



Institut
Mines-Télécom



CHALMERS
UNIVERSITY OF TECHNOLOGY

CEPS Workshop
May 12, 2016

The Changeover in Audiovisual services
Spectrum Implications

Gérard Pogorel

Professor of Economics-Emeritus
Telecom ParisTech, France

Erik Bohlin

Professor of Technology Assessment
Chalmers University of Technology





UHF: THE BROADCAST AND WIRELESS BROADBAND DILEMMA: FUTURE BUSINESS MODELS

- ✓ **Business challenges to wireless broadband operators:
Declining ARPU, ...Maturing & Stabilising Market**
- ✓ **Challenges to Telcos, MNOs & Broadcasters:
OTTs grabbing most of the revenue growth**
- ✓ **Key future trend: Provision of Audiovisual content**
- ✓ **Spectrum Management Implications**
- ✓ **Future of TV: Wireless-Broadcast convergence**
- ✓ **What spectrum for wireless and broadcast? UHF sharing
scenarios**
- ✓ **Legal and regulatory Considerations**
- ✓ **Economic vs Social Considerations**



...Mobile Maturing & Stabilising Market

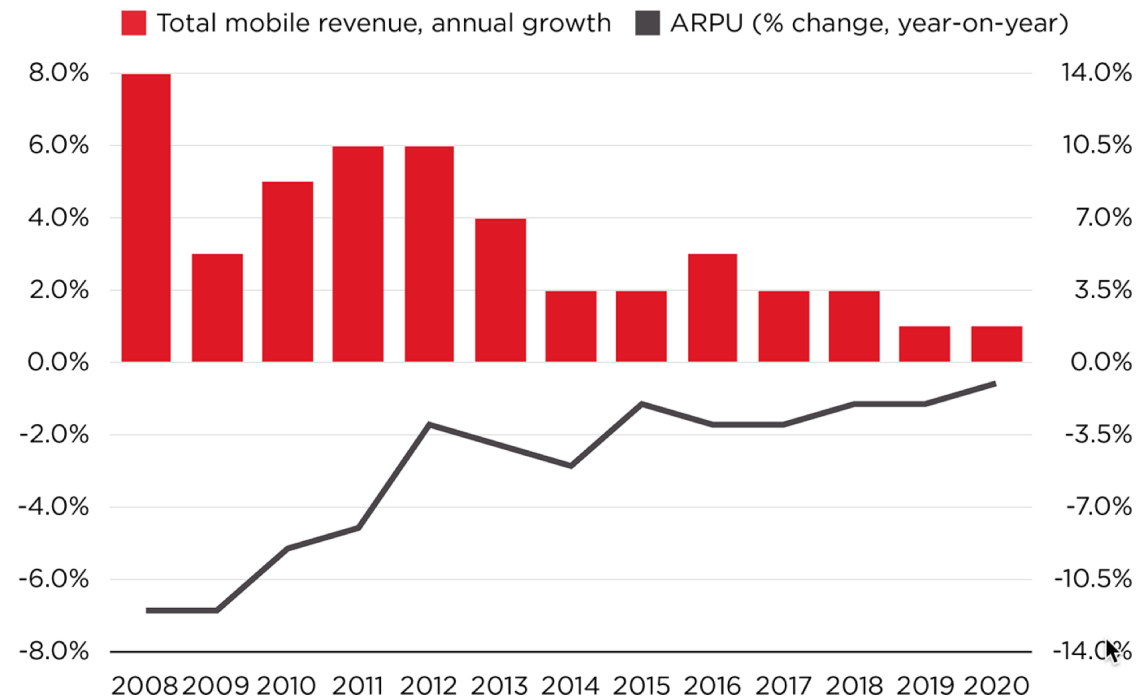


Figure 1: Mobile revenue growth and ARPU, 2008–2020

Source: GSMA Intelligence

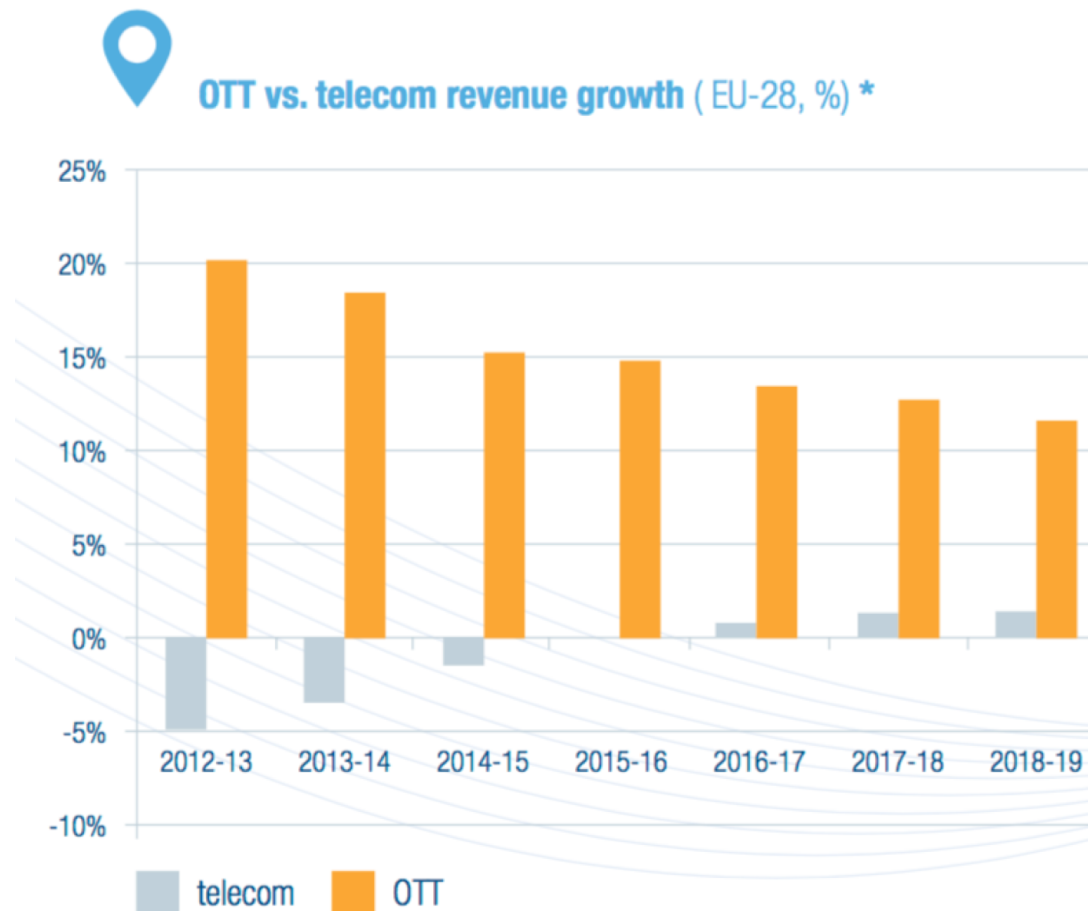


Challenges to Telcos, MNOs & Broadcasters: OTTs grabbing most of the revenue growth

Communications	• Voice Services • Messaging	
Applications	• Social Networks • E-Commerce, E-Health,....	
Video/Audio	• OTT TV • OTT Video • Streaming	



Challenges to Telcos and MNOs: OTTs grabbing most of the revenue growth



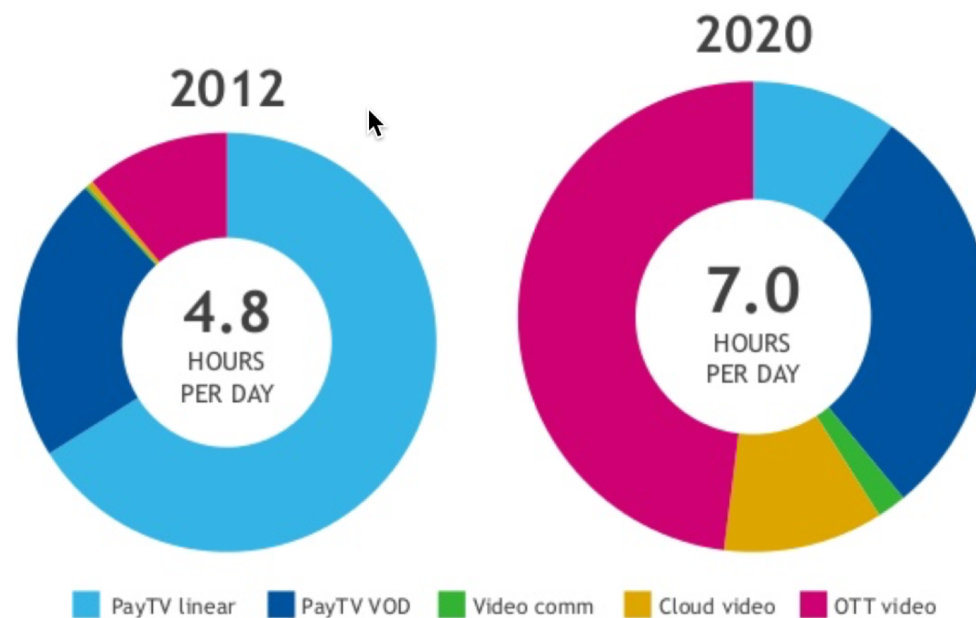


Next Generation Spectrum Management:



THE VIDEO DELIVERY MODEL IS SHIFTING

Clip slide

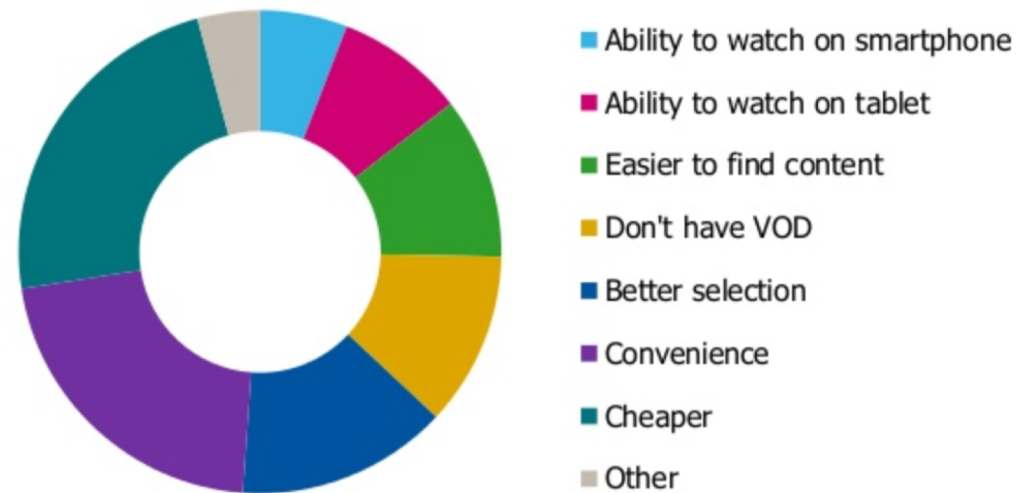


Sources: Bell Labs, 2012

Alcatel-Lucent

COPYRIGHT © 2014 ALCATEL-LUCENT. ALL RIGHTS RESERVED.

WHY DO CONSUMERS PREFER OTT ALTERNATIVES TO TV PROVIDER VOD?



Source: Digitalsmiths, Q2-2013 Video Discovery Trends Report (US & Canada)

Alcatel-Lucent





Key future trend in services: Provision of Video content

- **Traffic expectations for broadcast service and broadband access, including wireless, assume the increasing delivery of audiovisual content in improved quality to an increasing number of users.**
- **This will result in a higher asymmetry between upstream and downstream traffic.**



Spectrum Management Implications

- Propagation characteristics make the band 470-694 MHz efficient for the distribution of audiovisual services.
- These services may be linear or non-linear.
- The number of receiving users served by a content provider can vary from one to up to several million users.
- Therefore, the long term usage of the band 470-694 MHz is mainly foreseen for downstream audiovisual content distribution.



Future of TV: Wireless-Broadcast convergence

- **Personalized**
- **Combines Linear, VoD, and OTTs**
- **Cloud based, Ultra HD, 4K**
- **Multiscreen seamless: across fixed and mobile device**



Future of TV: Wireless-Broadcast convergence moves

- **ATT Direct TV**
- **BT + 1 TV Channel**
- **China Licences Broadcaster as 4th operator**
- **Telecom Italia-Vivendi: the « Media Company »**
- **....**

- **Xu (Huawei) Apr 12, 2016:**

« Telcos are “better positioned” in video services than competing online service providers, who currently dominate the market. “Since video is a real time application, telcos can combine this with their networking capabilities to deliver better and more compelling user experiences to consumers than OTT players”.

WHAT SPECTRUM FOR WIRELESS AND BROADCAST?



- **Until now different frequencies for broadcast and wireless broadband**
  - **TV in UHF**
  - **MNOs in 2G/3G/4G frequencies**



WHAT SPECTRUM FOR WIRELESS AND BROADCAST? ECC UHF SHARING SCENARIOS

- **A: Primary usage of the band by existing and future Digital Video Broadcast terrestrial networks**
- **B: Hybrid usage of the band by downlink LTE and/or DVB terrestrial networks: broadcast and mobile broadband services in the UHF band would in the future be delivered via LTE (downlink only), with or without the DTT platform. Provides additional unicast downlink capacity.**



WHAT SPECTRUM FOR WIRELESS AND BROADCAST? UHF SHARING SCENARIOS

- **C: Hybrid usage of the band by conventional two-way (uplink and downlink) LTE mobile broadband and/or DVB terrestrial networks**
Conventional two-way LTE mobile broadband services (i.e. operating with separate uplink and downlink channels in the UHF band) coexist with DVB
- **D: Usage of the band by future communication technologies: broadcast and mobile broadband services in the UHF band would in the future be delivered via evolved or via completely new, as not yet existing, communication technologies resulting in connectivity anytime anywhere through any available network.**



Legal and regulatory considerations: safeguarding freedom of speech, diversity, and publishers control over broadcasting in case of shift of broadcasting to other platforms

- **Provision of Free-to-Air36 (FTA) services on alternative platforms;**
- **Provision of Public Service Broadcasters' (PSB) services on alternative platforms;**
- **Provision of local and regional TV services;**
- **Provision of complementary commercial programmes;**
- **Lack of “universal” availability;**
- **Competition between TV distribution platforms;**
- **Legal requirements regarding national provision of infrastructure;**
- **Migration of DTT audiences to another platform.**



Consequences for spectrum allocation

- **Spectrum Allocation only has had little space for « efficient » allocation**
- **Spectrum is a « tension » area between actors, and between geographies**
- **Some variables are financial, some are not measured in monetary terms**
- **Policy decisions are...policy decisions (enlightened of course...)**



References

- CEPT ECC Report 224 Long-Term Vision for UHF Broadcasting Band, 2014
- Cave & Webb *Spectrum Management* Cambridge UP 2015
- Pogorel-Bohlin-Massaro *Valuation and Pricing of Licensed Shared Access: Next Generation Pricing for Next Generation Spectrum Access*, Working Paper, June 2014
- Pogorel *Nine Regimes of Spectrum Management* Communications & Strategies, 2008

Thank you

erik.bohlin@chalmers.se

gerard.pogorel@telecom-paristech.fr

