



Helsinki University of Technology
Networking Laboratory

Network Economy

Heikki Hämmäinen

IRoNet seminar

Otaniemi, Dec 10, 2002



Network Economy – why?

- Better services \Rightarrow more traffic \Rightarrow bigger investments
 - subscriber penetration, traffic per subscriber
- Market liberalization \Rightarrow new players
 - global operators, ISPs, cellcos, CLECs
- Standardization fragmentation \Rightarrow new technology risks
 - IETF, ATM Forum, 3GPP/2, W3C/WAP Forum
- Tighter competition \Rightarrow new earning logics
 - bit pipes, ad-hoc networks, virtual operators, revenue sharing, prepaid, advertisement
- Telecom growth \Rightarrow new government involvement
 - privatization, new investments, frequency auctions, subsidies, pro-competitive regulation



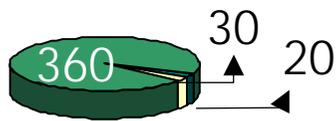
Observations on Cellular

- Operator's ARPU changes only slowly (now c. 40EUR/month in Europe)
- Governments strongly use their power on radio frequencies
 - licence-based service (e.g. UMTS auctions vs. beauty contests)
 - licence-free service (e.g. WLAN)
- Need of roaming drives the business boundaries
 - radio interface (maintains the global handset business)
 - network-network interface (maintains the bilateral roaming business)
- Person-to-person content more valuable than 3rd party content
 - Maslow hierarchy of needs for wireless (coverage->capacity->quality->features)
 - user perceived value of network = number of other users (snowball effect)
- Local content more valuable than global content
 - fixed Internet = virtual world, but mobile Internet = real world

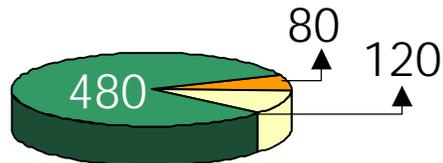


Annual service market (BEUR)

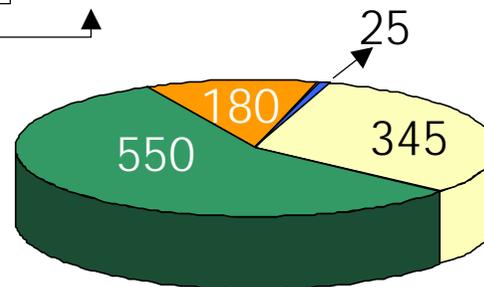
1991



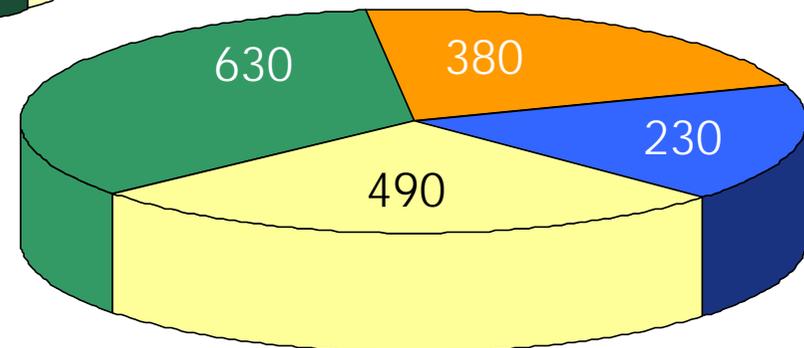
1996



2001



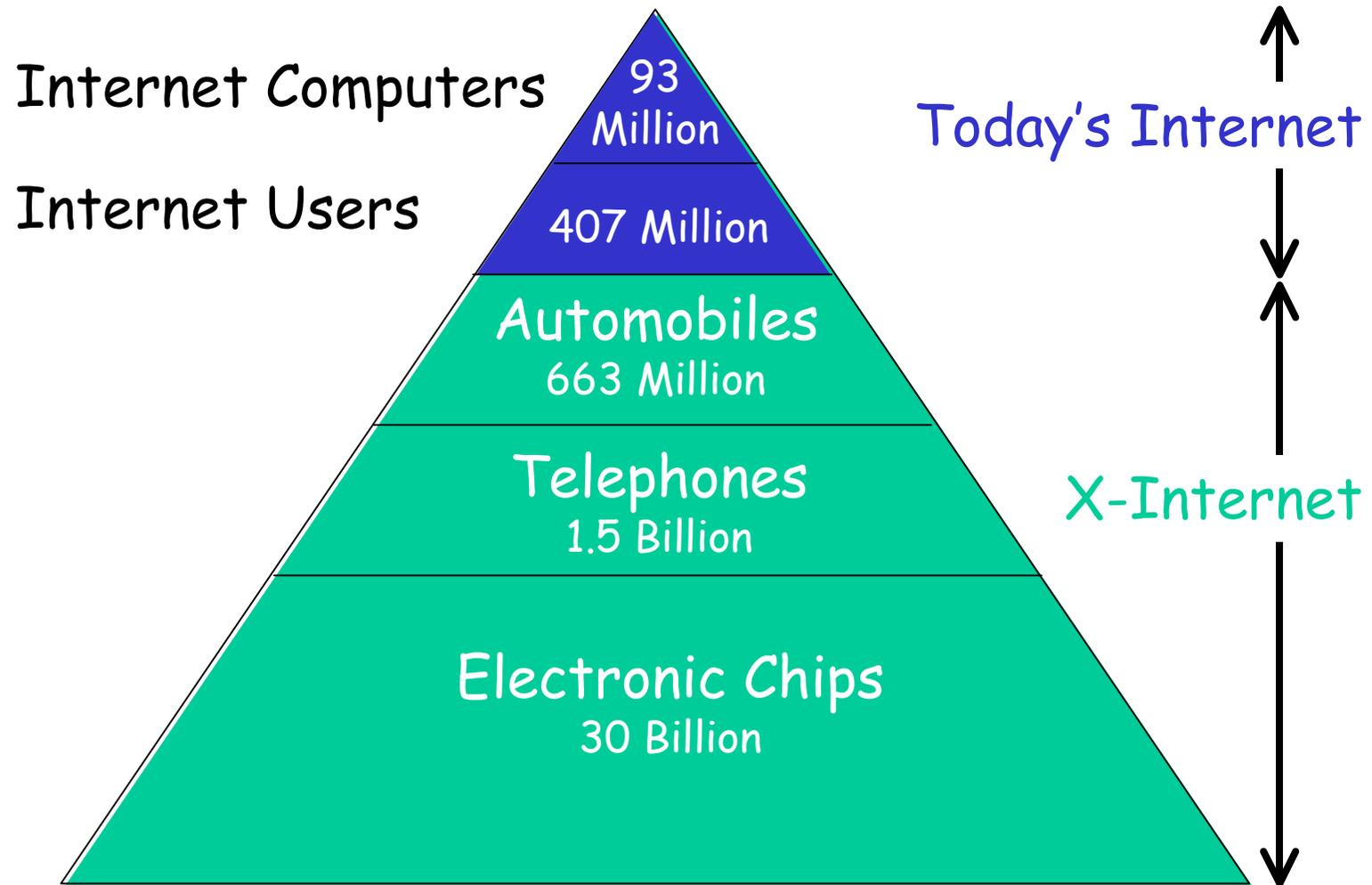
2006



- Fixed voice
- Fixed Internet/intranet
- Mobile voice
- Mobile Internet/intranet and messaging



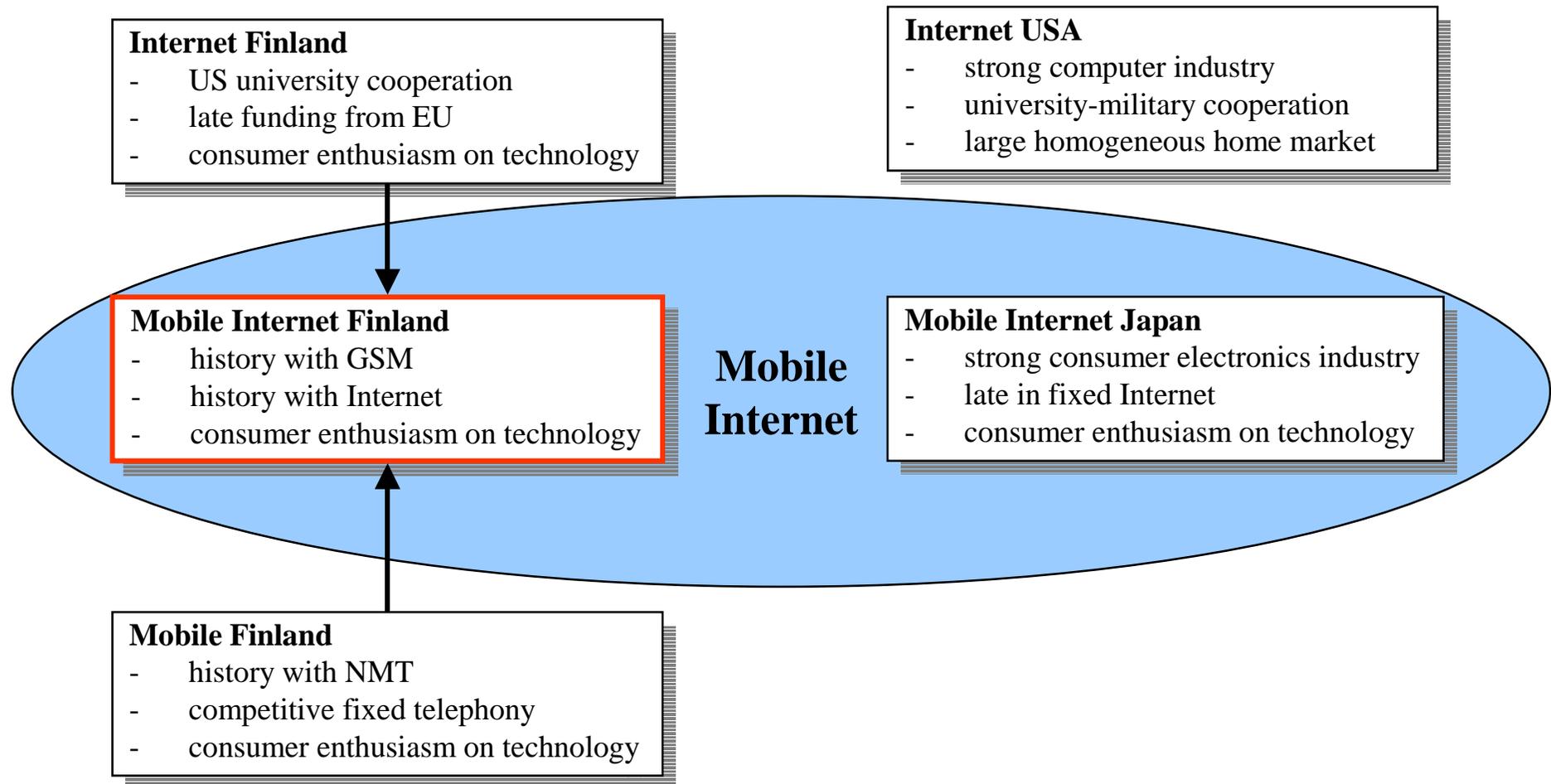
“X-Internet” Beyond the PC





National perspective

Who drives and where?





Network Economy - what?

Consumer tariffs

- vertical vs horizontal bundling?
- prepaid vs postpaid?
- flat rate vs usage-based? QoS?

Investments

- technology choices?
- CAPEX vs OPEX?

Operator domain

Interconnect charges

- bilateral vs centralized roaming?
- revenue sharing?

Pro-competitive regulation

- cost-based interconnect?
- anti-competitive bundling?
- dominant position?

Government domain

Licence auctions vs beauty contests?

Subsidies?

Market dynamics

- new business ecosystems?
- vertical vs horizontal markets?
- vendor financing?

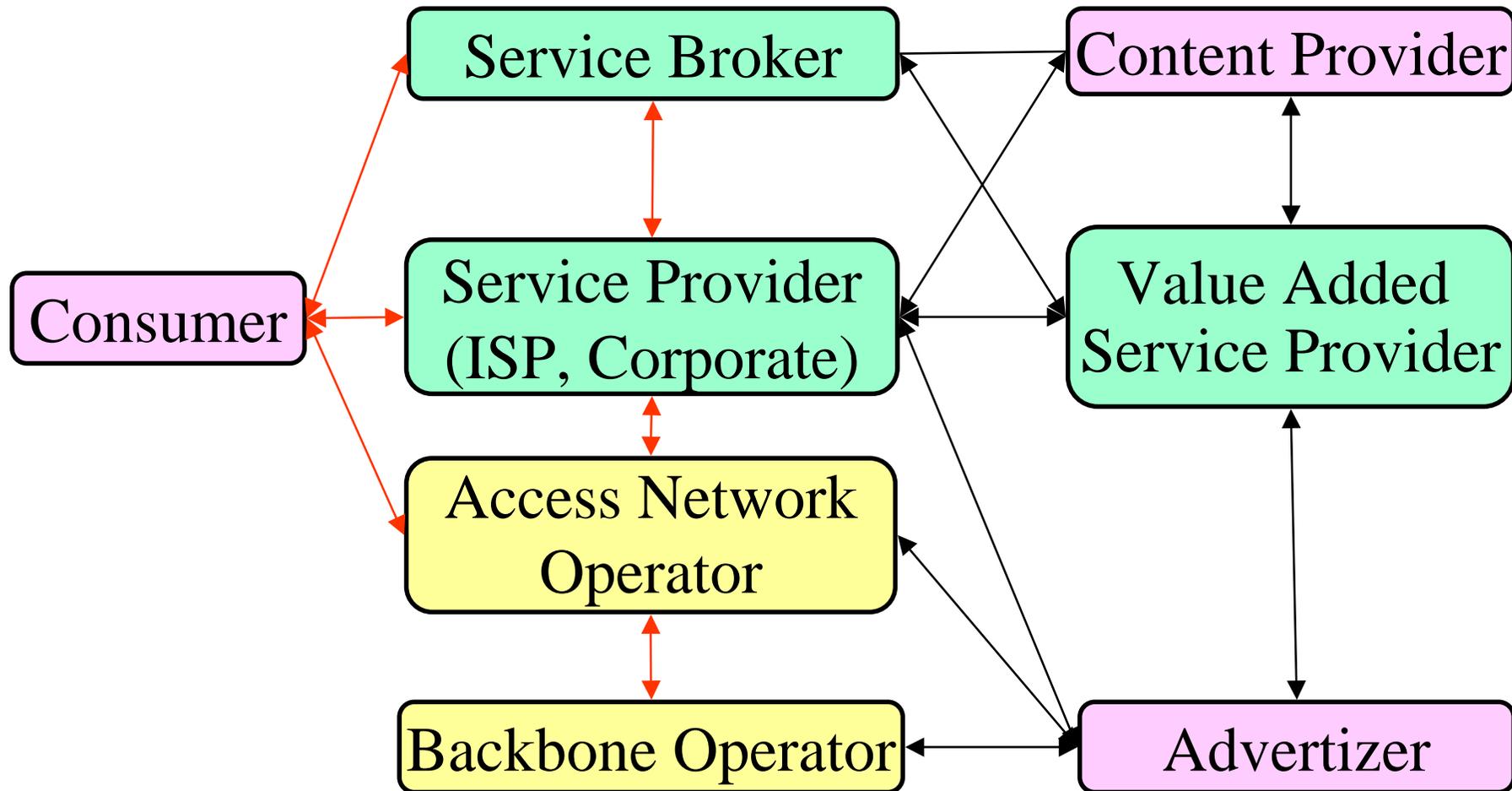
Vendor domain

Investments

- technology choices?
- outsourcing: production, R&D?
- product vs service business?



Reference Business Model





Initial Research Focus

- GPRS operator-operator interface and QoS
 - roaming (Gp)
 - interconnect (Gi)
- GPRS operator-service/content provider interface
 - levels of interfaces (Gi, WAP gw, "iMode")
 - types of services (MMS vs email, WAP vs WWW)
- Tools: scenario analysis, mathematical modeling, simulation
- Contributions to IETF and GSMA



Thanks