

state of **AUSTRALIAN CITIES**

national conference >03

Carlton Hotel, Parramatta  
3-5 December 2003

# Information Infrastructure and the Connected City

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## Purpose

- Information and communication at heart of city function
- 30 years ago, forecast impact on future urban form
- Now, essential infrastructure for knowledge society:
  - eg World Summit on the Information Society next week
- Relationship between communications technology & urban form?
  - Focus on point-to-point communication not mass
  - Focus on intra-urban not inter-urban or global city
  - Attempt to present Australian data

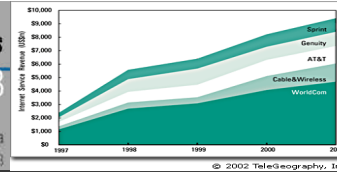
## Approach

- Then, direct impact of autonomous technology
- Now, understanding technology is socially constructed
- eg Castells' dominant activities organised around 'space of flows' in which this domination is via technology
  - technological infrastructure
  - nodes and hubs
  - habitats
  - electronic spaces including new social movements



## **Inventions change cities**

*...telegraph...      ...microwave transmission...  
    ...telephone...      ...facsimile...  
...radio...    ...transistor...    ...packet switching...  
    ...radar...    optical fibre...      ...television...  
    ...computer networking...    ...integrated circuit...  
...the internet...    ...satellite communications...  
    ...personal computer...  
    ...handheld devices...      ...mobile telephony...*



## Uneven infrastructure development

- 'Disruptive' technologies (change > 10x)
- Uneven development: 1998-2002 transmission capacity ↑x500 but computing power ↑ 'only' x4
- Boom and bust cycles of both cause over- and under-investment in urban infrastructure
  - Techwreck 2001
  - Telco crash

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Asia: Tokyo, Seoul, Taipei, Hong Kong, Sydney  
U.S. & Canada: Los Angeles, San Francisco, New York, Washington, DC, Miami, Atlanta, Dallas, San Paulo  
Europe: Stockholm, London, Frankfurt, Madrid, Copenhagen, Amsterdam

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## Convergence and aggregation

- Immature convergence from competing modes for voice, video, data, telecoms and information technology: telephone, ISDN, ADSL, cable, frame relay, satellite, mobile telephone, wireless
- Australian policy to 'aggregate' media into a national broadband network
- Focus on remote and rural access not urban divide



## Telephones

- Publicly switched networks of paired copper wires
- Traditional cost constraint on urban expansion
- Thus urban issues on unit fee boundaries, development staging
- Fixed-line telephony now declining in some countries eg Finland and overtaken by mobile accounts in Australia
- However, universal, reliable, plain old telephone service (POTS)

## Picturephone

- Bell product used in urban development experiments in USA, also tried in Japan and Germany
- Victim of 'network externalities' – subscribers waiting for subscribers – and of lack of common standards



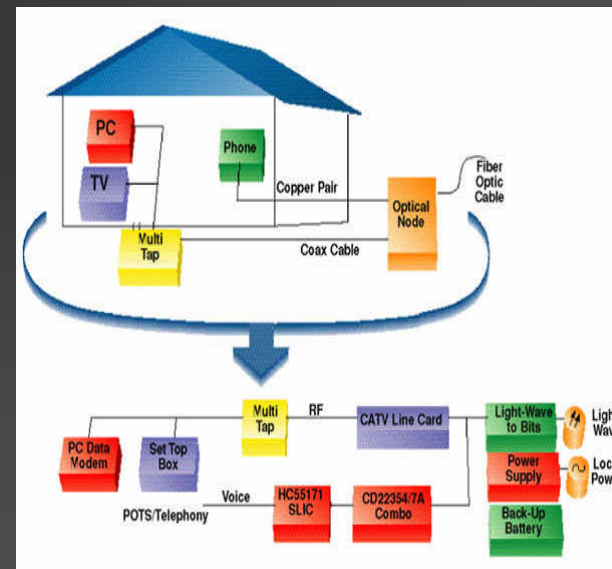
### NEW LOOK

### PICTUREPHONE

Now you can see as well as talk. The Picturephone has Touch-Tone controls to make calls and control the television screen so you can see the person you're talking to, be seen yourself, or have a darkened screen. Attended service between New York, Washington and Chicago began in 1964.

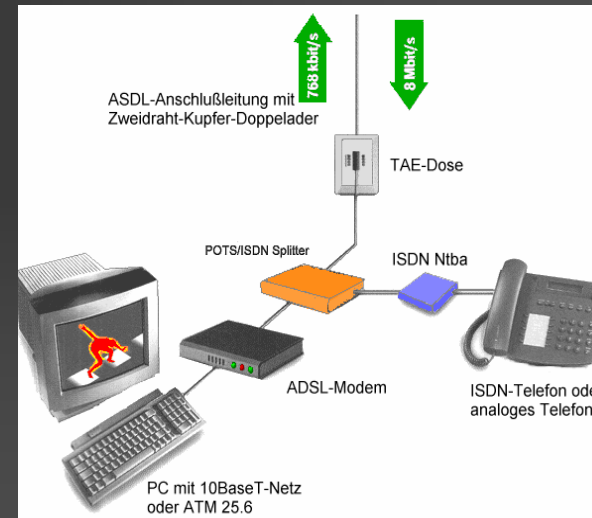
## Cable TV

- Essentially broadcast, typical 'tree' structure
- Seen as 'narrowcasting' potential but not major until internet standards established
- Australia late starter (now over 1300 provider licences) dominated by pay TV not point-to-point communications



# DSL

- Asymmetric digital subscriber line taking off on POTS
- Limits of proximity to exchanges typically 3.5 km can be extended to 30 km but outer metropolitan gaps



## Broadband fibre, ISDN

- Limited mainly to dense business areas
- In Australia ISDN only 4 % of use
- Some countries extensive publicly mandated fibre connections



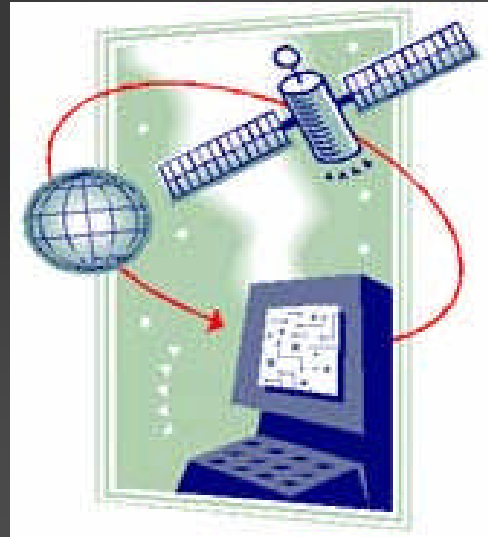
## Mobile telephony

- Spectacular growth esp in developing cities with no wires; prospect of leapfrogging
- In Australia mainly 2G with early adoption of 3G
- Despite DoCoMo and 4G unlikely to be integrator



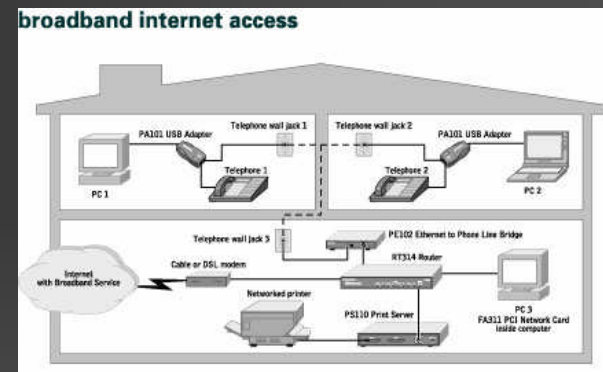
## Other media

- Private lines, LANs
- Broadband wireless
- Satellite (Telstra obligated to 2-way satellite internet service for all, mainly remote areas)
- Microwave



## The 'information utility'

- Foreseen in 1960s, history of internet well known
- Geography of internet – service locations, legal jurisdictions, geospatial target marketing – not spaceless
- Services and applications huge and unforeseen
- Centrality of standards and protocols
- In Australia 54% households online (6<sup>th</sup>) but only 4% broadband (11<sup>th</sup>)



## 'Information infrastructure' is...

- Current and future public and private high-speed, interactive, narrow-band and broadband networks
- The satellite, terrestrial and wireless communications systems that deliver content to homes, businesses and institutions
- The information and content that flows over the networks whether databases, text, media objects or software
- The computers, telephones, radios that people employ to access networks
- The people who provide, manage and generate new information.

## Transport ↔ communications

- 'Death of distance loosens the grip of geography but does not destroy it' (Cairncross)
- Sectors reinforce each others' growth and diversification
- Trip substitution, generation and modification re
  - trip timing
  - trip length
  - routing
  - mode choice
- Information, navigation, safety, tolling, monitoring, management and control

## Telework and telecommuting

Telecommuting (ITAC definition  $\geq 8$  hrs over 2 weeks)

- $\uparrow$  with income and education &  $\downarrow$  with age
- $\downarrow$  number of trips, distance travelled and non-work trips
- shifts mode from public to private transport
- $\uparrow$  labour and capital productivity
- contracts urban activity spaces of telecommuters
- routine workers can suffer isolation, lack 'soft' workplace-based learning
- First sponsored by ATT under US Clean Air Act amendments 1990
- Can open way to relocation of households, establishments but weak force
- However little effect because low substitution & journey-to-work trips mainly

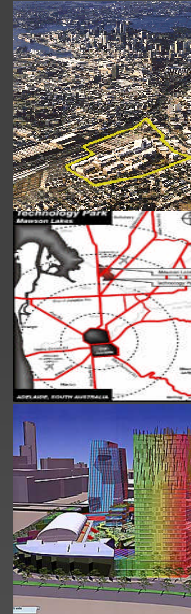


## NSW teleworker survey 2001

- Australians slow to adopt teleworking
- 8% of employed workers teleworked, 12% more after hours
- 72% were in Sydney
- 58% male, 42% female
- 35-44 years most likely
- Reasons
  - 33% work commitments / job requires
  - 15% fewer distractions
  - 13% childcare or family
  - 12% greater productivity
- Would like to telework more often: 47%
- Of those teleworking after hours: 38% would like more

## Information nodes and activity centres

- Enterprise restructure
  - automated business processes and enterprise systems
  - integrated supply chains
  - unbundling → international division of labour / 'global assembly' line
  - services, too
  - casualised, outplaced, outsourced, franchised, workforce
  - unceasing reorganisation
  - thus multi-location, flexible organisations
- Complex spatial consequences
  - agglomeration
  - fragmentation



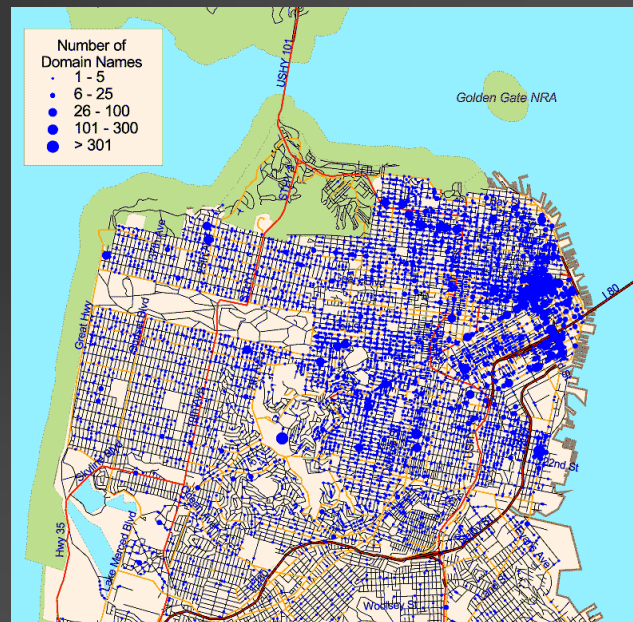
Australian  
Technology  
Park

Mawson  
Lakes  
Adelaide

Digital  
Harbour  
Melbourne

# Agglomeration

- Replacement of inter-firm or inter-establishment linkages with indirect economies of agglomeration
  - premium on F2F, tacit knowledge, handshakes
  - pools of highly skilled labour
  - universities as magnets, suppliers
  - availability of venture capital
  - creative clusters, 'buzz' cities
- High bandwidth necessary but not sufficient

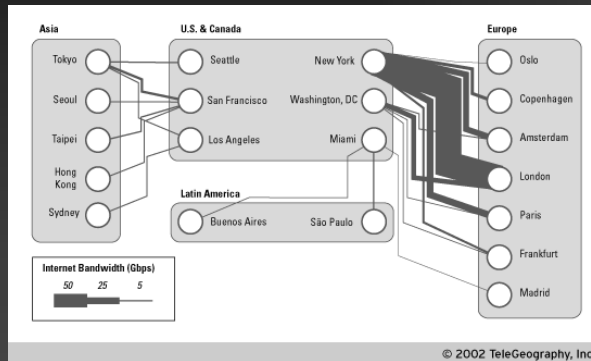


↑ Distribution of domain names, San Francisco (Zook)

## Fragmentation

- Most new technologies rolled out unevenly, business centres and corporate HQs first
- Graham's 'archipelago economy' hypothesis:
  - 'interlinked networked enclaves of high connectivity and intensive knowledge work
  - surrounded by 'network ghettos'
- Low connectivity places bypassed by new infrastructure providers and geodemographic targeting of social and local groups
- Australian attention to 'rural and regional' assumes urban areas covered – not so

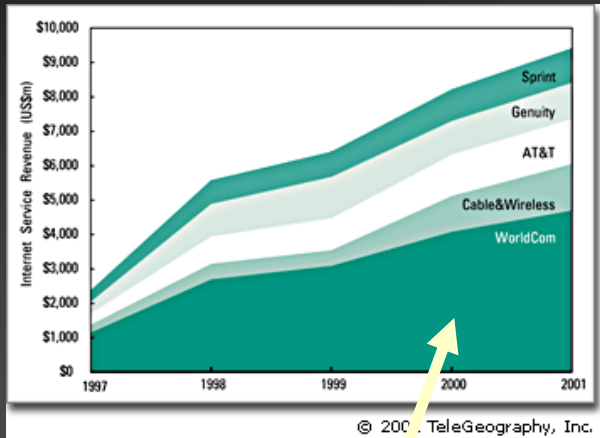
# Urban forms of the internet



- Very few hub cities for internet web 'hotels' for web hosting, peering etc
  - eg Akamai, Cambridge MA, manage 11000 caching servers in 62 countries
- Supported by huge server farms with own power etc – usually inner-urban
- Nondescript suburban back offices, nodes of global organisations
- Clusters of applications developed better known



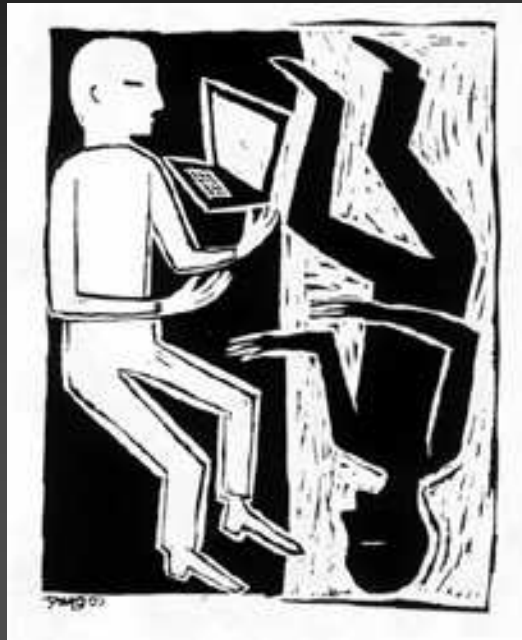
# ICT cycles have regional impact



(This is WorldCom)

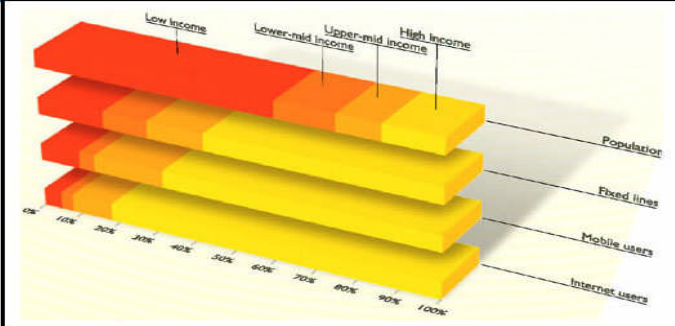
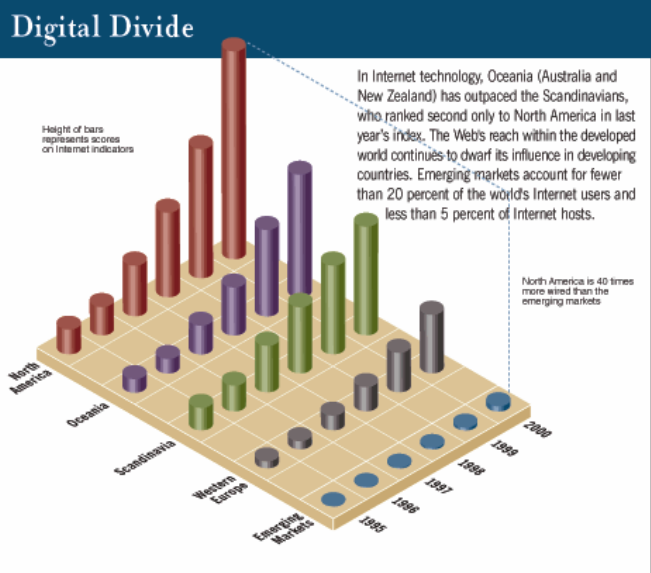


## Some issues for cities



- Is there an urban digital divide? In Australia?
- Fragmentation of urban information infrastructure: does it matter?
- Establishing a new commons
- Planning technology and technology in planning
- Developing cities: cut out or in the lead?

# 'Digital divide' the focus of WSIS

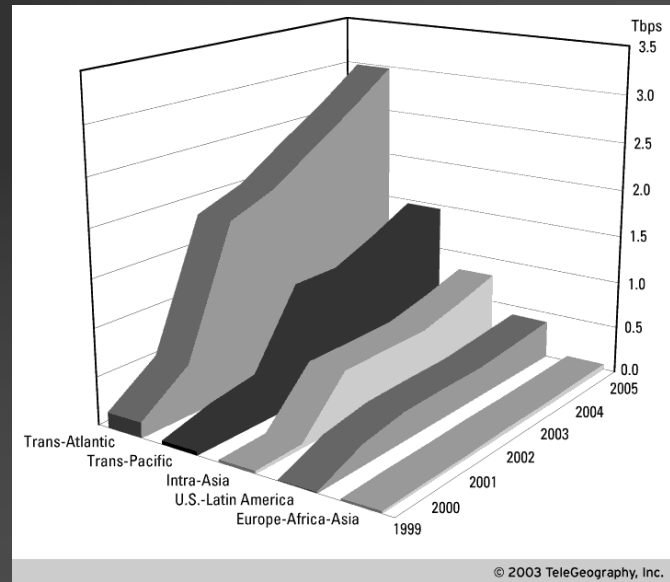
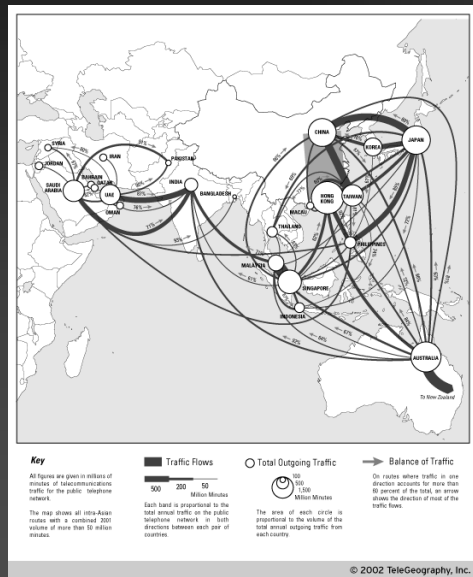


↑ by income group  
 ← by region

## Establishing a new commons

- ICT claimed to erode sense of place
- New virtual communities use spatial concepts
- Can ICT strengthen place (eg local service or organising tool, strengthen local social capital)
- Or are new discontinuous communities better – eg youth movements, social organising
- Obvious service delivery tools eg distributed learning, health and other resources
- Urban swarming” will smart mobs make smart places?

# Developing cities seek to hook into global ICT



but intercontinental internet traffic still light among developing countries

## Developing cities



- Effort to leapfrog into economic development through ICT eg
  - Multimedia Super Corridor (big)
  - Saigon Software Park (little)
- Fabrication facilities very selective and remains in enclaves (eg Penang)
- Mobile telephony, yes
- Software development largely a chimera
- Huge capacity-building exercise
- WSIS to watch