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# Trends in Communications: Measurement Challenges and Opportunities

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# Moore's Law and the evolution of technology

Steve Mann's "wearable computer" and "reality mediator" inventions of the 1970s have evolved into what looks like ordinary eyeglasses.



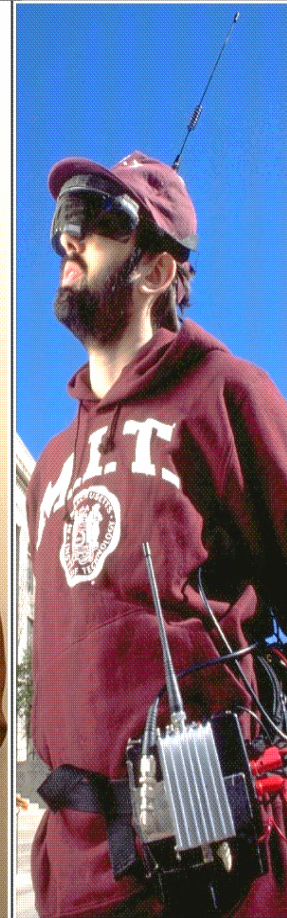
(a)  
1980



(b)  
Mid 1980s



(c)  
Early 1990s



(d)  
Mid 1990s



(e)  
Late 1990s



Today eyeglasses can be used to watch TV, play MP3 files or make telephone calls



Measurement Issue:  
Convergence means services are increasingly independent of any particular device. (We may not be able to infer use from asking about a device.)

Measurement Issue: Convergence (Divergence?) enables users to employ devices in ways that were not intended. (We may not be able to infer use from knowing what a device was intended to do.)



- ❑ Sony's PSP is primarily a game player that also lets users watch video or listen to audio.
- ❑ Within 24 hours of its release in the United States (March 2005) some users had reconfigured (hacked) their PSPs to use it as a wireless Internet access device for web browsing, relay chat and instant messaging.
- ❑ VoIP telephony is expected to be added to the PSP in this manner if not already in play.

Measurement Issue: Convergence (Divergence?) enables users to access services in locations that were not intended. (We may not be able to infer use from knowing the intended location.)



Sony's "Location Free TV" enables users to watch television anywhere they have Internet access

Slingbox does much the same ([www.slingmedia.com](http://www.slingmedia.com)) or [www.tv2me.com](http://www.tv2me.com)



Many media organisations trialing P2P such as BBC for program downloads or direct subscription (eWAN1)

Measurement Issue: Users can access any of these services anywhere they have access to the Internet  
*(Will we need to include questions on ICT use and transport/use of location information services)*

- ❑ Planes
- ❑ Trains
- ❑ Automobiles
- ❑ Ferries
- ❑ Buses
- ❑ DIY Telephony available anywhere with Internet access





Measurement Issue: Convergence means services are independent of any particular platform (Services don't automatically correspond to platforms as they once did)

- ❑ Telephone companies provide video over DSL or fibre optic cable (in addition to voice and internet)
- ❑ Cable television companies provide telephony over the cable network (in addition to video and internet)
- ❑ Cellular mobile companies can also provide triple play (voice, video and internet)
- ❑ Others options will also be available (Fixed Wireless, Satellite and Powerline)
- ❑ With an Internet connection, service provision can be independent of any particular platform



In the UK BT is trialing using payphone boxes as vending machines and cash points.

# Measurement Issue: Is your telephone service fixed or mobile or Internet or all three?

- ❑ Telephone companies are beginning to offer phones that allow people to make calls on the fixed network but revert to a mobile when they leave the home. Pricing will reflect whether the service is used at home or another location.
- ❑ In Germany, Freenet customers can buy a phone that makes phone calls for free through the Internet at home, and that roams over the mobile network outside the homes. BT Fusion is similar with different pricing.
- ❑ 3G mobile network operators plan services where consumers, in their homes, plug a box into an electricity socket and attach any fixed-line phone, fax or computer.
- ❑ Fixed telephone companies plan 'mobile' services where users can make VoIP calls when in hotspots (i.e. 802.11b or WiFi enabled locations). Mobile companies will most likely respond with dual mode (i.e. for Internet in hotspots and cellular services outside those locations).



# Does convergence make it easier or harder to compare tariffs?

- ❑ In France Iliad's *Free* services provides, for one flat monthly fee of 29.99 euros (1587 Indian Rupees):

- 24 Mbps DSL Internet access
- 200 television channels (100 free to air)
- Free unlimited domestic telephony to France Telecom fixed lines
- Free unlimited calls to 14 international locations (e.g. Australia, Canada, China, Germany, Italy, Singapore, UK, USA)

- ❑ Caveats

- Calls to some domestic non-FT users still charged
- Calls to mobiles still charged

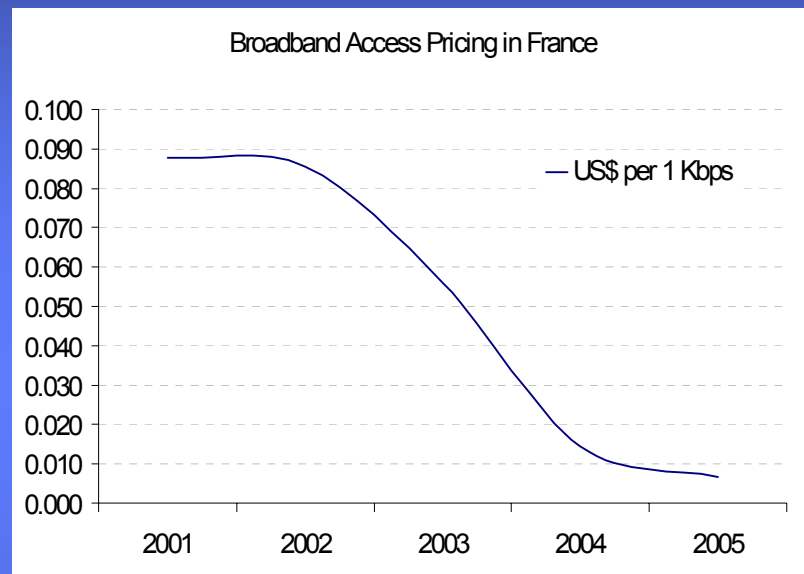
- ❑ How to compare bundle?

- ❑ In terms of traditional telephony

- No distance charges
- No time of day / day of week charges
- No call set-up fee or minimum fee
- No metered (timed) charges
- No line rental (in areas with unbundling)

# Measurement Issue: Concerns about the threshold speed of broadband should abate

- ❑ In 2001 there were only two countries with widely available commercial broadband offers higher than 1 Mbps. Today very few OECD countries do not have offers above that level.
- ❑ Offers at lower speeds are disappearing e.g. 128 kbps.
- ❑ Growing number of OECD countries have offers from 10 to 100 Mbps
- ❑ Hong Kong residential customers have 1 Gbps offers available.



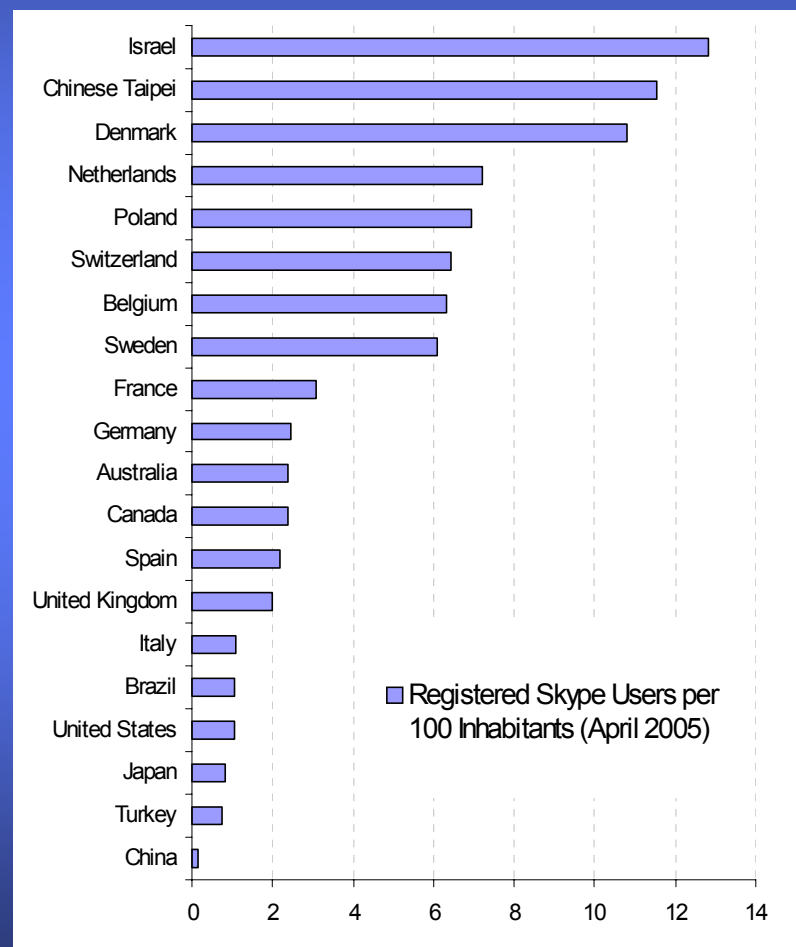
Average price for a basket of broadband offers ranging from 128 kbps (2003-2004), 512 kbps, 1 Mbps (2001-2005), 2 Mbps (2003-2005) 4 Mbps, 8 Mbps and 20 Mbps (2004-2005)

# Measurement Issue: Service suppliers may not be covered by national surveys

- ❑ A traditional telephony user located in France will have a local fixed, payphone or cellular mobile connection:
  - their telephone service will be provided from France by a company with a local presence
  - the telephone exchange will be located in France
  - they will use one or more numbers from French numbering plan
  - Unless they elect otherwise their number will show in caller line identification
- ❑ A user located in France using internet telephony (VoIP) may have a local broadband connection or access to such a connection but:
  - they might not have a fixed PSTN line or mobile telephony subscription
  - their telephone service might be provided by a company in Luxembourg or the United States whose servers may be in Estonia or Canada
  - they may have a USA or UK telephone number (or both and a user in those countries could have a French number)
  - they might have no number or use alternative identifier system such as e-mail addresses (e.g. [www.teltel.com](http://www.teltel.com))

# Not even taxes are certain!

- ❑ A PC to PC call (or PC to a PDA or Laptop or VOIP Telephone or other device) will incur no direct tax
- ❑ If a Danish user makes a call on the PSTN the VAT is 25%
- ❑ The same call over Skype to the PSTN would incur the Luxembourg rate of 15%
- ❑ If the user's registered location is outside the EU they don't pay tax





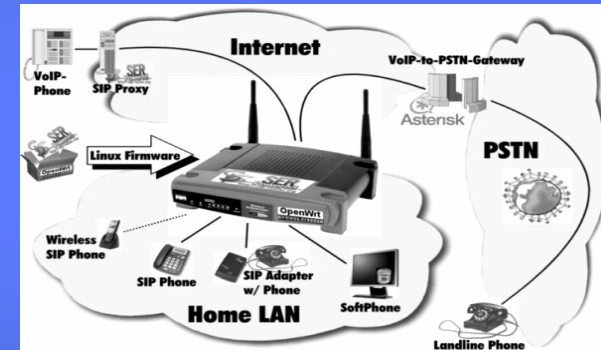
# Not much else is certain?

- ☐ [www.spoofcard.com](http://www.spoofcard.com)
- ☐ Enter your pin number.
- ☐ Enter Destination number.
- ☐ Enter Any Caller ID Number you wish to display.
- ☐ Choose the voice you would like to use (male or female).
- ☐ Your call is connected using the specified Caller ID Number.
- ☐ Record the call for later retrieval on your PC



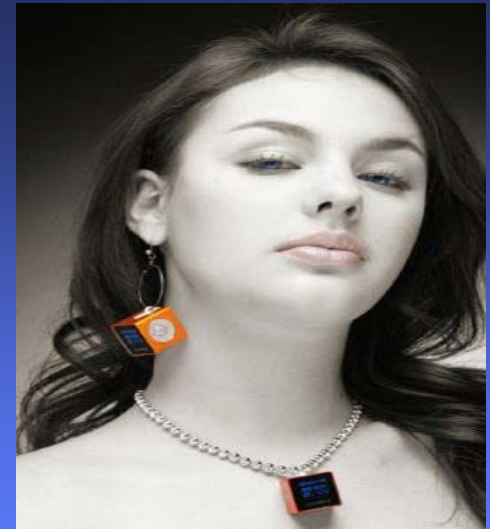
# Measurement Issue: Who is the Telephone Company?

- ❑ DIY Fixed
- ❑ DIY Mobile (Wifi, Wimax, FON, even Walkie Talkies)
- ❑ iSkoot over Skype over Hutchison 3
- ❑ Barablu mobile to mobile VoIP
- ❑ Or virtually no provider such as [theswitchboard.ca](http://theswitchboard.ca)



# Do MP3 players make good earrings?

- ❑ Mobile telephones make good substitute time pieces but do you want to wear one as a watch?
- ❑ NTT showed its first mobile "watch phone" in 1997. Nokia version, on right, is from 2003
- ❑ Caveat on Future: there are many social factors in the adoption of technology (e.g. fashion and utility may not converge)



# Summary

- ❑ Telephony (and other communication services) will increasingly be just another software application with no special relationship to device, platform or location.
- ❑ Supply side data will continue to exist where users pay for services (although it might not be 'local' in relation to the collection of data and it will be increasingly difficult to associate access or services with particular companies)
- ❑ User surveys are probably the only way for policy makers to get a handle on how and where people are using telephony
- ❑ Challenge for NSOs is to keep survey questions apace with technology
- ❑ Most users will continue to have imperfect knowledge of technology
- ❑ May need to ask business or residential users if they are also suppliers/producers as more services are supplied/produced at the edge of networks
- ❑ It will take time for change to occur for the majority of users.



# THANK YOU!

[www.oecd.org/sti/measuring-infoeconomy](http://www.oecd.org/sti/measuring-infoeconomy)

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