Future Business of Mobile
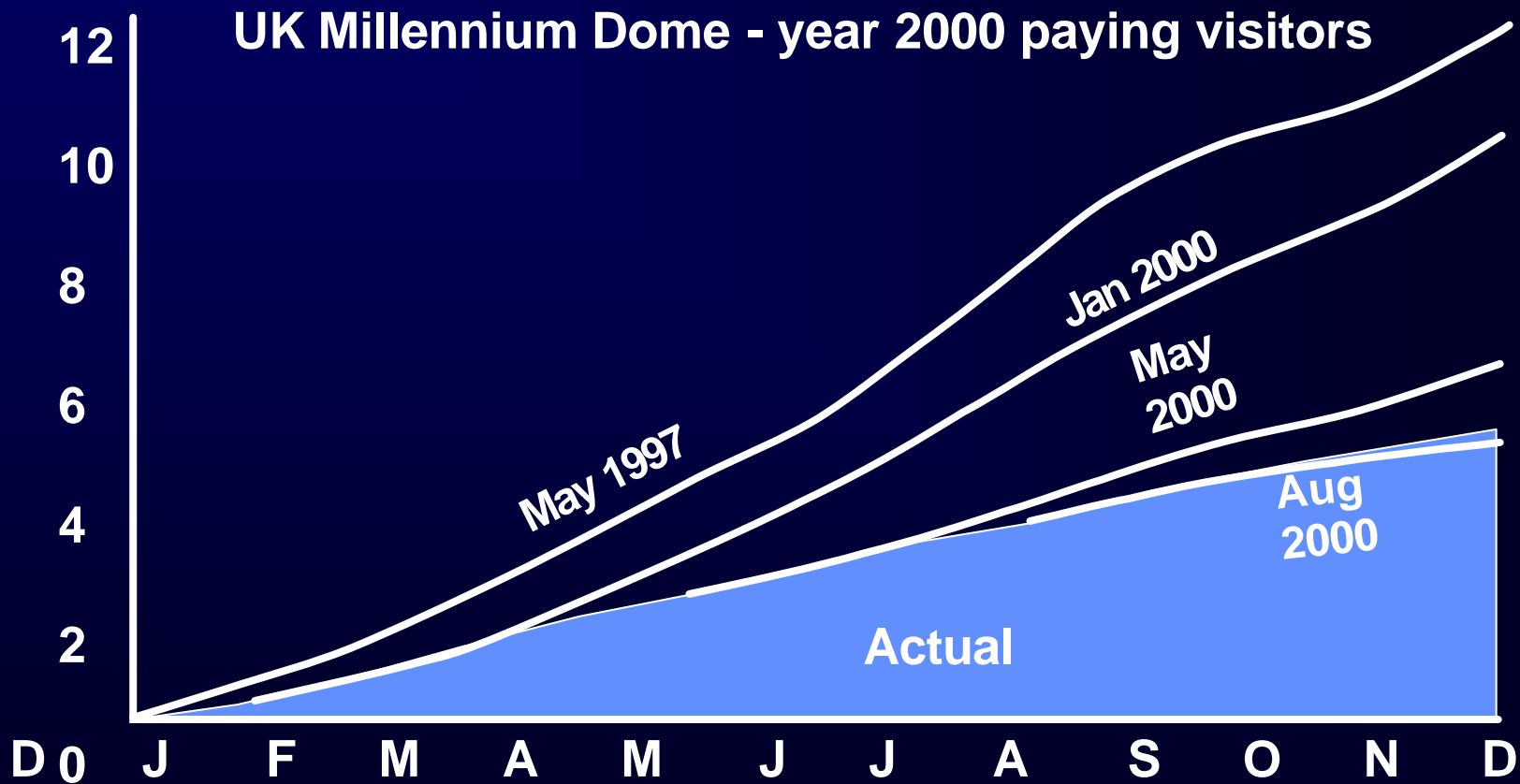
Professor Laurie Cuthbert

Queen Mary, University of London

Events often defy prediction

…… so take predictions with a "health-warning"

UK Millennium Dome - year 2000 paying visitors

Chart showing year 2000 paying visitors (in millions) by month J to D, with prediction lines labelled "May 1997", "Jan 2000", "May 2000", "Aug 2000", and shaded "Actual" area.

Source: New millennium experience company

What is required for a mobile workforce

☐ **Access**

- **From "fixed" services**
  - ➢ **Dial-up PSTN**
  - ➢ **Hotel LAN connection**
  - ➢ **Wireless LAN**
- **From mobile services**
  - ➢ **GSM / GPRS / 3G**

☐ **Security**

☐ **Authentication**

☐ **Performance**

- **Enough capacity (bitrate) for services**
- **Quality of Service (QoS)**

☐ **Value for money**

Assumptions

- **VPN can provide security and authentication**

- **Different degrees of transparency with different VPNs**

- **Really issue of *capability* of connection is down to the access connection**

- **Dial-up PSTN ubiquitous, but slow. 56kbit/s connections serve for accessing email – except with large attachments!!**

- **Cost of dialling back to home location leads organisations to use such things as:**
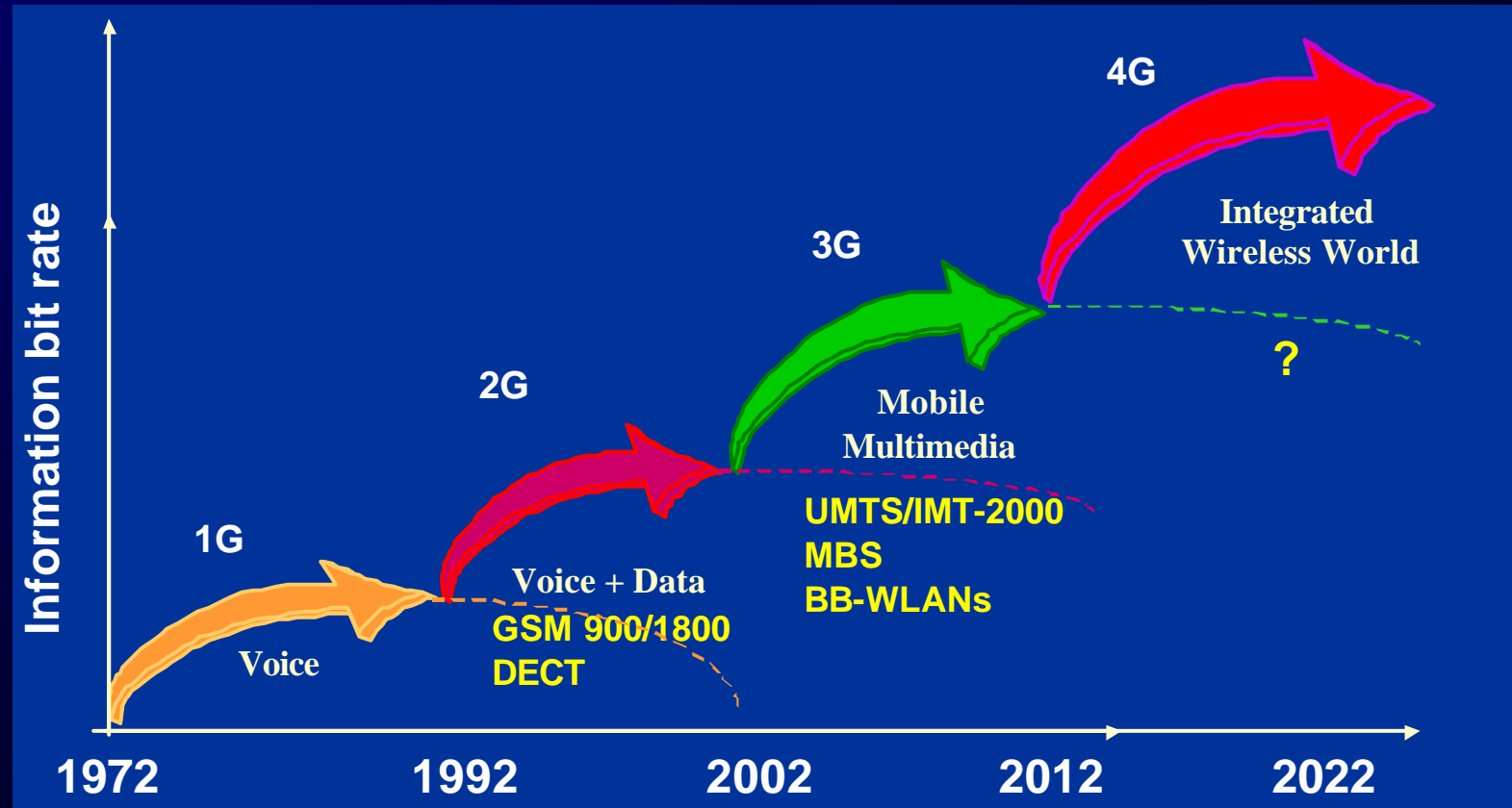 - **Roaming ISP access (local POPs)**
  - **Toll-free (0800) access**

What is required

- □ **High bit-rate connections (» 56kbit/s)**

- □ **Low cost of use**

- □ **Single authentication methods**

- □ **Available everywhere**

- □ **Service Level Agreements determine QoS, availability etc.**
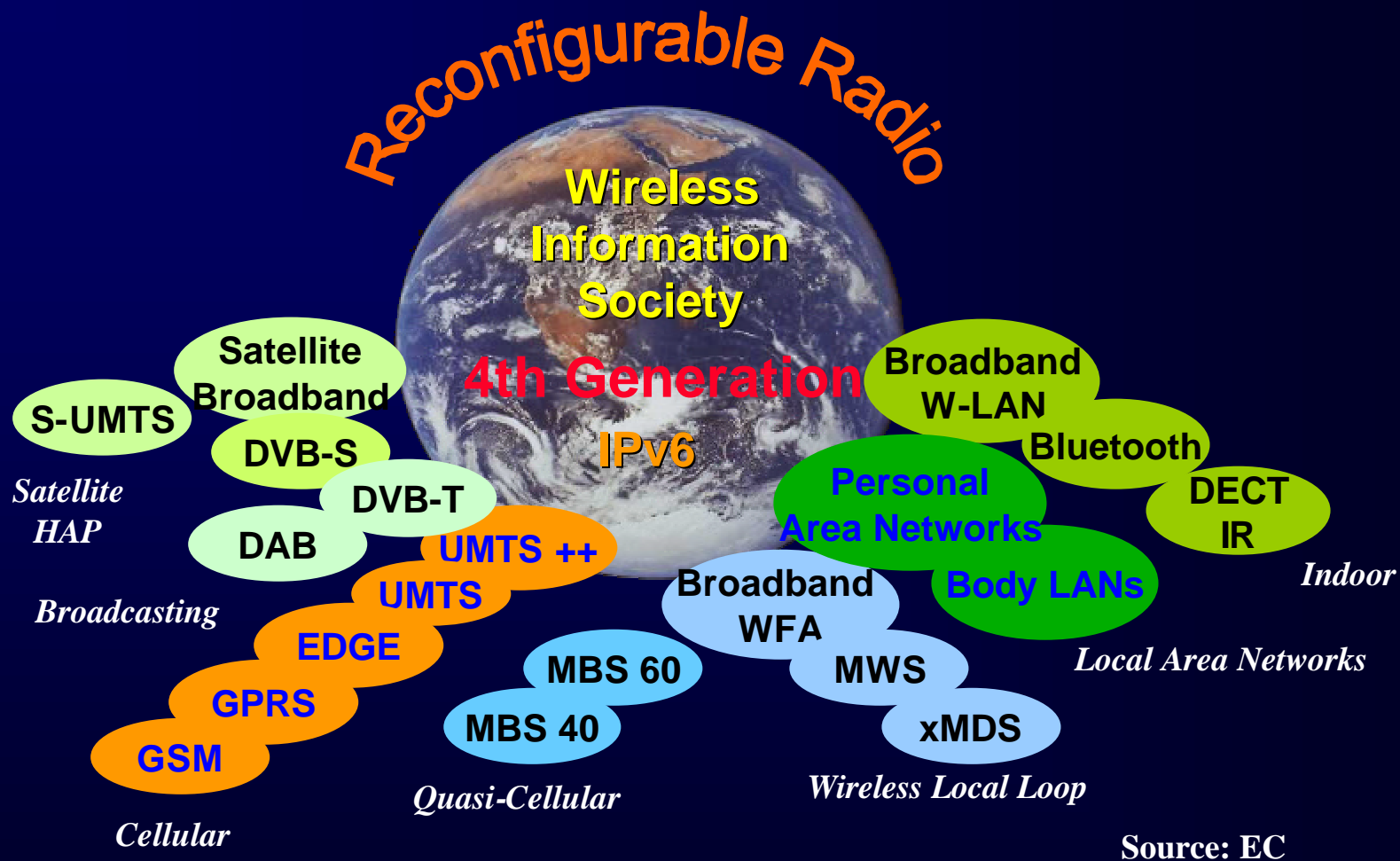
Is the answer mobile ??

The prediction ??

Information bit rate (vertical axis)

1G — Voice
2G — Voice + Data, GSM 900/1800, DECT
3G — Mobile Multimedia, UMTS/IMT-2000, MBS, BB-WLANs
4G — Integrated Wireless World, ?

1972   1992   2002   2012   2022

Source: EC

4G Wireless Information Society

Reconfigurable Radio

Wireless Information Society

4th Generation

IPv6

S-UMTS

Satellite HAP

Satellite Broadband

DVB-S

DVB-T

DAB

Broadcasting

UMTS ++

UMTS

EDGE

GPRS

GSM

Cellular

MBS 60

MBS 40

Quasi-Cellular

Broadband WFA

MWS

xMDS

Wireless Local Loop

Broadband W-LAN

Bluetooth

DECT IR

Indoor

Personal Area Networks

Body LANs

Local Area Networks

Source: EC

Everything over IP...   IPv6 over everything...

Let's look at some of the facts

Penetration of mobile:

No of lines (millions) in UK

Approx 70% of popn

Legend:
- Contract Mobile
- Prepaid Mobile
- Fixed

Y-axis: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

X-axis: Mar-97, Mar-98, Mar-99, Mar-00, Mar-01
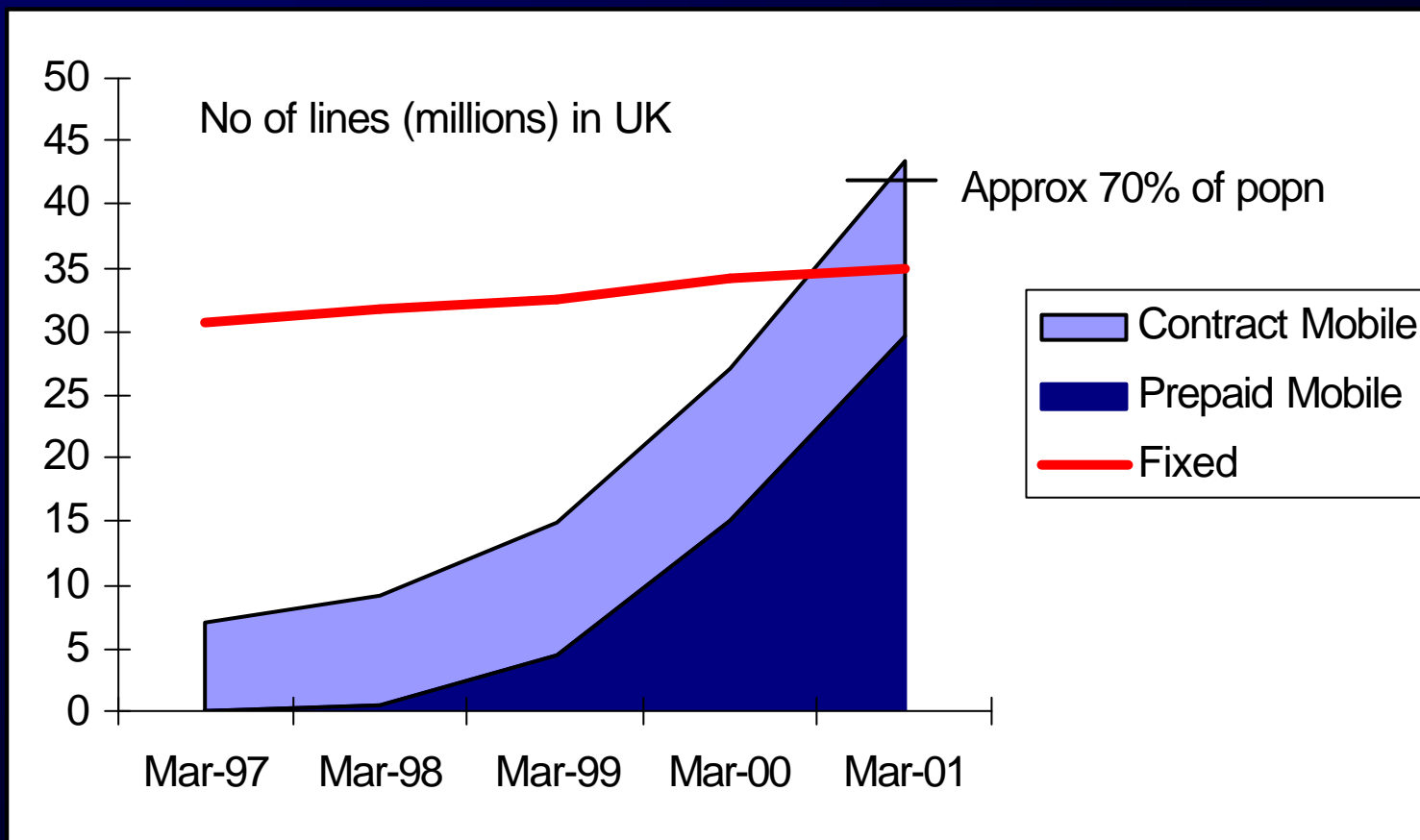
All UK statistics from OFTEL publications

Mobile revenues are growing

UK annual revenues (call-related)

US$ billions
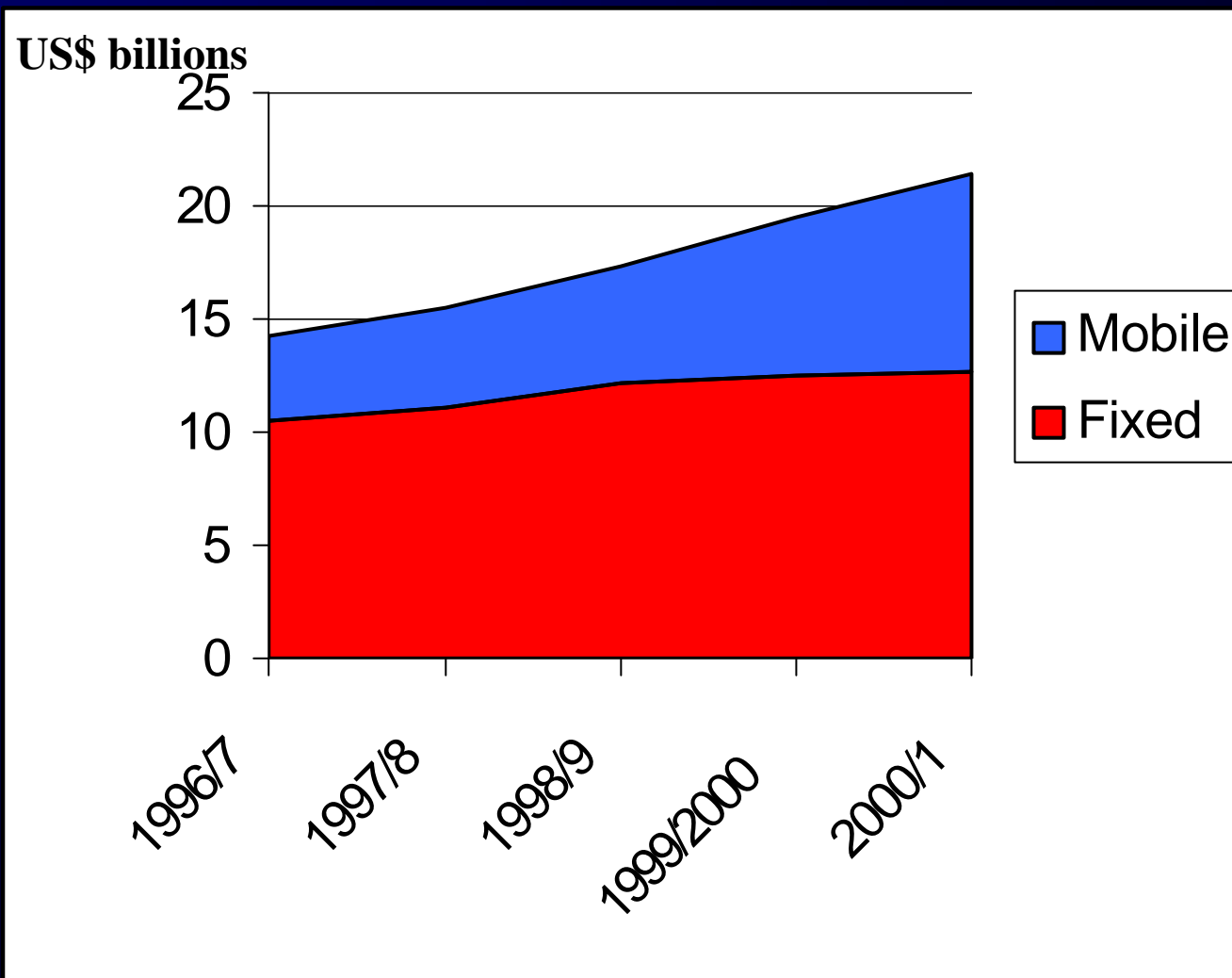
But revenue per customer is falling

Average revenue / customer / month

US$

Vodafone
BT Cellnet
One 2 One
Orange

1996/7 1997/8 1998/9 1999/2000 2000/1
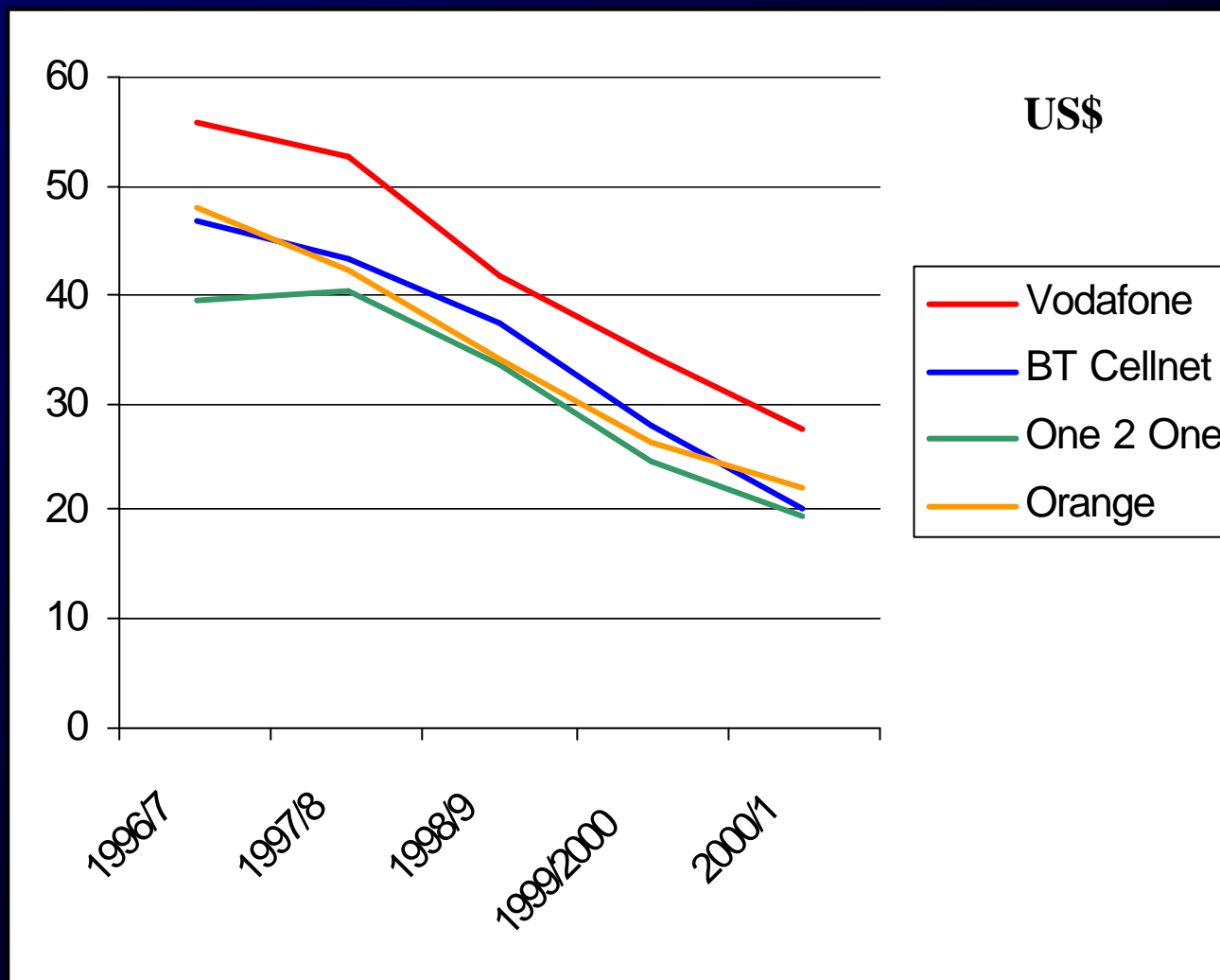
And so is revenue per min

US$/min
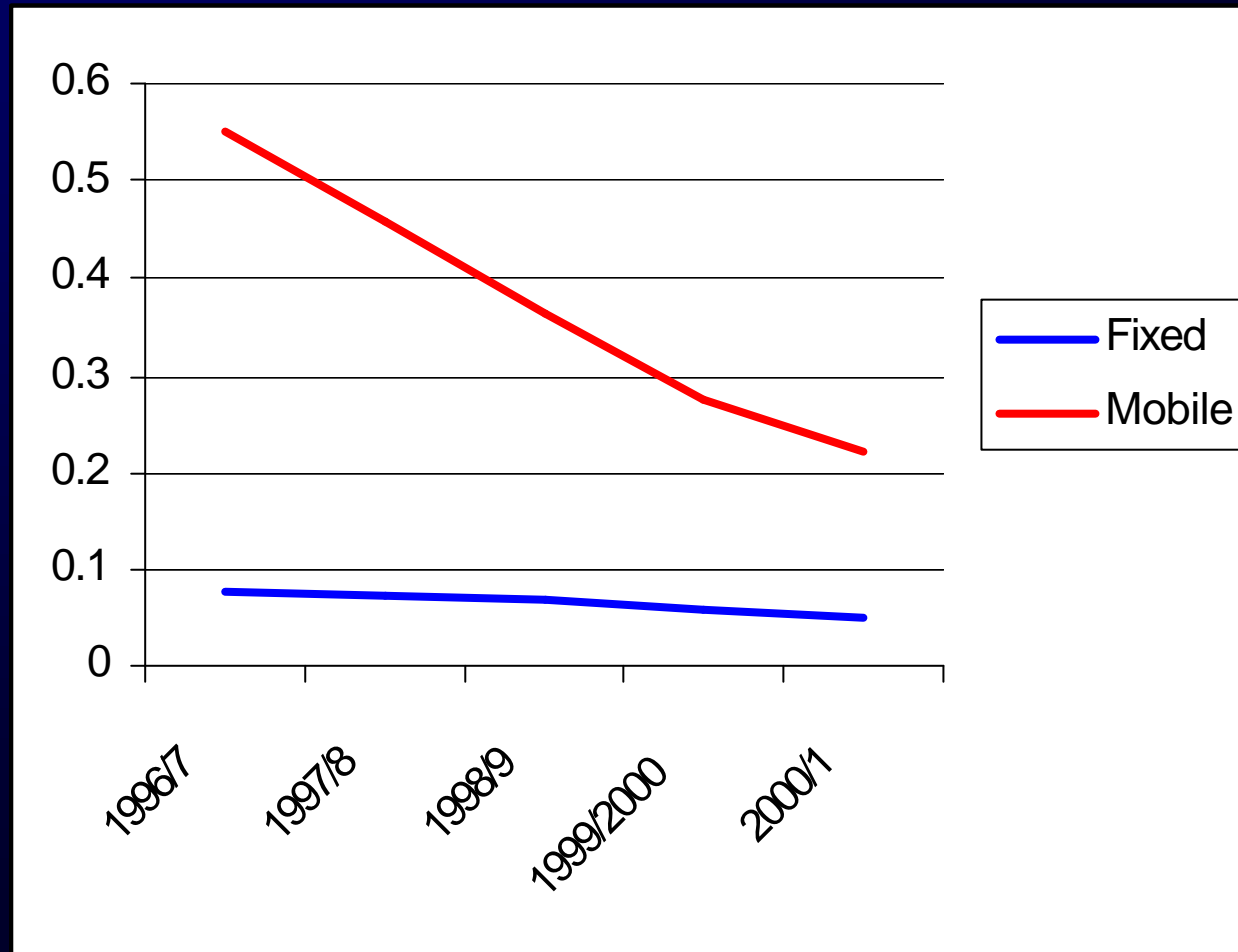
Implications

☐ **Mobile volumes rising**

☐ **Mobile revenue rising … but:**

- **Revenue per customer falling**
- **Revenue per min falling**
- **Investment required to keep up with growth**
- **3G licence costs**

☐ **Can new services lead to increased profitability**

☐ **Example: SMS**

- **Growth rate almost 100% / year**
- **Revenue / SMS growing (rip off ?? – Orange** *just doubled* **price !!!)**
- **SMS data rate cost: $875 / Mbyte**

So how suitable is mobile for data on the move

□ **GSM**

  ● **9.6kbit/s too slow**

□ **HSCSD**

  ● **Inefficient in terms of spectrum**

  ● **28.8kbit/s (Orange offering in UK) too slow**

□ **GPRS**

  ● **Promised widespread availability**

  ● **Initial offering only dial-up speeds**

□ **3G**

  ● **Broadband**

  ● **Very high bitrates in pico-cells (e.g. at airports)**

But what of the cost ??

Data costs – UK networks (selection)

SMS	$/message	$/Mbyte
SMS in UK	0.14	875.00
SMS from US to UK	0.27	1662.50
Circuit switched data	**$/Min**	
9.6kbit/s in UK	0.14	2.43
28.8kbit/s HSCD in UK	0.28	1.62
9.6kbit/s from US to UK	1.54	25.20
9.6kbits to local POP in US	1.54	25.20
GPRS (Vodafone)		
Low use: ($0 monthly charge)		28.00
High use: ($39.50 monthly charge)		2.52

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This is probably just about affordable (but not cheap) *provided* roaming costs are low

But what of 3G ???

- Licence costs: $ 32 billion in UK (5 players)

- With interest and infrastructure costs, around $2,000 per customer over the licence period.

- Average revenue will have to go up.

- Costs will depend on overall success

- Let's hope services will take off – is there a killer app ?

- As an aside, current thinking on "killer apps" is:
  - Games
  - Gambling
  - Pornography

!!!!!

Is wireless LAN an alternative technology ?

☐ **Probably – but access more restricted.**

☐ **Example – MobileStar (now part of T-mobile)**

- ● **In quite a few Starbucks in some US states (but 70% of all US Starbucks locations within the next few years)**
- ● **In a few hotels, but coverage very limited: e.g. Florida:**
    - ➢ **Longwood - Ramada Inn North**
    - ➢ **Miami -**
        - – MIA Admirals Club Miami E
        - – MIA Flagship Lounge Terminal E
- ● **Notice the airport locations – in specific lounges !**

☐ **Affordable …..**

Affordable

□ **MobileStar tariffs (examples):**

□ **Prepay:**
- ● **$20/ $50 : 120 mins / 300 mins (16.6¢ / min) nationwide**

□ **Contract:**
- ● **$59.95 / month unlimited minutes**
- ● **$15.95 / month 200 free mins then 10.0¢ / min**

□ **Pay as you go:**
- ● **$2.95 for first 15 mins, 20¢ per min**

□ **Compare with GPRS**
- ● **$39.50 monthly charge, 15Mbye free then $2.52/Mbyte**

Coverage

□ **This is the real problem:**

□ **Different providers in different locations mean that multiple accounts are required – if there is a location at all:**

- ● **E.g. Washington DC – 5 Wayport, 1 MobileStar**

□ **Mix of technologies**

- ● **different wireless protocols – e.g. MobileStar Wi-Fi (IEEE 802.11b direct sequence) and OpenAir**
- ● **Wayport use wireless in hotel common areas and Ethernet in bedrooms.**

But this will change

- **Integration with 3G**
  - **Tight coupling – seamless transition**
  - **Loose coupling – same authentication**

- **In his keynote speech at the CTIA Wireless 2002 conference in Orlando, Mar 2002, VoiceStream Wireless CEO John Stanton highlighted the company's vision for providing wireless data access via an integrated GPRS/EDGE/802.11b service offering.**

"By combining 802.11 and our existing GPRS service, customers will have access to the right technology at the right time. Whether they need to have constant e-mail access on the go or predictable access to large files on demand, VoiceStream will be able to meet customer needs with coverage where they want it and speed when they need it."

http://www.t-mobile.com/

Conclusions

- Access will continue to be a mix of wired / wireless LAN and mobile for some time to come

- Integrated WLAN and wide area mobile offers great scope for the future but is some way off before it becomes a common reality