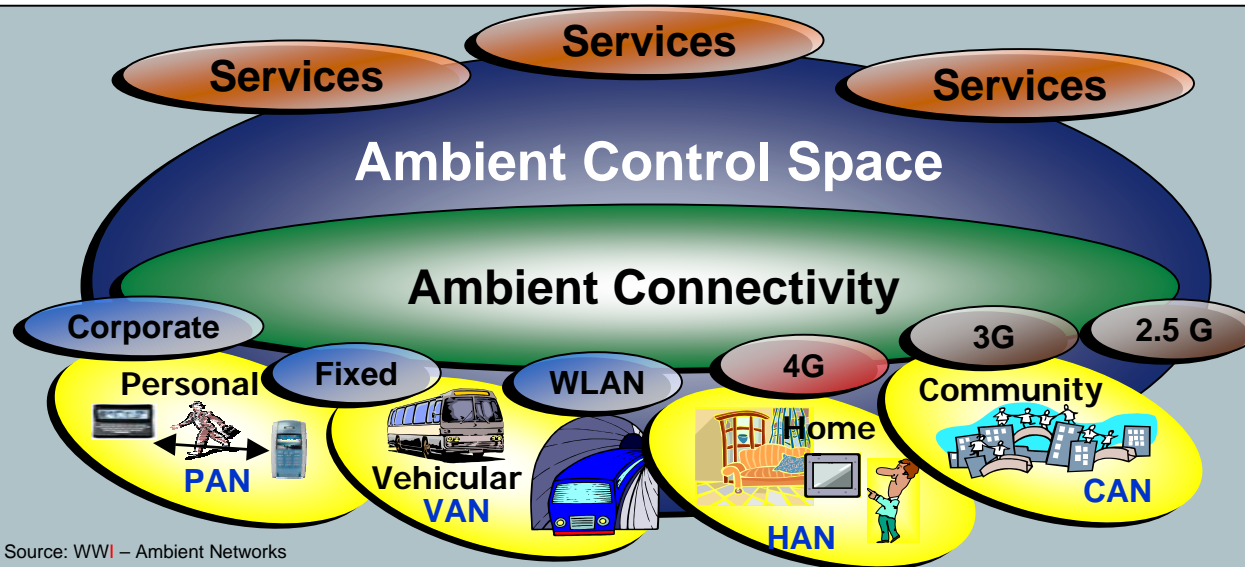
Outlook

- **Market drivers**
- **Operator challenges**
- **Spectrum and regulatory**

Market Drivers for Ubiquitous Networks

- **Electronic customer support any time, everywhere**
- **Emerging bandwidth-intensive applications and services**
- **Continuing innovations and cost reductions of infrastructure and active equipment**
- **Increasingly extended capacity of traditional access networks**
- **Ability to use existing infrastructure to capture incremental revenues and an accelerated RoI**

Vision of Ubiquitous Networks



Source: WWI – Ambient Networks

- Transient, spontaneous “composition” of networks
- Competitive & Cooperative networking (limited sharing of resources & functions)
- Scalability & Manageability of the concept (easy to use/deploy, many networks everywhere)
- Integration of legacy technologies & networks

The subscriber wants ...

... it cheap, wants it now and wants to choose:

- to get one bill, one number
- to have one phone book
- to check one mailbox instead of many
- to communicate immediately in real-time
- to communicate cheaply
- to communicate with many people who are using different media at the same time

... his services anytime, anywhere, on his device:

- Personalized and highly customized
- More individual bandwidth
- Always-on
- Global roaming
- Seamless network, GSM-EDGE-UMTS-beyond IMT-2000
- Rich multimedia services: information, transaction, entertainment

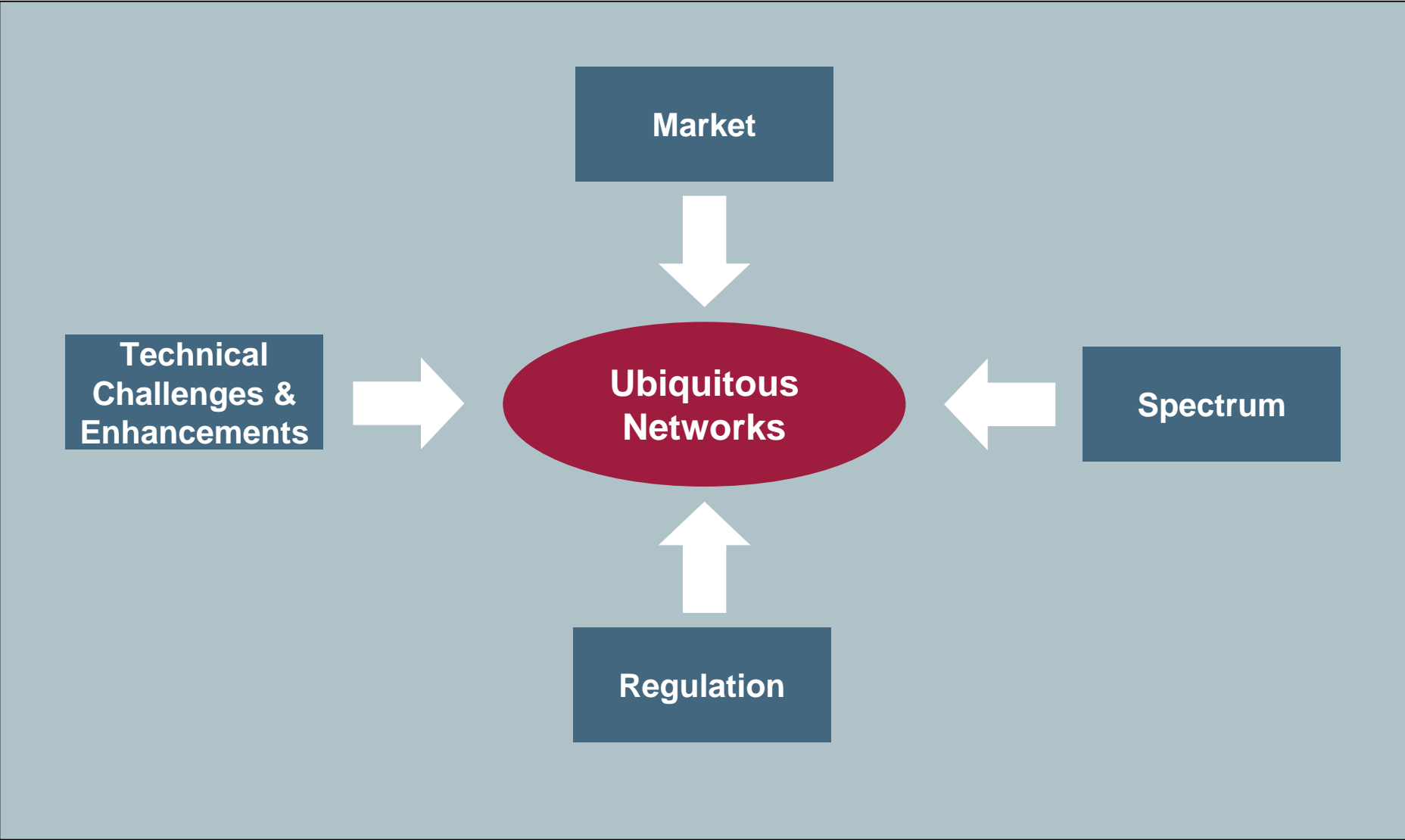
**Loss
of subscriber loyalty**

**Increase
of subscriber knowledge**










**Increase
of subscriber sovereignty**

Ubiquitous Networks

are subject to a number of opposing forces



Changing lifestyles and end-user habits

	1990	2000	>2006
<p>Sending a "hello" from vacation</p>	 <p>Phone, postcards & pictures</p>	 <p>E-mails, attachments, SMS, videos etc.</p>	 <p>Video-telephony, Photo messaging via mobile</p>
<p>Gaming Service</p>	 <p>Board games</p>	 <p>Gameboy, Playstation etc.</p>	 <p>(Interactive) Mobile gaming</p>
<p>Find out a nice movie and buy a ticket</p>	 <p>Paper guide & telephone</p>	 <p>Online guide & online ticket reservation</p>	 <p>Real-time guide with nearest cinema & mobile ticketing</p>

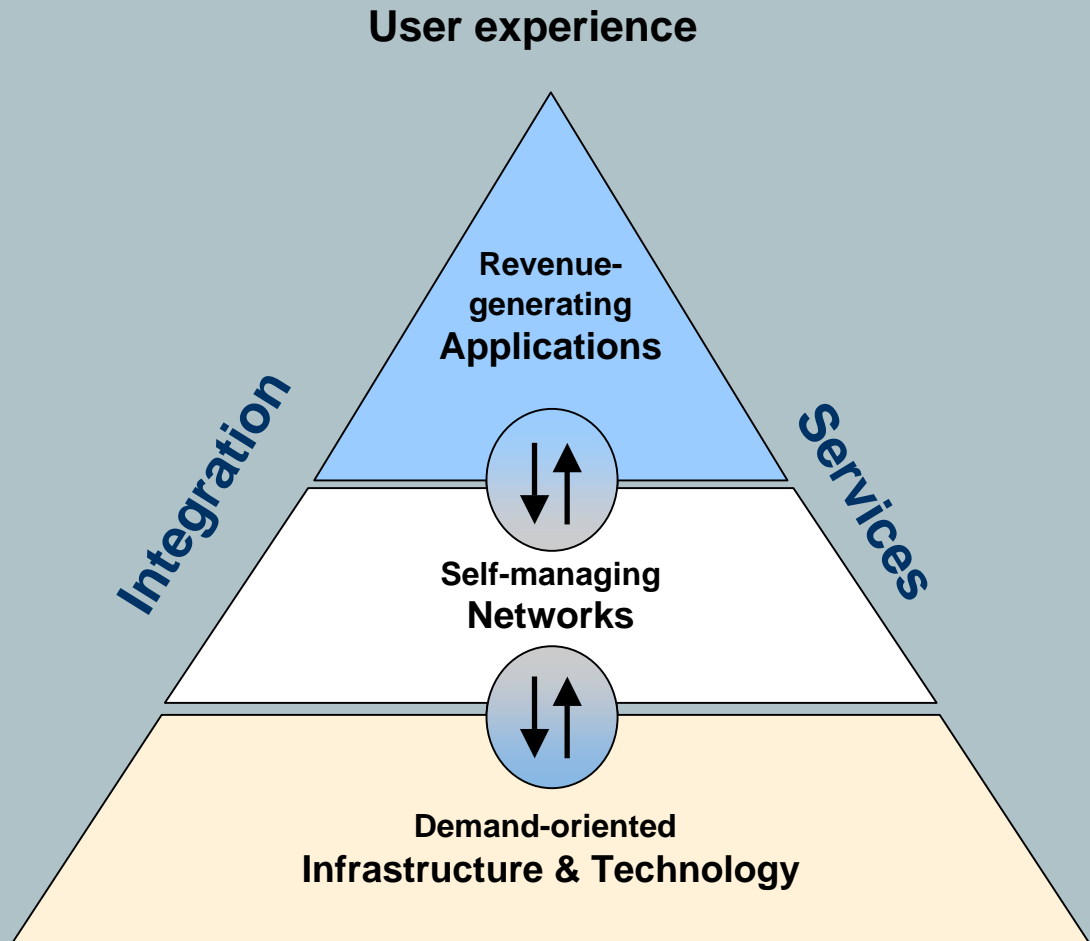
New mobile services will have a strong impact on everyday life of end-users

Operators' needs: Deploying Profitable Multimedia Networks

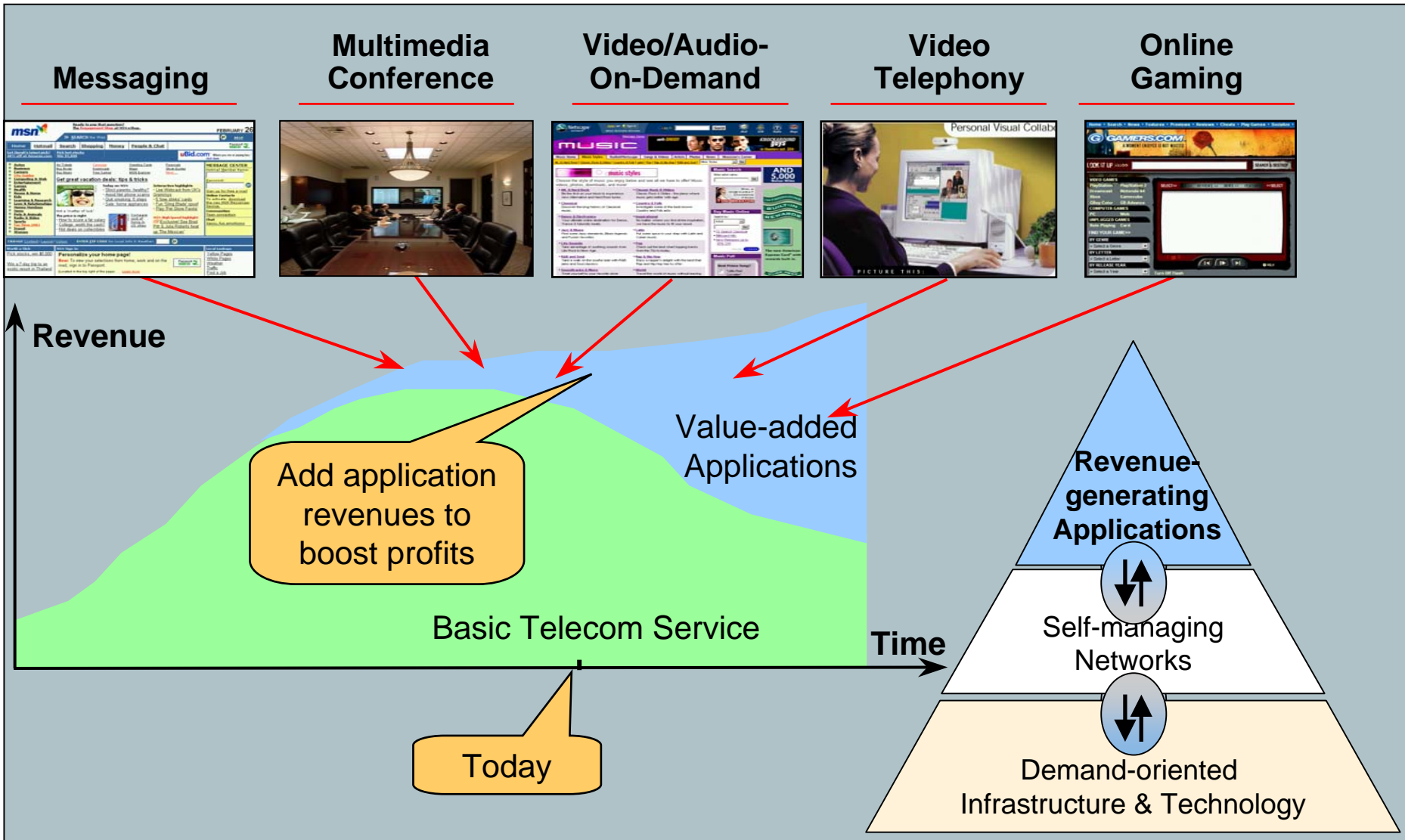
- New revenues

- Optimized utilization of networks

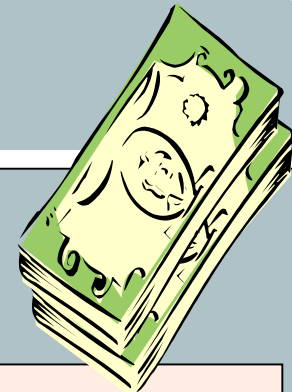
- Harmonized & standardized infrastructure



Operators' Challenges: Shift of Revenues' Sources



Operators' Challenges: More Bandwidth = Increased Revenue ?

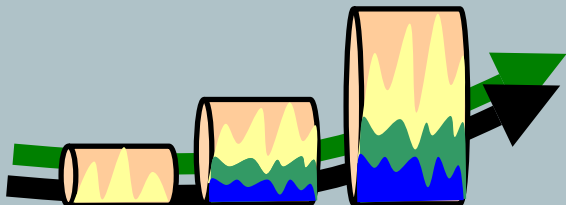


Bandwidth capacity is multiplying

- Deployment of xDSL, UMTS, WLANs

Bandwidth demand is growing even faster

- Gaming and Video Services are bandwidth intensive

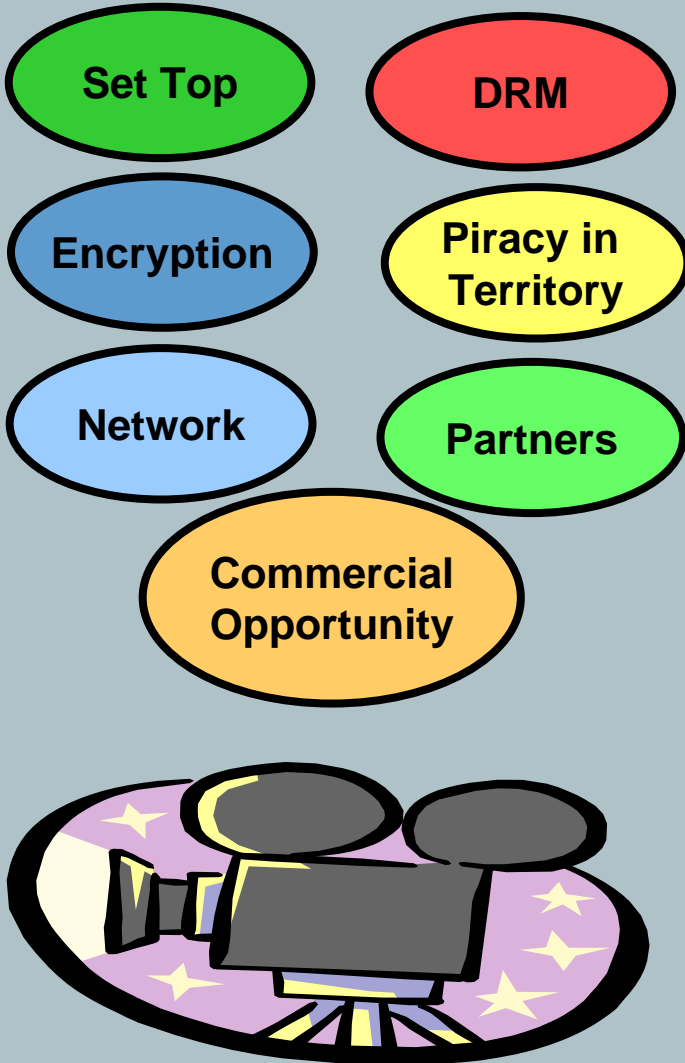


Bandwidth & Demand are both exploding

- Near real-time & real-time traffic puts more stress on the BW
- The nature of traffic is changing to more dynamic with QoS orientation

- Most European operators are losing money on flat-rate concepts
- Peer 2 Peer is major driving force
- Each household has a limited amount of money to spend
- Adding further BW does not resolve the QoS problem, generally worsens it by attracting more QoS-sensitive applications eg. Broadcast Video
- Increased bandwidth is NOT increasing ARPU automatically!

Operators' Challenges: Complexities



Paradigm shift	Market unsure	PC or TV centric?
Open MPEG4 Issue	What is good video quality?	Individual "TV culture"
60+% Hollywood margins	Young market	Proprietary solutions
Fixed to mobile substitution	VoIP telephony	New players as ISPs & ASPs
Investment delays	Operator role?	Business model?

Technical Challenges and Enhancements

Challenges

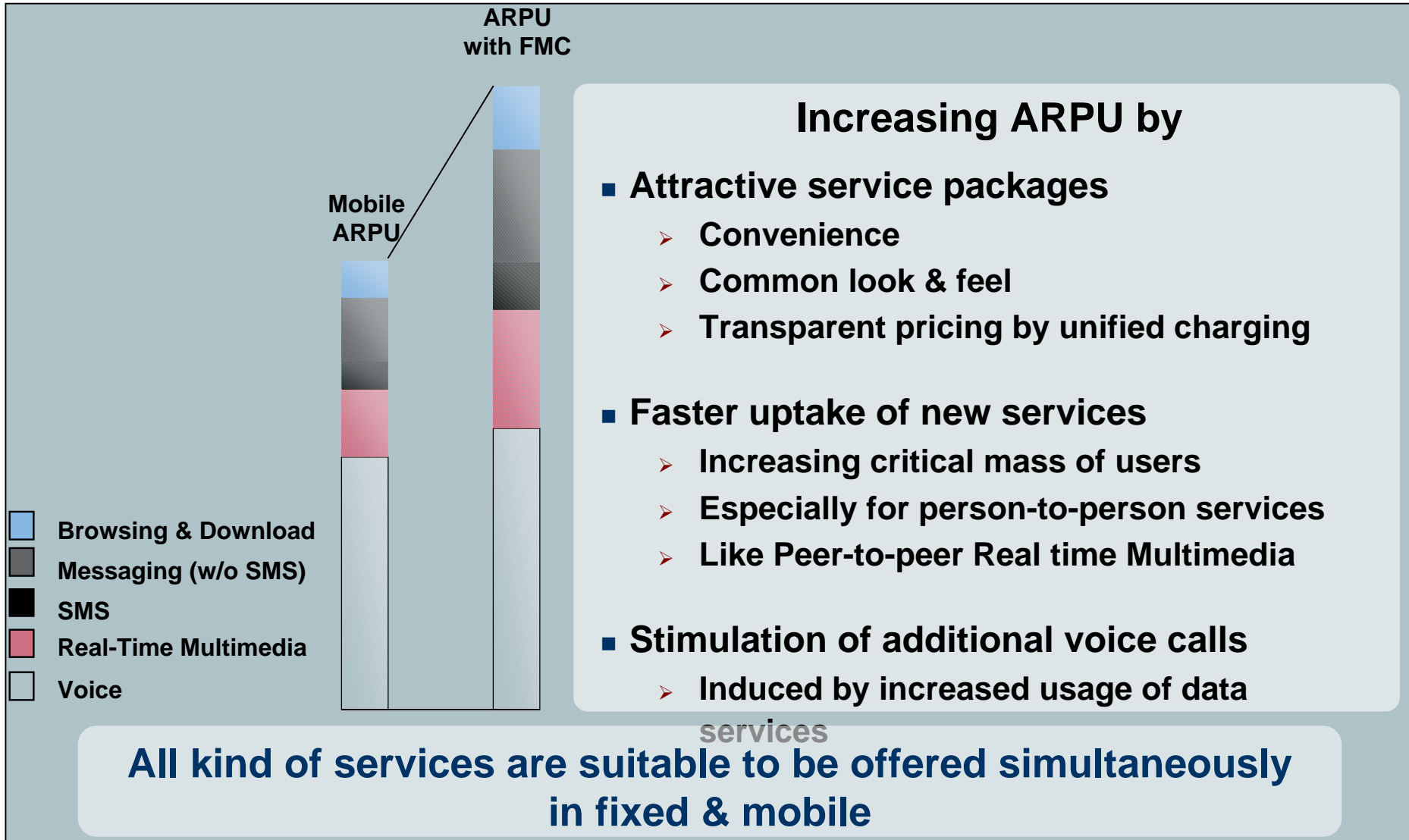
- Higher frequencies increase processing requirements
- Coexistence of different radios requires sufficient separation
- Underlay of ultra wide band (UWB) raises the noise floor for other users
- Higher data rates require wider bandwidth and new radio principles
- Seamlessness and ubiquitous use imply multimode & multiband devices

Enhancements

- Microelectronics innovation (Moore's Law) delivers increased performance
- Improved filter technologies
- Radio technology improvements
- Higher order modulation schemes and smart / MIMO antenna systems
- Software configurable radio

Innovation is able to compensate many challenges but complexity and cost increase in the process

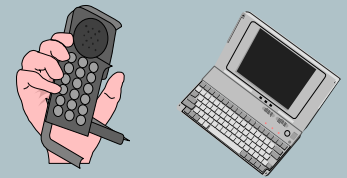
Upside Potential through Fixed-Mobile Convergence



Different Categories of Convergence

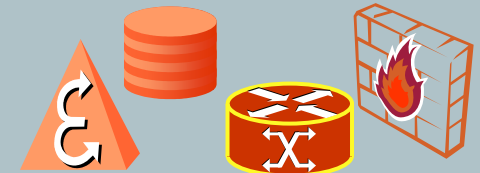
■ Service Convergence

- same service offering for fixed and mobile user access (e.g., SMS / MMS, multimedia conferencing, gaming)
- universal numbering
- one bill



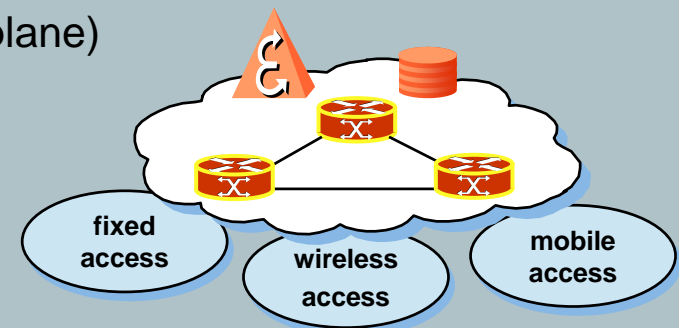
■ Product Convergence

- common application server
- common service enabling solution (incl. charging)
- common session control
- common interworking functions

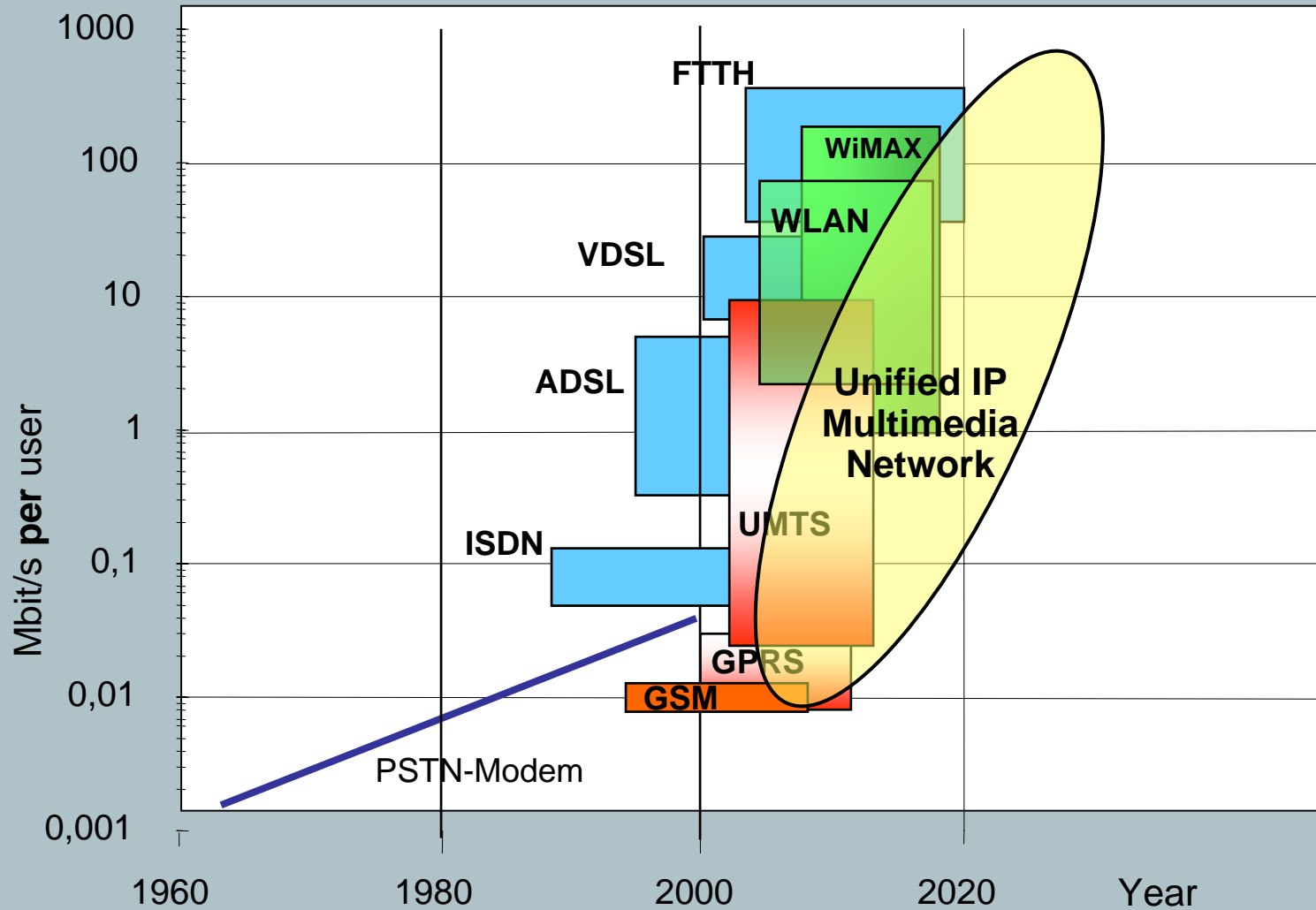


■ Network Convergence

- common core network (control, user and transport plane)
- common operation
- support of any access network



Data Rates and Access Technologies



All-IP: ...hype or necessity?

Hybrid networks rule today in for long time

- High OPEX
- Service convergence slow
- Service evolution slowed-down by the hybrid infrastructure (physical, logical and operational)
- Slow terminal equipment price erosion in hybrid environment

It is a must, to come to a common denominator:

- IP infrastructure
- IP control (SIP)
- IP-based terminals
- IP-based services

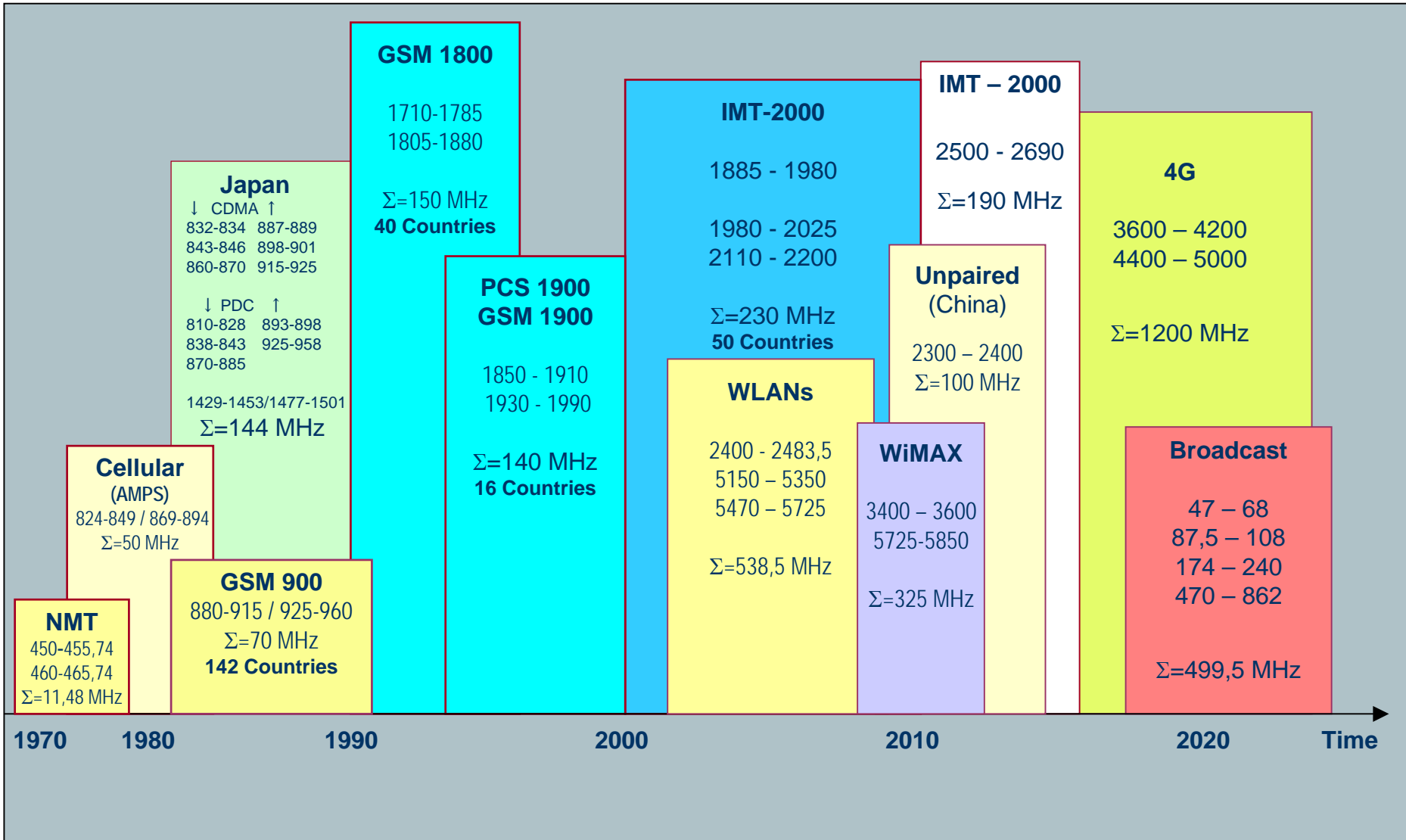
All-IP is necessity to decrease overall communication costs

Radio spectrum is a precious asset



- Spectrum is the raw material for mobile business. It is of strategic importance for the entire industry.
- The largest economic value per radio spectrum unit is generated by the mobile network user
- Many new players want a piece of this billion dollar pie.
- We cannot generate new spectrum, only optimize its use and only harmonized spectrum is valuable.
- Spectrum is licensed nationally, but has global issues: radio waves do not recognize geopolitical boundaries, therefore harmonization and coordination are required.
- Major regulatory decisions in the next four years will affect the mobile industry for many years to come.

Spectrum for mobile telecommunication services



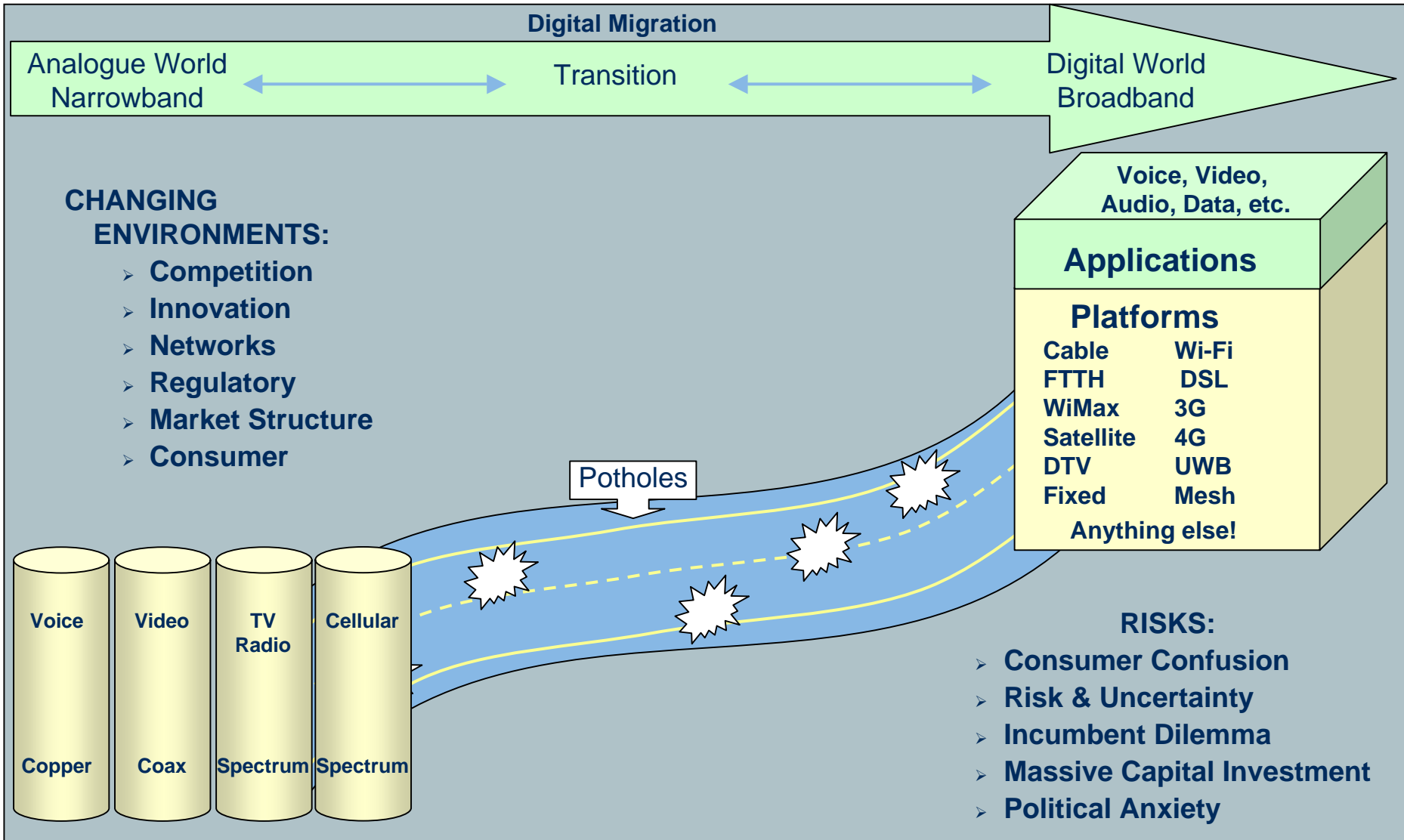
The regulatory framework is under discussion

to increase efficiencies and take advantage of innovations

- **Success of GSM and UMTS is built upon concerted industry approach.**
- **Today's regulators are reluctant to influence technology choices.**
- **„Technology Neutrality“ is supposed to provide a level playing field, but endanger economies of scale.**
- **Spectrum Trading provides new options for underutilized frequencies, but increases risk of incompatibility and fragmentation.**
- **Suitable (harmonized) spectrum is hard to find, therefore very valuable and in high demand.**
- **New applications and usage scenarios blur the boundaries.**

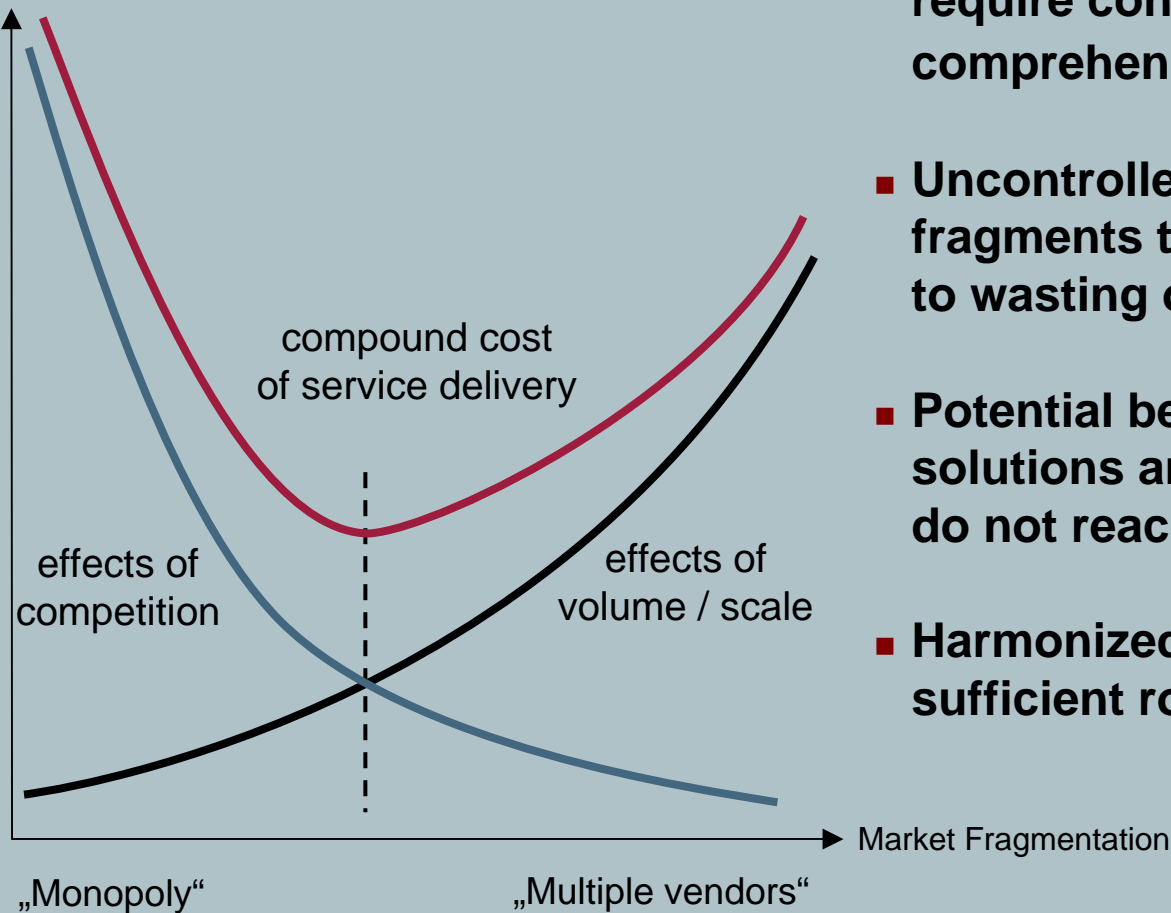
Vision of (De-)Regulation

Source: FCC



Harmonized environment is economically superior

Cost & Prices



[not drawn to scale]

- **Worldwide roaming and plug & play require consistent standards and comprehensive interoperability**
- **Uncontrolled system competition fragments the market and leads to wasting of economic resources**
- **Potential benefits of proprietary solutions are short-lived since they do not reach economies of scale**
- **Harmonized standards provide sufficient room for competition**

Summary / Conclusion

- **Telecommunication market is here to stay as growth engine of global economy**
- **Generating new revenues is still the major challenge**
- **Customers like the variety of services, but not the burden of technology details**
- **Harmonised standards and inter-operability of multiple interfaces provides the optimal response to the end-users needs**
- **Migrating towards customer centric networks: continuous process, solid performance and reliability**

Thank You!

Any Questions?

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