An ICT Driven World:
Is this reality, or just our imaginations?

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“It is precisely because change is constant that our foundations must be strong.”

Peter Drucker
Key foundational questions

- Are information and communication technologies really engines of economic growth and social change?
- Does it matter whether a country is rich or poor?
- Does it matter whether markets are government controlled or open?
Telecommunications Landscape

- Investment
- Patterns for Internet and Broadband
- Developed versus developing countries
Worldwide Telecom Investment, 1990-2002

Investment in constant US$ billions

Year

Source: The World Bank, 2008
Population and Internet Distribution, 2007

World Population Proportions

World Internet Proportions

Internet and Broadband Penetration by Country, 2007

Leading Broadband Countries

### Observations

Only 12 countries make both lists

Those making both lists are
- Asian (2)
- European (8)
- Islands (3)
- Americas (1)

IP Address Density, 2007

Sources: www.internetworldstats.com, 2008
Rise of developing countries

- Broadband available in 166 countries by April 2006, twice as many as 4 years earlier
- Broadband tariffs reduced 40% past two years
- In Beijing, 50% connected to Internet and 64% of those use broadband

Falch, 2008
Illustration: Thailand

10 years ago

- 6 percent had fixed line
- 2 percent had mobile phone
- < 2 percent used PC
- < 1 percent used Internet

Today

- > 50 percent have fixed, mobile, or both
  - Mobile growth > 2000 %
- 9 million Internet users

Source: ITU
Summary of Internet and Broadband Development

• Developed nations dominate Internet, but developing countries in Asia are gaining

• Internet and broadband are not the same thing
  • Many countries with extensive Internet do not have much broadband, and visa versa
Economic Development

“The development and deployment of information technology is the foundation of the American growth resurgence.”

Dale Jorgenson, Harvard University (2001)

Presidential address to the American Economic Association
OECD Study (Scheyer, 2000)

- ICT capital goods were important contributors to economic growth in G7 countries in the 1990s, but were most accentuated in the United States.
Effects of Advanced ICT in the U.K., 1984-1996

<table>
<thead>
<tr>
<th>Sector</th>
<th>Lower Prices from Advanced ICT</th>
<th>Productivity Increase from Advanced ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity, gas and water supply</td>
<td>4.3%</td>
<td>45%</td>
</tr>
<tr>
<td>Transport</td>
<td>10.8%</td>
<td>50%</td>
</tr>
<tr>
<td>Financial</td>
<td>27.3%</td>
<td>486%</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>56.0%</td>
<td>13%</td>
</tr>
<tr>
<td>Total economy</td>
<td>14.1%</td>
<td>111%</td>
</tr>
</tbody>
</table>

(Correa, 2006)
Röller and Waverman (2001)

- Telecommunications development causes economic growth
  - Telecommunications development caused about one-third of OECD economic growth, 1971-1990
  - About US$1700 per person per year
  - 10% improvement in per capita GDP
Röller and Waverman (2001)

- **Reasons**
  - Adoption in one firm triggers adoption in another
  - Lower prices for consumers give additional discretionary income
    - savings, investing, education, or other pursuits
- **Benefits occur at nearly 100 percent penetration**
Waverman, Meschi, and Fuss (2005)

- Impact for developing countries twice that for developed countries
- Success depends on “regulatory policies that favour competition and encourage the speediest possible rollout of mobile telephony.”
Illustration: India

- Mobile phones enable fishermen to find the most profitable market to sell their daily catch
- Consumer prices fell 4 percent
- Fishermen’s profits rose 8 percent
Senegalese fishermen look for updates on market prices with their mobile devices.
Filipino farmer checks in on orders placed for his produce on www.b2bpricenow.org.
Grameen Village Phone Program in Bangladesh provides women entrepreneurs with business opportunities
Economic Development

In 1989-1995, investment (largely in IT) accounted for more than four-fifths of the economic growth in most parts of the world.

Jorgenson and Vu (2005)
ICTs and Social Development

- Job creation
- Healthcare
- Education and training
Ugandan regulator oversees rural service fund
Tele Health

- Monitoring medical developments
- Reminding patients of medications
- Health education materials
With the Satellite Distance Learning Program in Thailand, classrooms throughout the country are able to network and exchange ideas.
Internet MBA

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Launch

Forbes SkyRadio
Florida's Internet MBA Program
Featured on American Airlines

More on the Forbes interview with Alex Sevilla

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Launch the Internet MBA demo
Rapid communication of election results protects against fraud
Relating ICT lessons to broadband

• What is the government’s role if any?
  • Protect competition
  • Expert policy analyses
  • Provide incentives
  • Limiting opportunism
Competition Improves Performance in Telecommunications

- Waverman, Meschi, and Fuss (2005)
  - Competition improves mobile penetration
  - Competition improves investment
- Wallsten (2004)
  - Protecting incumbents hinders investment
Competition improves performance in broadband

- Aron and Burnstein (2003)
- Denni and Gruber (2005)
  - Resale launches broadband competition
- Lee and Marcu (2007)
  - Fixed broadband increased by
    - Local loop unbundling
    - Modem vs. DSL competition
  - Mobile broadband increased by Standards competition
Insulating investment from politics

- Cubbin and Stern (2006)
  - both regulatory law and higher quality regulatory governance are positively and significantly associated with higher per capita investment

- Lyons (2006)
  - Commitment increases investment
Opportunism Limits Investment

• Gutiérrez (2003)
  • “Sound regulatory governance in telecommunications has a positive impact on network expansion and efficiency.”

• Cubbin and Stern (2006)
  • Effective institutions essential to growth
Maiorano and Stern (2007)

- The establishment of a separate regulator, especially in developing countries, results in the long-run in about 11 percent higher mobile penetration.
Henisz and Zelner (2001)

- “the level of institutional support for private property rights in Thailand and the Philippines (was) considerably greater than that in Malaysia and Indonesia.”

- “Investors in Thailand and the Philippines fared considerably better than did investors in Malaysia and Indonesia.”
Demand factors

• Digital divide in U.S. greater in computers than in broadband (Stanton, 2005)
  • Education; e-government

• Later adopters more influenced by social factors than are early adopters (Rogers, 2003)
  • Industry marketing
Demand factors

- Bundling and pricing options slow adoption. So does desire to wait for next technology. (Adams, 2008)
  - Industry marketing and research
- Multiple firm locations and presence of young and skilled workforce makes. (Colombo et al., 2008)
  - Macro conditions for business
Relating ICT lessons to broadband

“It is precisely because change is constant that our foundations must be strong.”

Peter Drucker
Key foundational questions

- Are information and communication technologies really engines of economic growth and social change?
  - Yes: Investment, productivity, and opportunity

- Does it matter whether a country is rich or poor?
  - Poorer can benefit more than richer

- Does it matter whether markets are government controlled or open?
  - Competition and distance from politics are key
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