

# Opportunities and threats in the Digital Age

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# Recent research

- \* In the past working-age groups agreed that a landline was required in order to be able to access the internet, but in 2014 working-age people without children agreed that communication needs could be met using a mobile telephone and internet via a dongle (a small device that plugs into the computer and allows internet access with a mobile broadband connection).
- \* M1: “With the internet you actually don’t need [a] landline anymore.
- \* Because there is companies now that provide a little ... I don’t know what it’s called.”
- \* M2: “Yes like a dongle-type thing.”
- \* M3: “I mean that’s where it all gets a bit ... where things are moving so fast isn’t it. Potentially landlines will be obsolete in a few years’ time.”

# Yes, possibly

- \* But some countries are saddled with massive investments in fixed line infrastructures.
- \* And the future is (to quote an ITU report) increasingly mobile
- \* Around 40% of UK landlines are maintained almost exclusively for Internet access

# Digital threats and opportunities

- \* A big topic.
- \* I can only cover a small number of points.
- \* This presentation will focus on 3 areas
  - \* What are telecommunications networks today?
  - \* What do we expect from them?
    - \* With a particular focus on emergency calls
  - \* What do we do about privacy in communications?

# What is the problem?

- \* We have moved from an industrial to an information economy.
- \* The evidence?
  - \* And evidence is something which is sadly lacking in many of the debates in the field.
  - \* And as has been said, there are lies, damned lies and statistics.

# From craft to industry

- \* Knowledge based industries have become central to the UK economy—in 2004 the Creative Industries contributed 7.3 per cent of UK Gross Value Added, and from 1997 to 2004 they grew significantly quicker than the average rate across the whole economy.

# Again

- \* At the heart of what we are discussing today are the British creative and communications industries, which produce £125 billion a year and employ just fewer than 2 million people. (out of a working population of about 30 million)

# We trade data

- \* Every year in the last decade, investment by UK business in intangible assets has outstripped investment in tangible assets: by £137 billion to £104 billion in 2008. Global trade in IP licences alone is worth more than £600 billion a year: five per cent of world trade and rising.
- \* Digital creative industries exports rank third, behind only advanced engineering and financial and professional services.
- \* Data is valuable



# And in telecoms

- \* We have witnessed massive transformation in the sector.
- \* From monopolistic land-line operators to competitive mobile networks.
- \* And the emergence of Over the Top (OTT) services such as SKYPE

# A story from a friend

- \* “I have leased, from an aggregator in Hong Kong, a geographic London fixed line number, in the 0203 range. This number points to my IP voice server sitting in my study, such that calls to this London number are delivered to my house.
- \* That was the hard part — getting the routing right for what is known as a "DID" (a Direct Input Dial number) to direct calls to me, and to make the necessary configurations for me to be able to handle that incoming traffic.”

# How many of us?

- \* Will you please raise your hand if you understood all (anything) that appeared on the previous slide?
- \* My hand is not raised.

# Clear?



# The bottom line

- \* I have to pay for the leg between my house and my mobile (i.e. the cost of originating a call to Vodafone). As this goes over a VoIP trunk itself, this leg is very low cost anyway — **approximately £0.02 per minute.**
- \* The second test was a conference call facility which, traditionally, is rather expensive. In this arrangement, multiple people can ring the 0203 number, and they are prompted to enter a PIN. When they enter the PIN, they enter a virtual conference bridge, controlled by a separate leader PIN. **There is no incremental cost to me in operating this, and the participants pay only their origination costs for calling the 0203 number.**

# The key point

- \* ‘I just thought you might find this interesting, particularly that what once would have been the preserve of a sophisticated telecoms company is now available to anyone willing to spend a few minutes learning how to put it all together.’

# Major changes

- \* We used to live in a world of monopolistic telecommunications providers.
- \* No more!!
- \* We were told that the world needed five computers - although definitions are always important.

# An explanation?


- \* After all, when IBM's Thomas Watson said "computer," he meant "vacuum-tube-powered adding machine that's as big as a house." It's fair to say that few people ever wanted one of those, regardless of the size of their desk.



# And what is a computer?

- \* If time travel should become practical and we sent an iPhone (or similar device) back to around 1985, it would be the single most powerful computing device on the planet.
- \* Current data protection laws date from around (before) that time.

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## Smartphone Users Worldwide Will Total 1.75 Billion in 2014

**Mobile users pick up smartphones as they become more affordable, 3G and 4G networks advance**

*Jan 16, 2014*

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eMarketer expects 4.55 billion people worldwide to use a mobile phone in 2014. Mobile adoption is slowing, but new users in the developing regions of Asia-Pacific and the Middle East and Africa will drive further increases. Between 2013 and 2017, mobile phone penetration will rise from 61.1% to 69.4% of the global population, according to a new eMarketer report,

# Should we be scared of a smart phone?

- \* Perhaps yes but maybe not by reason of what it can process.
- \* Our phones tell a great deal about us.
  - \* And in particular our contacts and movements
- \* It can become the spy in our pockets – and of course an important weapon in the armory of law enforcement

# A decade or so ago

- \* We had telecommunications (telephone) networks that worked on a point to point basis.
- \* Initially using operators and then automatically, a direct, physical connection would be established between the calling and called parties
- \* In the 1970s we started to see dedicated data networks
- \* And we had the Internet – which applied the new notion of packet switching.

# Change brings opportunities

- \* Over the Top (OTT) companies such as SKYPE realised that they could use Internet technology (and business models) to allow customers to make calls bypassing traditional networks.
- \* To the Internet, data is data and it does not distinguish between text, audio or visual data

# A personal anecdote

- \* I teach regularly in Africa – mainly Tanzania.
- \* 5 years ago I would spend around \$(US)200 a week calling home.
- \* I now spend nothing.
- \* My normal hotel offers free wifi and the speeds are good enough for voice calls and – sometimes - video

# Long running issues

- \* We have had many debates about OTT services and the manner in which they should be regulated.
- \* Some have perhaps become over simplistic but they do relate to deeper problems.
- \* An example is the ability to access the emergency services. A couple of issues arise
  - \* If I'm using my computer as a phone, what happens if there is a power cut?
  - \* What about data location?.



# Emergency Calls

- \* Very limited scope with Skype (or similar)
  - \* Skype emergency calling is enabled in the following countries/regions, platforms and versions of Skype Software:
    - \* Skype 4.1 for Windows (and later versions): available in Australia, Denmark, Finland and UK
    - \* Skype 2.8 for Mac (and later versions): available in Australia, Denmark, Finland and UK
    - \* Home phone adapters: available in UK

# But what are emergency calls?

- \* Let's make sure we know what we want from these emergency services. Don't force legacy emergency calling onto innovative networks."
- \* For example, he said, the emergency service should not force you to make a voice call. "When there is a burglar in my house, I don't want to call the police; I want to email or IM them. The burglar may hear my voice!"

# Mobile phone problems

- \* To some extent a UK problem. We tend to use the numbers 999 for emergency calls (there is another tale why that was chosen). Many other countries use 112 which is less prone to mistaken calling.
- \* We now have a non-emergency number 101 to call the police – and 111 for the health service. Some people never learn from experience!
- \* There are also numerous stories of people calling 999 for trivial reasons.

# And the point is??

- \* People are demanding more from emergency services numbers.
- \* In my childhood, you would have had to walk perhaps half a mile to find a payphone to call the services – or ask a wealthy neighbour for help. Only about 20% of UK households had phones in 1965.
- \* What do/should we expect of emergency services
- \* And can we afford to meet expectations?

# Reasons (not) to call 999

- \* Highlights include a woman who had forgotten her laptop password, a man who couldn't get served in a McDonalds drive-thru and a man who called 999 to ask for the non-emergency number, 101.

# The Inevitable But

- \* “For general enquiries or to report less urgent crime or disorder, people should call 101. For example, if a car has been stolen, property has been damaged or to give police information about crime.”
- \* What are emergencies?
  - \* I would think that my car being stolen was an emergency

# We live in changing times

- \* Old definitions and certainties are of limited relevance.
- \* Today's revolutionary OTT service (SKYPE) may be tomorrow's pillar of the establishment.
- \* It is not easy to regulate a few tens of network operators. How should we seek to control 10's and possibly hundreds of thousands?
- \* And how should we seek to regulate billions of computing devices?