The future evolution of mobile content, mobile applications and mobile 2.0

Claudio Feijoo
Institute for Prospective Technological Studies

COST Network (Econ@Tel)
COST 605 MCM and Plenary Meeting
Limassol, 2-4 Feb 2009

Context

The emergence of the mobile 2.0 - wireless web (FP7)

- Wireless technology is a **major driver of economic value in the EU** economy (250bn € or 2-3% of GDP and rising)
- Next year **3/4 of the planet's population** will have use of a mobile handset.
- "Wireless is a lighthouse of **European technological leadership**" (Commissioner Reding. *Digital Europe Megatrends Speech*. 13 Nov 2008)

The result will be **an explosion of new applications**, limited only by our imagination, and a **transformation** of the mobile domain.

Moboogle

What can be done to increase the probability that the next **mobile innovators** happen in Europe?

Why this work was initiated

- **Creative content** industry goes mobile (IPTS previous research)

  e.g. listening to music or gaming

- User empowerment effect of **social computing** (IPTS previous research)

  e.g. privacy and identity

Mobile 2.0

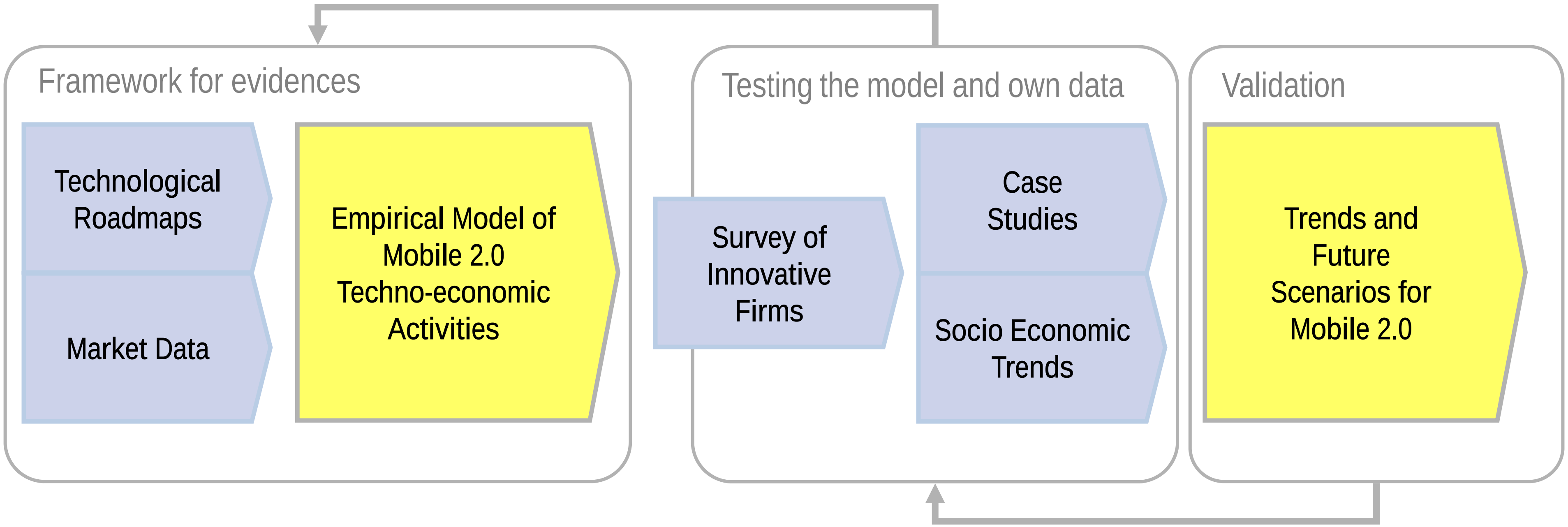
- Disruptive effect of **context-awareness** (IPTS future research)

  e.g. “augmented reality” (location + sensors + information + …)

Need to elucidate the **drivers and barriers** for the development of the mobile 2.0 domain

What and how

Currently there are little useful data and no realistic models to assess innovation and competitiveness in mobile 2.0

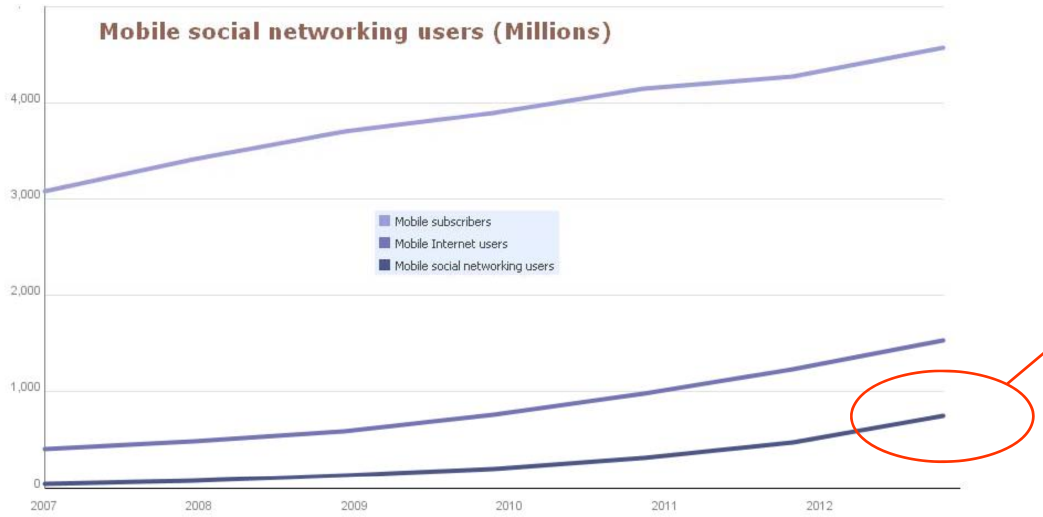


Need to investigate an **emerging** and rapidly **evolving** phenomenon in its very **early** phase to produce **coherent** policy options

Technology roadmap

	HDPA (3,5 G)	LTE (4G)	Femtocells	Mobile WiMAX (4G)	IMT Advanced (4,5 G)	NFC – Wireless sensors	Cognitive radio and mesh networks	Context – awareness and cognitive technologies
Theoretical maximum data rates	14 Mb/s (downstream) 5,6 Mb/s (upstream)	100 Mb/s (downstream) 50 Mb/s (upstream)	-	50 Mb/s	1 Gb/s	-	-	-
Typical data rates	3,6 Mb/s (downstream) 2 Mb/s (upstream)	-	-	10 Mb/s	100 Mb/s	1 Mb/s	-	-
Begin of massive deployment	2008 - 2010	2009 - 2012	2009 - 2010 2010 - 2011 (for handsets)	2009 -2011	2013 - 2017	2013 - 2017	2013 - 2017	2013 - 2017
Enhanced version	HDPA+ 40 Mb/s (downstream)		-	100 Mb/s	-		-	-
Critical technologies	MIMO	OFDMA	Management	OFDMA	Dynamic spectrum management	UWB and similar Spectrum management	Dynamic spectrum management	3D real virtual integration Artificial intelligence
Main advantages	Evolutionary from existing 3G	Evolutionary from 3,5 G	Fixed-mobile convergence Increase of coverage	Not a legacy technology	Evolutionary from 4G	Smart environment	Data rates Coverage	Integration in daily life
Main disadvantages	Transition technology	Time-to-market	Integration in existing networks	Business case for new technology	Still in early stages of standardization process	Business case for deployment	Early development state	Very early development state

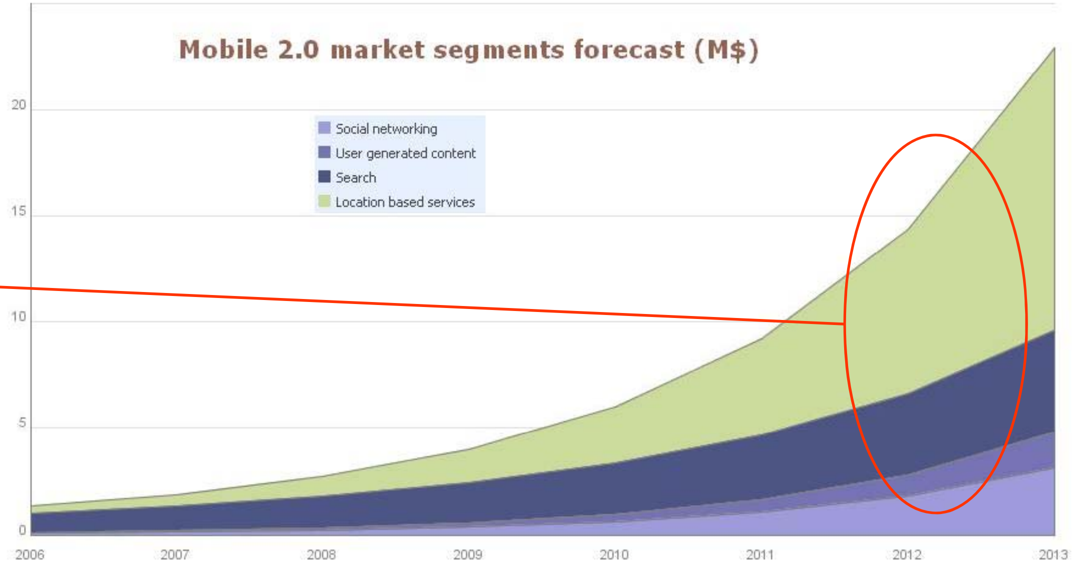
Market data and forecasts



Source: own elaboration from data of ABI Research, EC, eMarketer, EITO, Eurostat, ITU, Juniper Research, Informa Telecoms & Media and Netsize

Mobile social computing is foreseen to reach the impressive figure of 1 000 million users some time around 2014.

Source: own elaboration from data of ABI Research, Juniper Research, Informa Telecoms & Media, Netsize and Strategy Analytics



The emergence of personal, social and virtual context-awareness applications

Mobile "ecosystem": a model

The value network

- Creation - development - production
- Distribution - access
- Use - consumption - interaction

X

The users' demands

- Communication users
- Entertainment users
- Internet users
- Social networking users

X

The industries aims

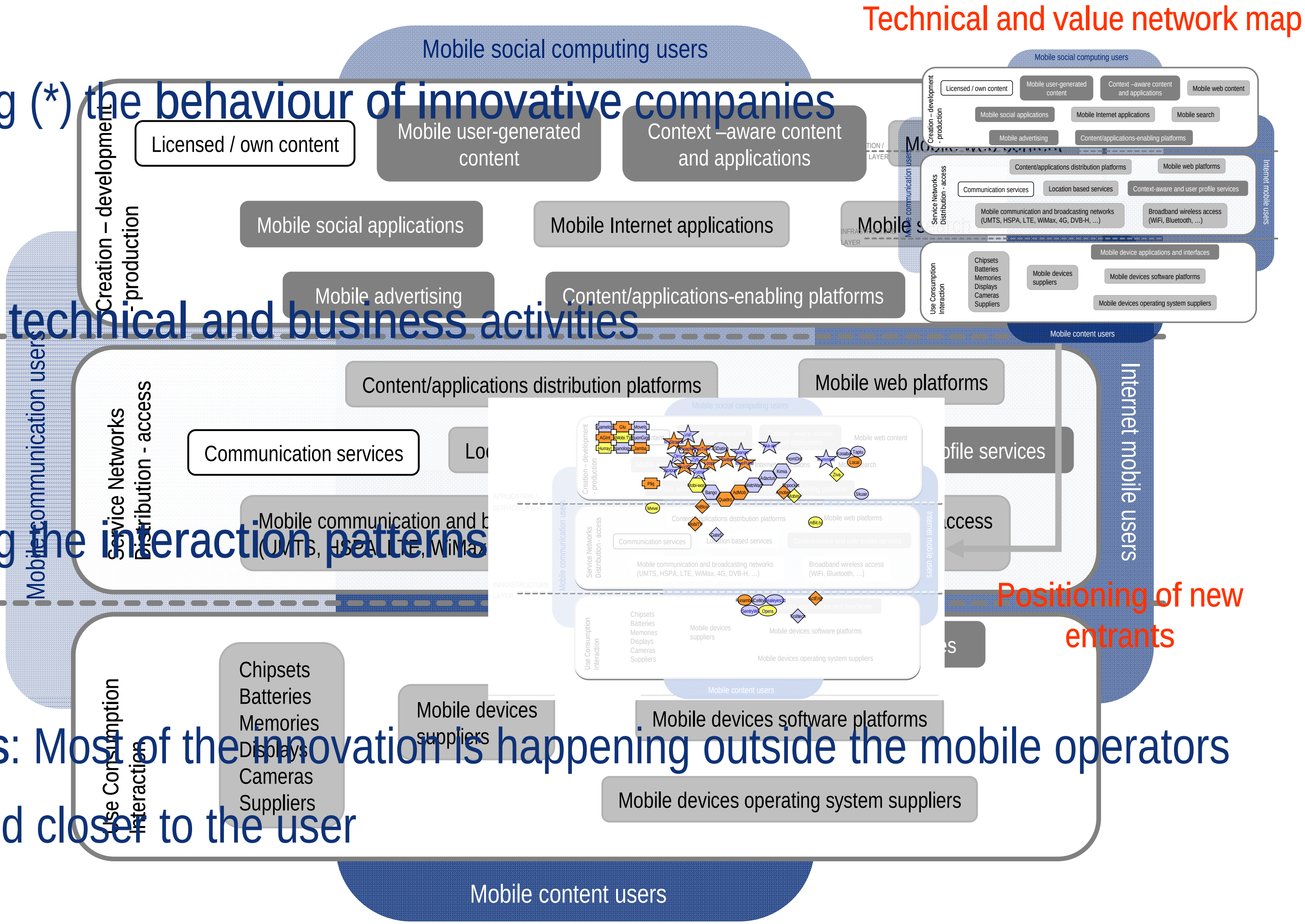
- Mobile
- Internet
- Media

+ 15000 applications,
+ 150 smartphones
+ 20 operating systems

Variables:

- Technologies
- Infrastructures
- Platforms
- Standards
- Interoperability
- Business models
- Players' strategies
- Users' demands
- …

Model application (I-1): Where is innovation?

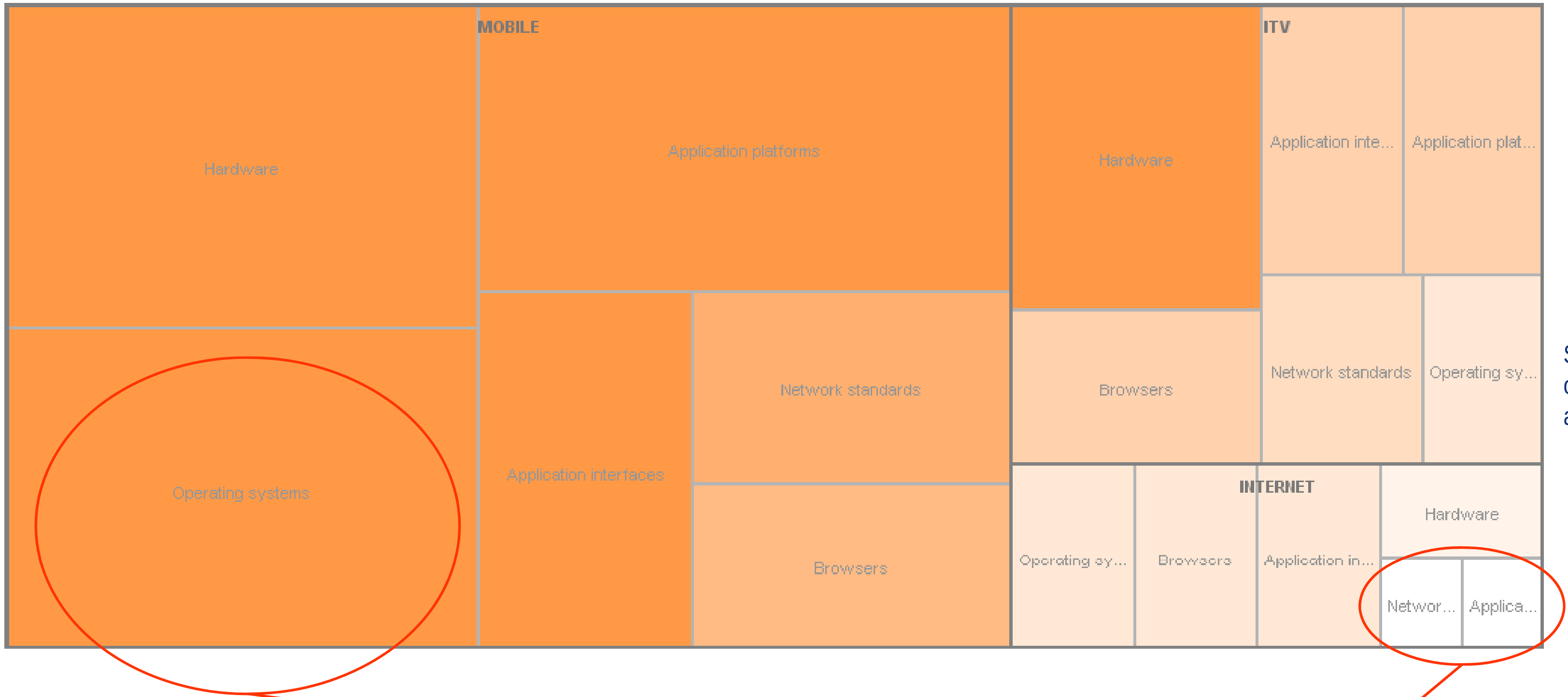


1. Analysing (*) the behaviour of innovative companies
2. Mapping technical and business activities
3. Analysing the interaction patterns
4. Findings: Most of the innovation is happening outside the mobile operators range and closer to the user

(*) Based on survey of new entrants, selected interviews and case studies

Model application (I-2): interplatform competition and clash of business models

Treemap of platforms (mobile, Internet, and iTV) relative complexity



Complexity proportional to number of competing solutions

Source: upcoming IPTS report on mobile content and applications, 2009

- Internet: application, operators and suppliers neatly separate
- Mobile communications: silo models and revenue sharing schemes, operators providing applications, providers developing operating systems, and handset suppliers providing applications.

Model application (I-3): two waves of innovation

2nd wave:

Mobile 2.0 and mobile applications (expectations on new conditions exist: broadband, prices, handsets)

It began in 2005-6 and still going on

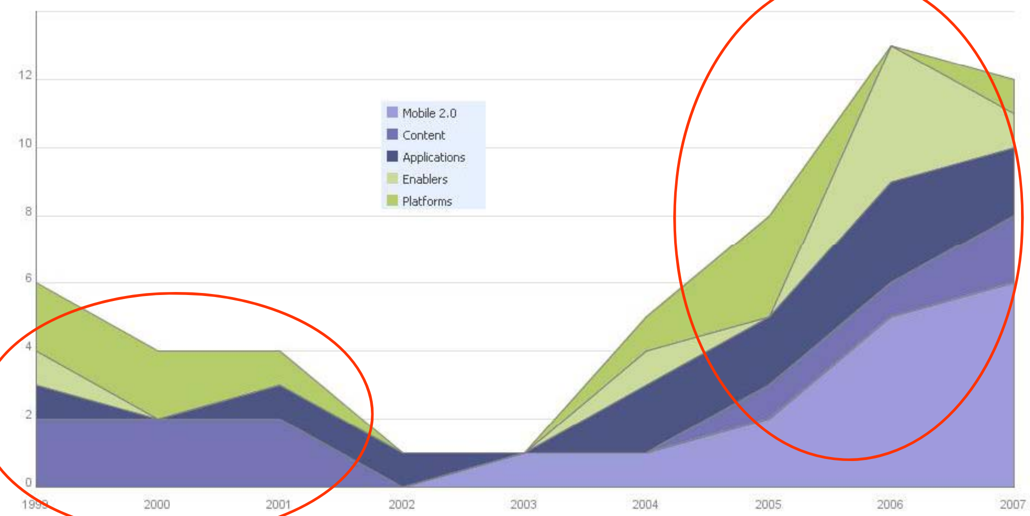
Major changes appear

Source: own survey of innovative mobile content and applications firms (IPTS 2008)

1st wave:

Mobile content and enabling platforms were the most obvious opportunities (expectations on convergence)

It lasted until 2001 (end of dot com bubble – mobile licenses auctions bluff)

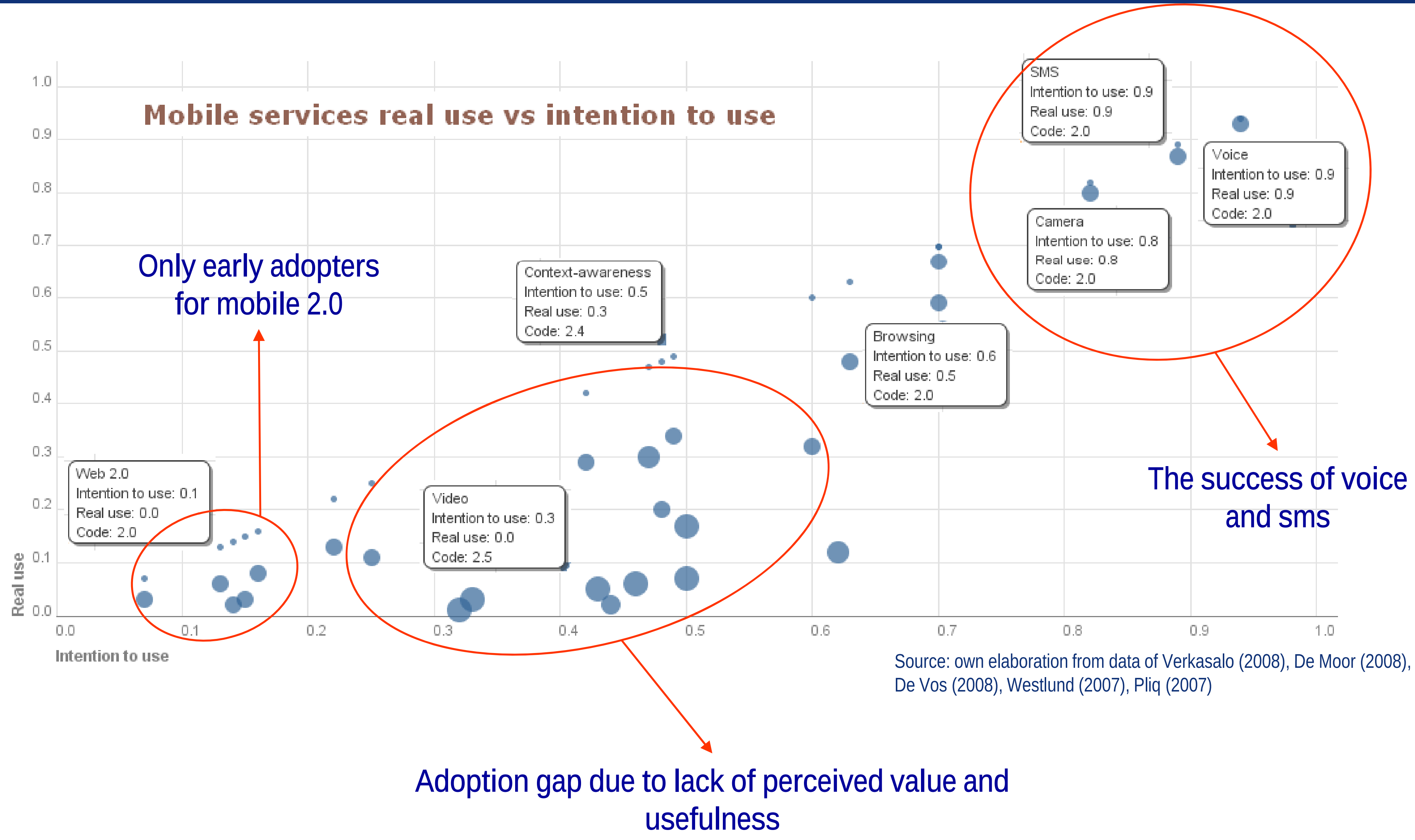


Model application (II-1): The role of users

Size of bubbles represents focus of innovation of firms

1. **Empirical** analysis
2. Establishing **an index** of innovation
3. **Findings**
   - **Social networking** leading
   - **User-generated content** is a key element for nearly 60% of the firms
   - **User innovation** is an explicit part of the R&D
   - **Erosion of the walled garden - silo model**, i.e., mobile incumbents moving towards users

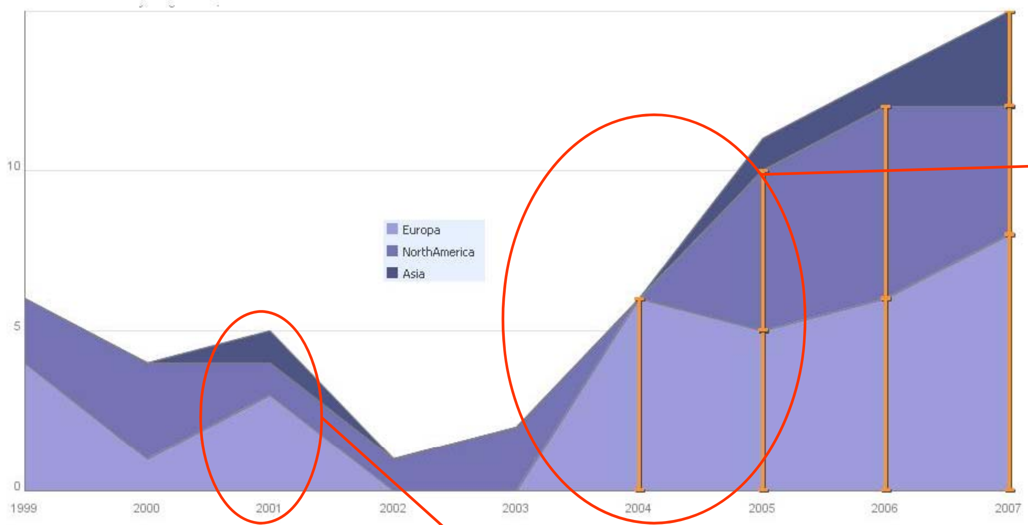
Model application (II-2): The adoption gap



Source: own elaboration from data of Verkasalo (2008), De Moor (2008), De Vos (2008), Westlund (2007), Pliq (2007)

Model application (III-1): competitiveness

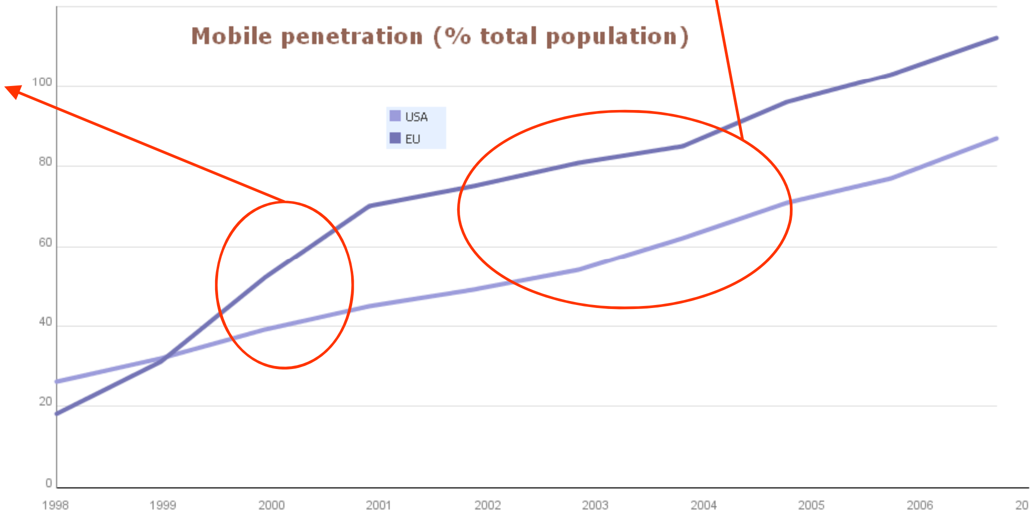
Source: own survey of innovative mobile content and applications firms (IPTS 2008)



An initital EU "critical mass" advantage (the 80% penetration level)

The "GSM" effect

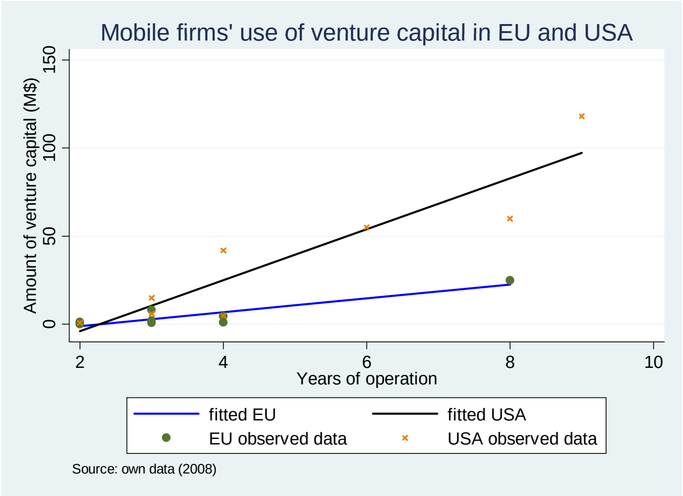
- EU competitive advantages in mobile industries might be vanishing in the mobile content and applications domain.



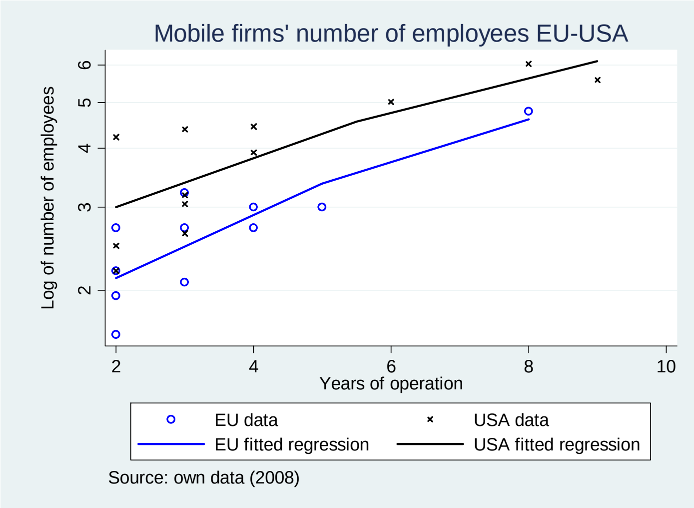
Source: own elaboration from EC Progress Reports on electronic communications and FCC Reports on wireless competitive market conditions

Model application (III-2): Competitiveness

1. Examining where the companies were originated, where they are now and where they research and develop



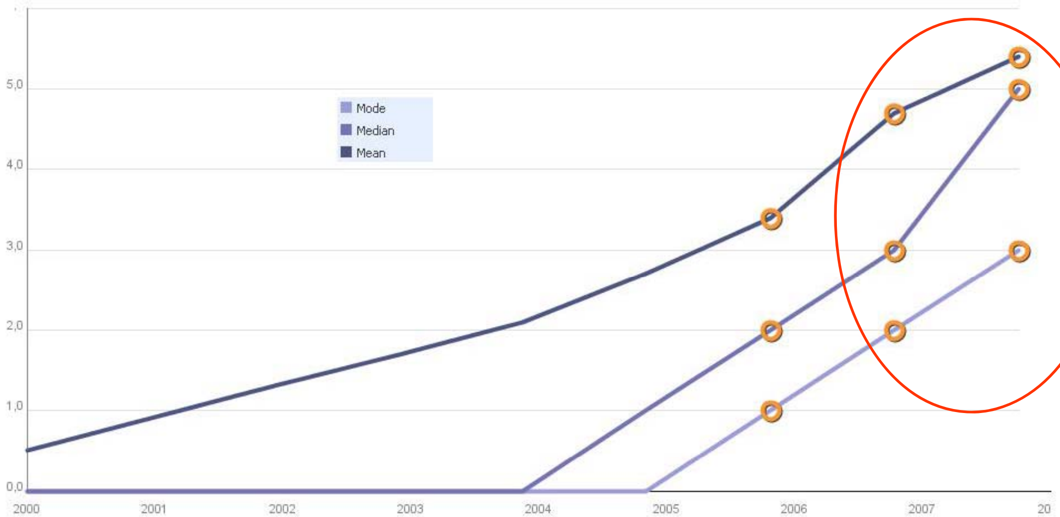
2. Availability of **venture capital**
3. Evolution of **skilled employment**
4. Findings:
   - EU: No surprises, important role of incumbent players
   - USA: A different institutional framework and business demographics, opportunities for newcomers



JRC
EUROPEAN COMMISSION

Model application (III-3): Competitiveness

Institute for Prospective Technological Studies

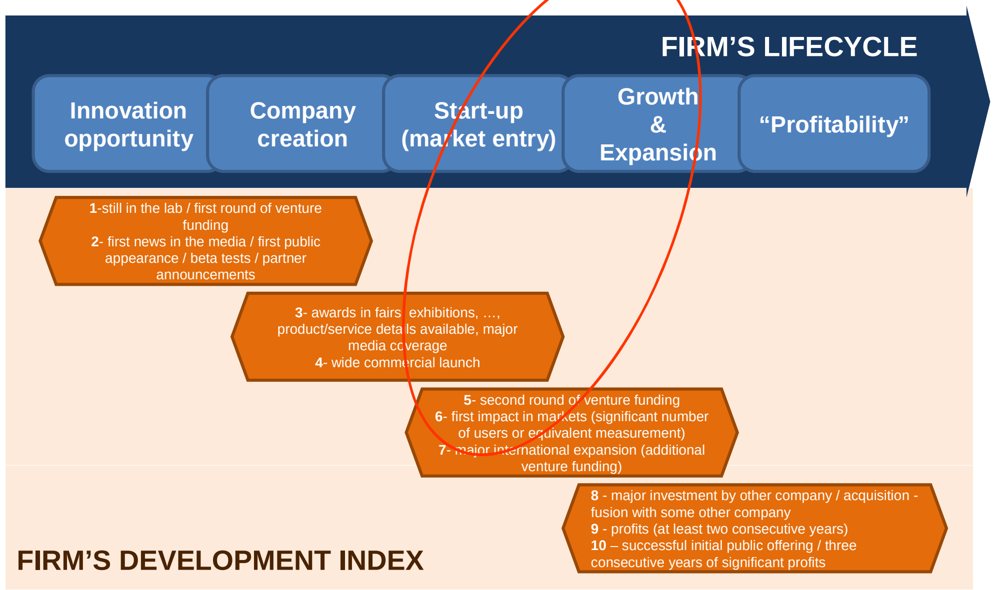


Source: own survey of innovative mobile content and applications firms (IPTS 2008)

Tipping point for growth and expansion?

Early signs of consolidation?

- Early stage of development of the domain as a whole
- Some niches still unpopulated
- Significant activity of big players positioning themselves and buying start-up companies

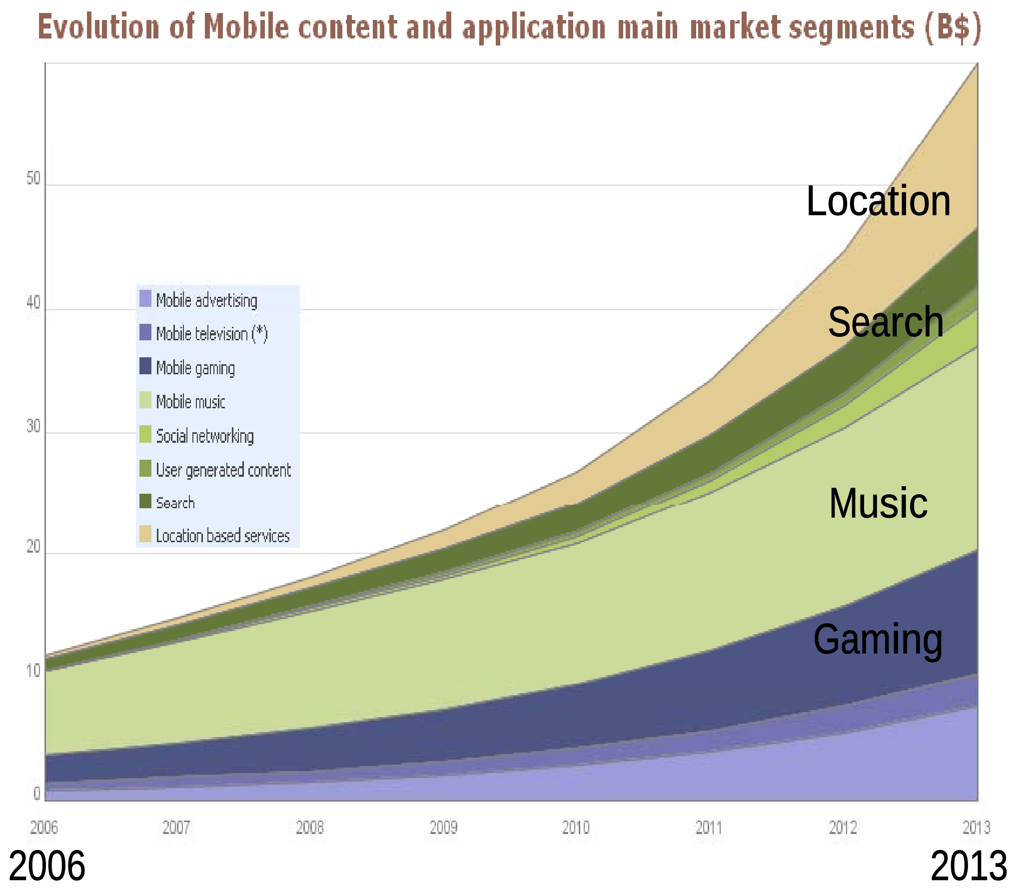


Model application (IV-1): Quantifying opportunities

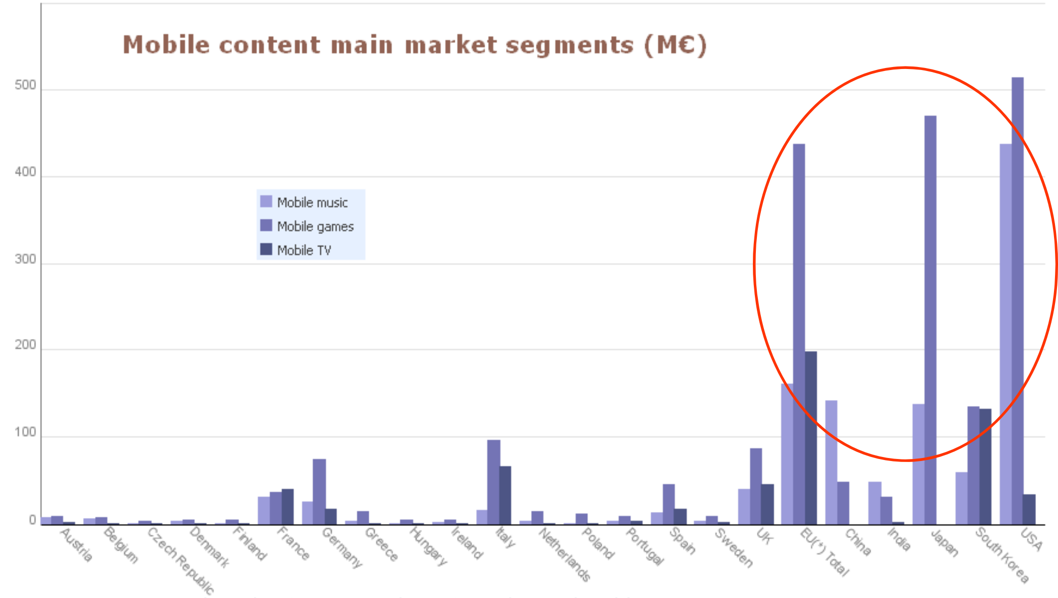
1. Collection and verification of market data

2. Trends, baseline and scenarios

3. Findings:
   - Games: level situation EU – Asia – USA
   - Television: EU – Korea
   - Advertising: the “market test”
   - User generated content
   - The return of location based services
   - Social networking: Facebook?
   - Search: Google?
   - Music: USA leading



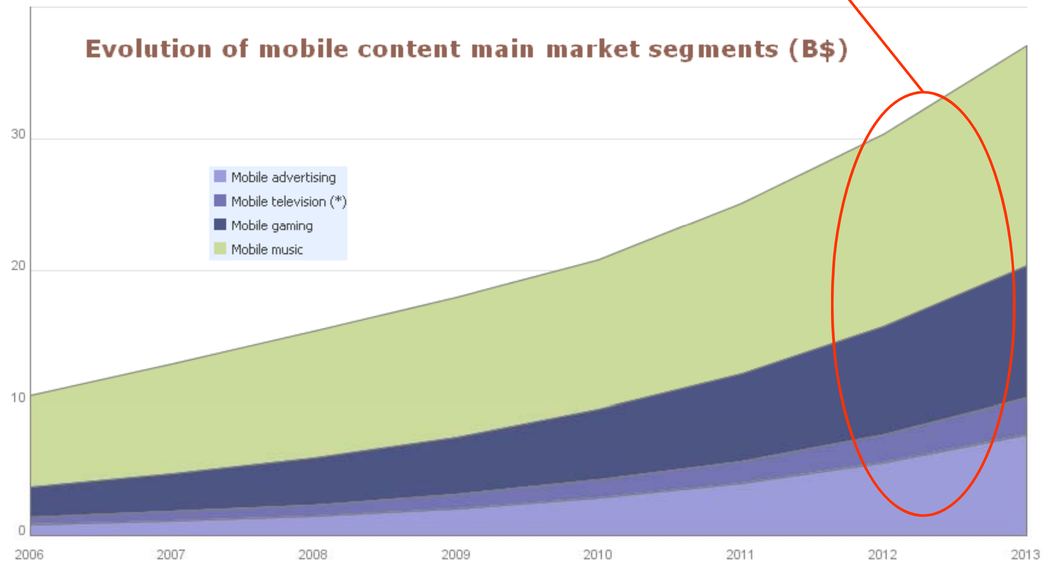
Model application (IV-2): Quantifying opportunities



Source: own elaboration from 2007 data of Netsize and mobile operators

Music: USA leading
Games: level situation EU – Asia - USA
Television: UE/Korea
Advertising: the revenue model behind

- Different behaviours for each mobile content market segment, with mobile music and mobile gaming leading in the mid term
- The success of mobile television, as it conceived today, is controversial
- Scalability of mobile advertising is also controversial



Source: own elaboration from data of Gartner, Juniper Research, Informa Telecoms & Media, iSuppli, Strategy Analytics and Verizon

Conclusions

Findings in support of a new type of mobile (2.0) development

- Major innovations outside traditional mobile players → openness of platforms
- Empowerment of mobile users as a major transformation force → user driven applications and business opportunities
- Expect more innovation and disruption as business models evolve
- Research in the marrying of mobile application and enabling / enhancing technologies which exploit the interactions between the real and the virtual world in everyday activities → EU well placed to hold leadership in emerging market segments
- Consider the EU institutional framework → avoid strangling the growth of this domain

Follow up

Contribution to the scientific-policy discussion on the evolution and framework for next generation mobile content and applications

Future work:

- Build capacity and enabler for future research on the impact of context-awareness (mobile, ubiquitous) technologies, including augmented reality, wireless sensors and mobile search

A research 2.0 note:
data and graphs used throughout the presentation are available at:
http://manyeyes.alphaworks.ibm.com/manyeyes/users/claud10#contributions
for mobile sector news and reports follow http://delicious.com/claud10 tag “mobile” and related

The future evolution of mobile content, mobile applications and mobile 2.0

Claudio Feijoo
Institute for Prospective Technological Studies

COST Network (Econ@Tel)
COST 605 MCM and Plenary Meeting
Limassol, 2-4 Feb 2009