The costs of internet access in developing countries
Internet in South-East Asia
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Introduction

• Study commissioned by UK DFID with DTI: contact k-yeomans@dfid.gov.uk
• Standard disclaimer: “the views expressed do not represent or commit DFID or DTI in any way”
• Team effort: 12 in core team plus many others
• Full report available on website http://www.antelope.org.uk
• Studies of 6 countries: 2 full and 1 short case study in each of Africa and Asia
• Review of legal and regulatory framework for internet interconnection (especially WTO implications)
Outline of presentation

• Overview of study and findings
  – End-user costs – cybercafe, dial-up, leased line users
  – Breakdown of end-user costs between telco and ISP
  – International component of ISP costs

• A little more on the Asian countries

• The cost-sharing issue

• Policy options (recommendations)

NB: differences found are mainly LDCs vs bigger/richer countries (rather than Africa vs Asia)
Study terms of reference

• Commissioned because of:
  – complaints from developing countries about high costs and lack of competition for their international internet connectivity
  – debate about cost-sharing principles in APEC TEL

• Aim:
  – to understand the impact on developing countries of the international dimension of the internet market
Prices for 20 hours of local use per month (US$)

Cambodia | India | Nepal | S Africa | Uganda | Zambia | OECD
---|---|---|---|---|---|---
ISP charges | $62.4 | $3.5 | $13.0 | $10.6 | $50.0 | $25.0 | $9.4
Telephone Call Charges | $24.0 | $10.2 | $6.0 | $31.5 | $52.4 | $25.3 | $15.1
Telephone Line Rental | $10.0 | $4.0 | $2.0 | $10.4 | $5.8 | $1.3 | $12.2
PPP prices for 20 hours of local use per month (US$)

<table>
<thead>
<tr>
<th>Country</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>$507.4</td>
</tr>
<tr>
<td>India</td>
<td>$88.9</td>
</tr>
<tr>
<td>Nepal</td>
<td>$123.5</td>
</tr>
<tr>
<td>S Africa</td>
<td>$145.8</td>
</tr>
<tr>
<td>Uganda</td>
<td>$386.3</td>
</tr>
<tr>
<td>Zambia</td>
<td>$112.2</td>
</tr>
<tr>
<td>OECD</td>
<td>$44.1</td>
</tr>
</tbody>
</table>
Case study findings: end user costs

• By OECD standards, cybercafe and dial-up end-user costs are not high in India or South Africa (or in Nepal or Zambia for local access)

• However:
  – High long-distance call charges lead to high costs for national access in Least Developed Countries
  – Leased line charges are high (affecting business users)

• Even low costs are out of reach of most potential users

• Also:
  – The cost of the PC is not included (and is a large extra burden)
  – Average usage remains low (except in India)
  – Poor quality can add significant cost (repeat calls, slow downloads)
Case study findings: ISP costs

- ISP costs are less than 50% of the average end-user costs in all countries (the rest being telco charges)
- International internet connectivity accounts for about 30% of ISP costs (but 80% in Cambodia)
- Reticence on topic suggests it is key to competitiveness
- International internet connectivity has two parts:
  - *International leased circuits*: over-priced (often grossly)
  - *Global internet connectivity*: rarely identified separately (“free extra”)

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International component of average end-user costs

![Bar chart showing the international component of average end-user costs in various countries.](chart.png)
## International component of ISP costs

<table>
<thead>
<tr>
<th>Country</th>
<th>Total inbound international bandwidth</th>
<th>Average price (US $ 000 per Mbps/month)</th>
<th>International component as average % of ISP total costs</th>
<th>International kbps per account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>2 Mbps</td>
<td>40</td>
<td>80%</td>
<td>0.6</td>
</tr>
<tr>
<td>India</td>
<td>1 Gbps</td>
<td>2.6</td>
<td>19%</td>
<td>0.2</td>
</tr>
<tr>
<td>Nepal</td>
<td>10 Mbps</td>
<td>10</td>
<td>24%</td>
<td>0.4</td>
</tr>
<tr>
<td>South Africa</td>
<td>260 Mbps</td>
<td>7</td>
<td>22%</td>
<td>0.4</td>
</tr>
<tr>
<td>Uganda</td>
<td>5 Mbps</td>
<td>20</td>
<td>30%</td>
<td>0.4</td>
</tr>
<tr>
<td>Zambia</td>
<td>5 Mbps</td>
<td>16</td>
<td>25%</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Cable bandwidth scale economies

![Graph showing cable bandwidth scale economies](image-url)
Cambodia

• Internet is held back by a severe shortage of fixed lines
• There is very limited market entry, with integration between the incumbent and its ISP
• The international component is a significant cost to end users
  – Low total bandwidth
  – Prices much higher than would be expected
India

• There have been steep ISP price falls since 1995 (so now the total price is US $0.80 per hour)
• Healthy ISP competition has been achieved by early constraints on incumbent
• International internet gateway provision has been fully opened to competition recently
• Cable television is expected to expand internet access
• Most Indian websites are in the USA: more caches in India would save bandwidth and perhaps reduce delay
Nepal

- Internet is held back by few fixed lines, few multi-person enterprises and little relevant or local language web content
- ISP growth and relatively low prices have been helped by
  - VSAT liberalisation
  - Continuing low local charges from monopoly telco
- The international component is a significant cost to end users, but less than 50% of telco charges and other payments to the government
International internet connectivity: two parts

Satellite

ISP
Telco
Developing country

Intermediary at regional node

Cable

IBP
IBP
IBP

Global node

Global internet connectivity

International leased circuits

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International internet connectivity: two markets

• International leased circuits:
  – suppliers: telcos and, where allowed, satellite carriers
  – traditional monopoly
  – deliberate policy of high prices
  – time lag between market liberalisation and consequent price fall (especially if voice remains a monopoly)

• Global internet connectivity:
  – suppliers: internet backbone providers
  – several competing suppliers at the main global nodes
  – low barriers to switching between suppliers
  – low prices compared with international leased circuits
  – widespread bundling of connectivity with international leased circuits
  – confidential contracts (perhaps discriminatory, but no evidence of this)
Comment on APEC principles

- Sharing the costs of international leased circuits between a poor country and the USA based on the direction of traffic:
  - Would benefit poor countries little short-term, because most traffic is instigated by them (and flows towards them)
  - Has been pressed mainly by more developed countries (e.g. Singapore, Korea) that want to become regional hubs
  - Cannot be imposed by regulatory means
  - Poses significant measurement challenges
  - Will come anyway in amended form through commercial processes; but less of an issue as prices fall
Comment on ITU recommendation D.50

• “Administrations..[should].. **negotiate and agree to bilateral commercial arrangements** enabling direct international Internet connections that take into account the **possible need for compensation between them**
  – for the value of elements such as traffic flow, number of routes, geographical coverage and cost of international transmission…”

• This has no force, as it simply describes what is happening anyway.
Policy options – developing countries

• Liberalise telecoms industry within developing countries, including internet telephony
• Separate ISP part of monopoly from telco part
• Require incumbent to provide flat-rate national numbers with revenue sharing for internet access
• Encourage better use of scarce international bandwidth (e.g. local internet exchanges and caches) – may be opposed by larger, established ISPs
• Open doors to lower-cost technology (especially wireless and terminal equipment)
Policy options – international bodies

- Launch an information service to help developing country ISPs get best buys, especially among satellite carriers (plus other support, e.g. training)
- Be alert to potential competition problems in internet backbone provision
- Consider requiring dominant backbone providers to interconnect on cost-based, non-discriminatory terms
- Consider developing EU and WTO avenues for redress
- Investigate the transition to IPv6, and better utilisation of IPv4, from the viewpoint of developing countries
- Note that charging for content could be the sting in the tail of commodity pricing for access