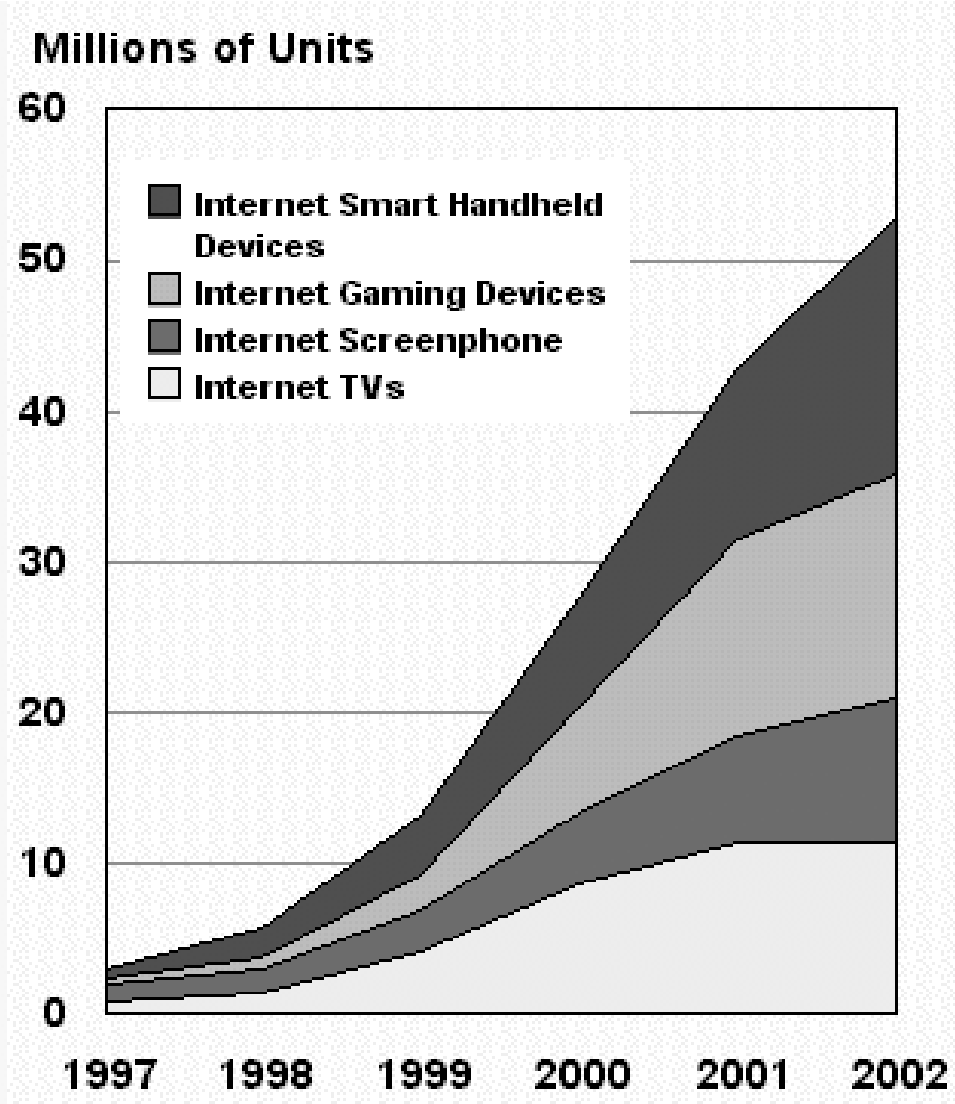
B336 Advanced Internet Computing

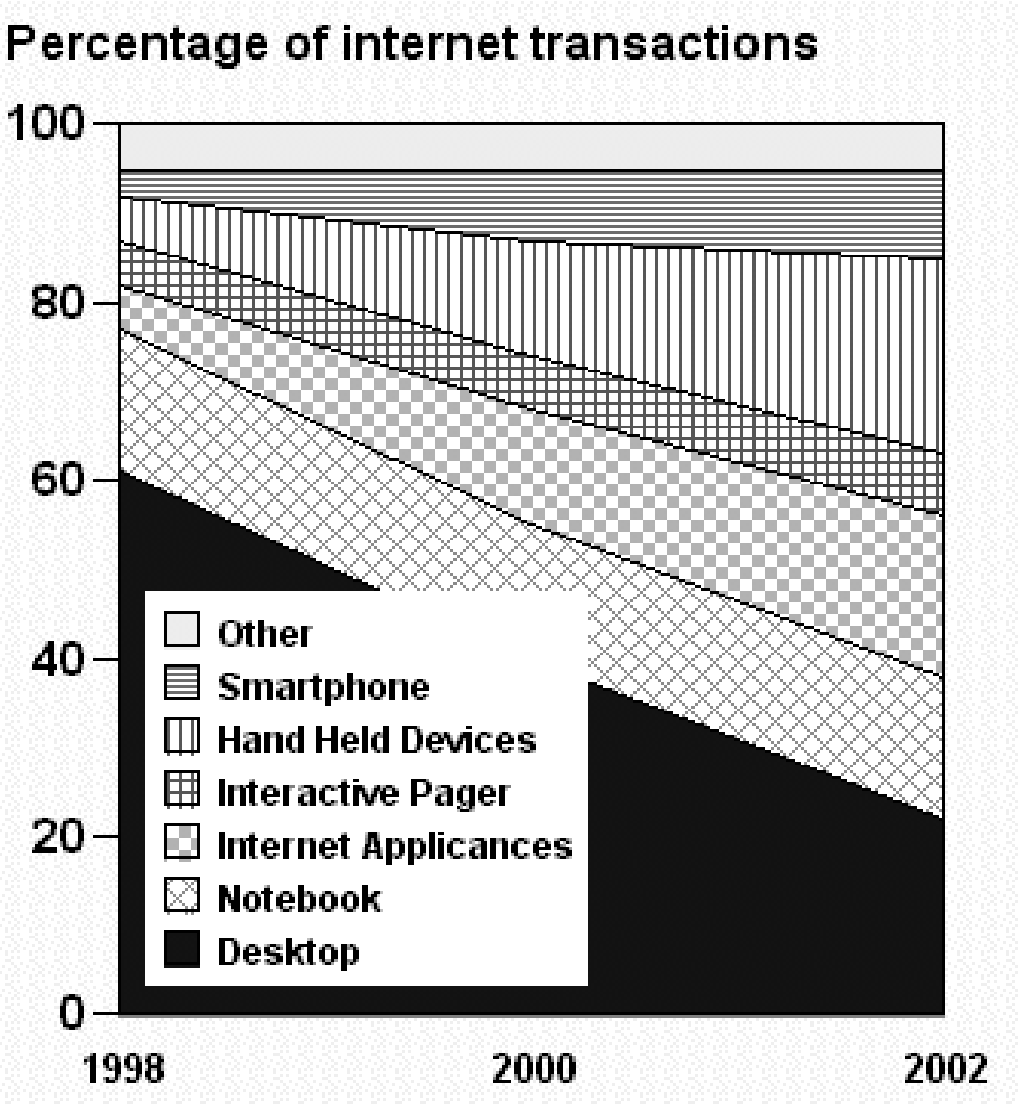
The Future of Wireless Applications

Learning Objectives

- Understand the strengths of WAP
- Understand the weaknesses of WAP
- Examine likely developments in the technology
- Case study: Bluetooth
- Case study: MIT's Oxygen Project
- Visualise new kinds of service, business models
- Forecast the social impact of wireless revolution

Growth of Wireless Web Access





Strengths of WAP

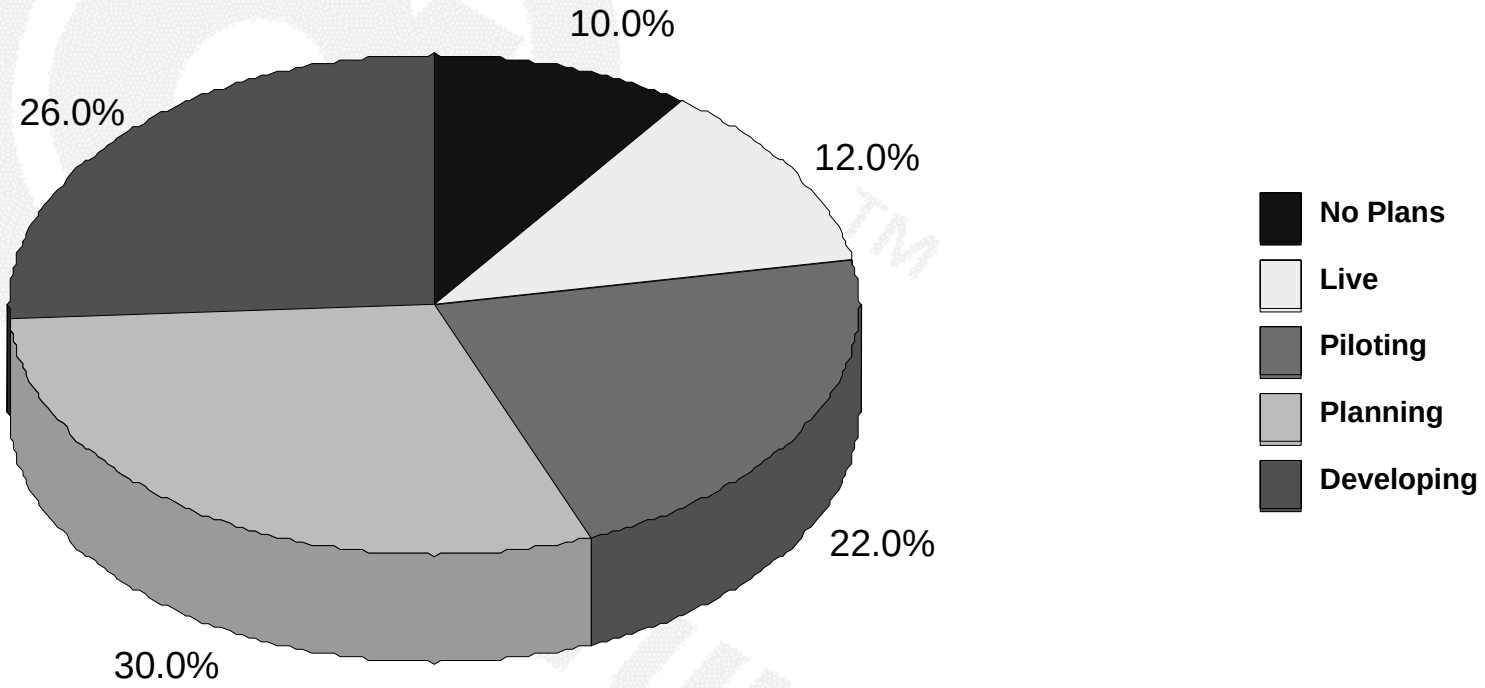
- It is the only, internationally accepted non-proprietary standard for wireless Web delivery that works
- It has a large and growing uptake in the EEC >> ~16.5 million WAP subscribers there
- It has a standardised, well-equipped interface to (WML and WMLScript)
- WML is designed with the limitations of handheld devices in mind
- Develops an obviously viable market in personalised mobile communications

Strengths of WAP

What is the current status of your WAP project?

Interview on Top 50 leading European Internet companies

Source: Forrester Research, Inc. (12/99)



Weaknesses of WAP

- dynamic, *disruptive* technology - nobody wants to commit resources until things settle down
- Security problem: during transcoding at the WAP gateway, data is unencrypted for a fraction of a second
- Patent dispute (US). Geoworks holds patent on WAP interface, want to charge US$20,000/yr license fee. Phone.com sued, Geoworks counter sued
- Might lose to competing wireless Web delivery systems
- Screens are too small, too dim, too low-contrast; buttons are too small, too hard to see

The Japanese Scene

- In Japan nearly 20 million i-mode subscribers and 50,000 per day new subscriptions (and slightly over 3 million WAP users)
- i-mode is a proprietary system owned by NNT DoCoMo (>9% of revenue) and cannot easily be exported to other countries - but they are trying
- i-mode is based on cHTML, but will try to serve pages written in HTML == more web pages accessible
- Much faster (9.6kbps), easier access to web pages
- Pricing model charges by data retrieved, not time connected
- Higher-function handsets - teenagers send still pictures to each other, download cartoons. Super i-mode

Likely Developments: Don’t write off SMS

- Text messaging has become very fashionable in Europe and Japan, especially among younger subscribers
- ~15 billion SMS messages/month worldwide, accounting for 7-10% mobile phone co's revenue
- Use for 1) Keeping in touch with friends
  2) Dating
- Not just a fashion accessory, but basic for teen mobility, personal space definition, social interaction
- 160-char limit forges new language!

Likely Developments: Internet 2

- A consortium of 8 major US universities now working with NSF and Worldcom on a new Internet infra-structure to support the huge demand for Net services

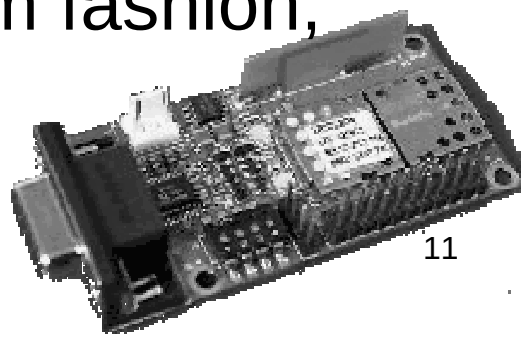
- Accomplishments include:
  - Data throughput of 100x - 1000x current rates
  - 'Abilene' parallel web today links 180 research facilities with a 2.4 Gbit/sec fiber-optic cable
  - Gbit Points of Presence (GigaPOPs) act as high-speed hubs for long distance transport
  - IP v.6 expands existing IP numbers to allow *many* more nodes - 3.4×10^{38} , == 3×10^{24} IP addresses per each m^2 on Earth == no of grains of sand
  - Ubiquitous, embedded IP nodes; multicasting become possible
  - Development of new applications that can fully exploit this capacity: remote control of telescopes, advanced VRs, digital music libraries, video dorms

Case Study: Bluetooth

- Defacto standard for wireless Personal Area Network
- Specification for a low-cost, short-range radio data links between mobile PCs, mobile phones and other portable devices.
- The Bluetooth Special Interest Group (SIG) consists of telecom and computing representatives driving and marketing the technology
- Includes IBM, Toshiba, Ericsson, Nokia, Intel - Motorola, Microsoft, Lucent, 3Com - plus 2000+ others

Case Study: Bluetooth

- Operates in the 2.4 GHz Industrial-Scientific-Medical band at 721Kb/s
- Uses Frequency Hopping spread spectrum, which divides the frequency band into a number of channels (2.402 - 2.480 GHz yielding 79 channels)
- Supports up to 8 devices in a *piconet* (1 master and up to 7 slaves sharing a channel).
- During a connection, radio transceivers hop from one channel to another in a pseudo-random fashion, determined by the master.
- Built-in security



Case Study: Bluetooth

- Non line-of-sight, omnidirectional transmission through walls and briefcases
- Supports both voice and data services; easy integration of TCP/IP for networking
- Regulated by governments worldwide
- Supports both point-to-point and point-to-multipoint networking topologies
- "Bluetooth" after Harald Blatan, a 10th Century Danish king

Case Study: MIT’s Oxygen Project

- At present, communication acts are complicated, manual operations with bits of gear
- Need seamless, easy, communications *services*
- Oxygen is MIT's visionary project to address the gigantic need to automate comms/IT tasks
- An integrated collection of 8 new technologies
  - Advanced handheld devices
  - Wall and car boot computers
  - A new, better network
  - Built-in speech understanding
  - Automatic access to knowledge
  - Automation of links and services
  - Collaboration
  - Customisation

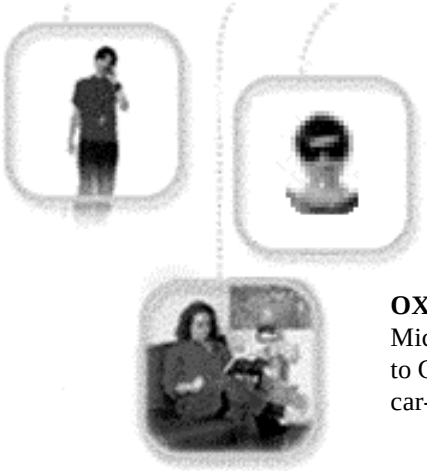
Case Study: MIT’s Oxygen Project

JANE’S HANDY 21 "sniffs" the electromagnetic surround, finds the local cellular network and calls her boss, Joe, in New York City so that she can tell him she has just found an attractive site for the company’s French office.

JOE’S ENVIRO 21 in the wall of his office answers the phone, to which it is connected. It recognizes Jane’s voice and her urgency and forwards the call to Boston, where Joe is chatting with the local VP.

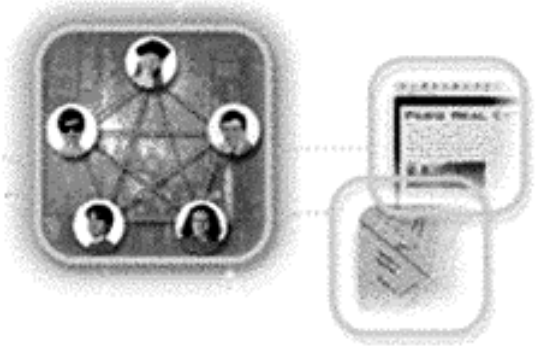
BOSTON’S OFFICE is also equipped with an Enviro 21, which fields thecall. It senses that the VP’s door is open and, based on an automation script, determines that it can interrupt.

JANE’S IMAGE appears on the wall in the Boston office and clears its throat. She explains about the site and that they have six hours to grab it. Joe understands and says, "Oxygen, get Juan, Michael and Mary."



OXYGEN finds Juan out jogging, Michael at home and Mary driving to Chicago, connected via her car-trunk Enviro 21 computer.

COLLABORATIVE REGION is created by Net 21 within seconds. As the five co-workers confer, they say things like, "Oxygen, get me the map from Lori’s message" or "Find Web info on this new site."

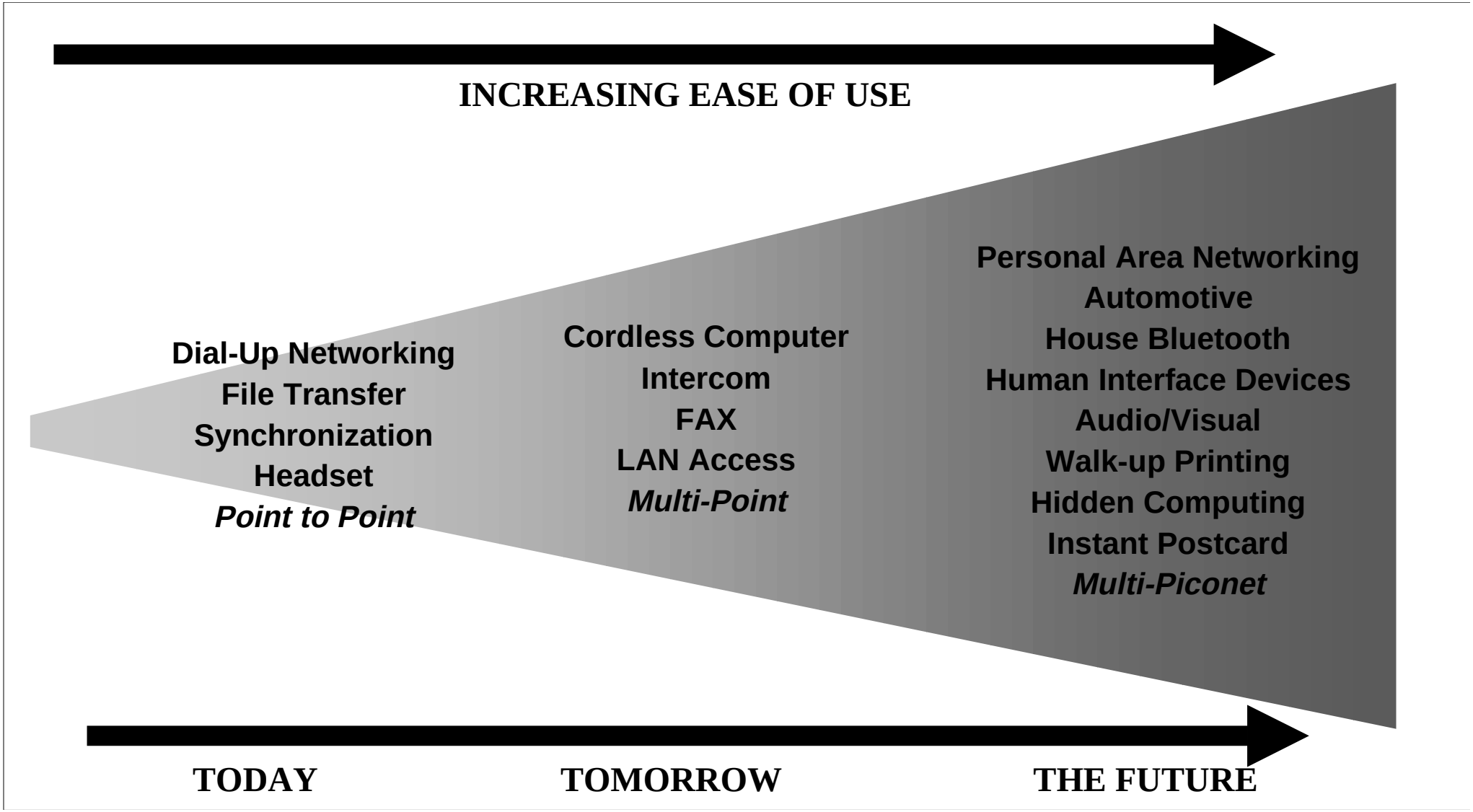


"WE’LL DO IT," Joe concludes. He points his Handy at the printer and instructs, "Oxygen, send us copies of the documents we reviewed."

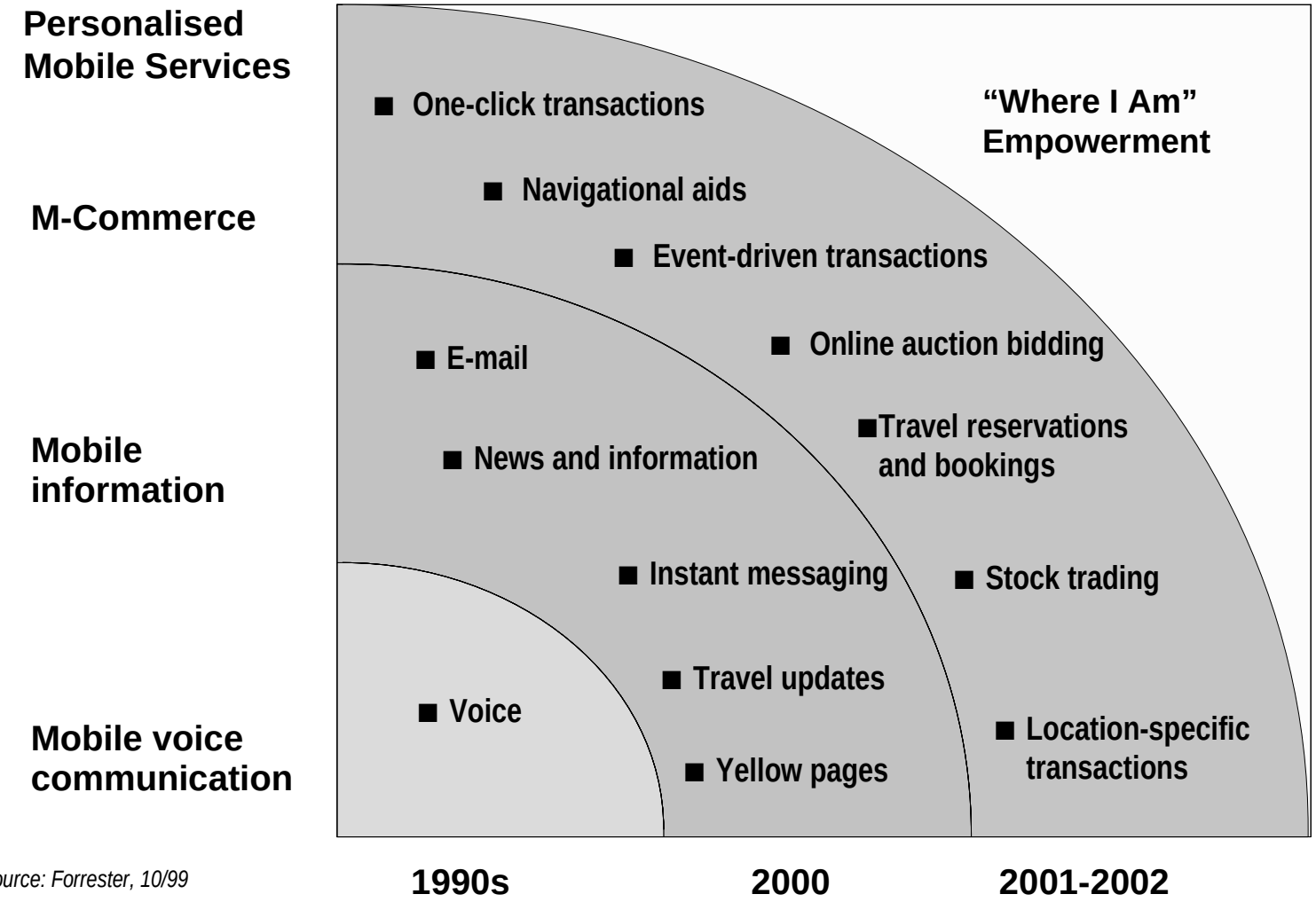
Case Study: MIT’s Oxygen Project

MIT Oxygen project’s "Handi-21" universal wireless device

New Kinds of Services



New Kinds of Services



Source: Forrester, 10/99

Future services

- Navigation software on a tablet
- Personalised news, mail, audio-visual entertainment
- Personal library of e-books
- Passport, tickets, itinerary
- Mobile videophone
- Voice activation, reply
- Combines with personal agent software

And here is Ericsson’s concept design for an EDGE communicator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Social Impact of the Wireless Revolution

- Critical review goes beyond simple pros and cons
- Pick and choose technologies to serve human goals
- Choose who you work for
- Get positive, and get creative with this stuff
- To do that, need a clear *value system* that goes beyond fashion consumerism - currently lacking!
- Products that do well in 21st century ought to support personal value choices, as well as aesthetic choices
- If we can't control it, we can make personal choices - customise products and services to civilise them

References

WAP Forum at http://www.wapforum.org

***Buisness and Technology Wireless* magazine Volume 1, 2001, entire issue. See website at http://www.WBT2.com**

The Official Bluetooth SIG website http://www.bluetooth.com/

The Oxygen Project, *Scientific American*, August, 1999, pp36-47