Wireless Technology for bridging Digital Divide in developing countries
1. World indicators on
   - 1.1 Mobile Revolution (ITU source)
   - 1.2 Calling Opportunities (ITU Source)
2. Cambodia Indicators
   - 2.1 Telecom in Cambodia
   - 2.2 Telephone tariff and Subscriber number
   - 2.3 Internet tariff and Computer penetration
3. Why wireless for developing countries
4. Restrictions of Wireless
5. Conclusion
Wireless Access

1. Fixed wireless
   - Terrestrial: MMDS (Multi Point microwave Distribution System), LMDS
   - Satellite: Intelsat, VSAT

2. Mobile
   Multi Access (simultaneous use of access)

Technologies:
- FDMA (Frequency Division Multiple Access)
- TDMA (Time Division Multiple Access)
- CDMA (Code Division Multiple Access)
1.1 A Mobile Revolution

Fixed Lines vs. Mobile Users, worldwide, Million

Source: ITU World Telecommunication Indicators Database
1.2 Calling opportunities worldwide

Source: ITU Fixed-Mobile Interconnect website: http://www.itu.int/interconnect
2.1 Telecom in Cambodia

- National fixed and mobile telephone penetration is of 5.72% for about 13 million people.
- Three (3) operators provide these fixed telephone services where MPTC (Ministry of Posts and Telecommunications of Cambodia) is the largest operator. The total number of fixed line telephones is currently of 30,000 Subscribers, a penetration of 0.22%
- Four (4) Mobile Phone operators have the total of 750,000 Subscribers a penetration of 5.5%.
### 2.2

**Telephone Tariff (International Call USD/minute)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fixed Phone</th>
<th>Mobile Phone</th>
</tr>
</thead>
<tbody>
<tr>
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### Number of Telephone Subscribers

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<th>Mobile Phone</th>
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<td>2005</td>
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</tbody>
</table>
2.3 Internet Tariff (in USD/Hour)

Dial-up Internet Access Per Hour
2.4 Computer Penetration

Computer Penetration is virtually non-existent outside Phnom Penh and outside major provincial towns. About 12,000 in total.

What limits the penetration of computers in society:

• Lack of affordable internet connectivity.
• The computer operating system and applications are not in Khmer language.
• Minimal Khmer Content.
• Non-availability or not reliable or expensive electricity.
• The cost of the computer is high for most families.
• There is lack of computer assembly industry in Cambodia.
3. Why Wireless for Developing Countries

- Developing countries have no firmly established infrastructure and strong fundamentals specially fixed network as Developed countries.
- Mobile network is costless than fixed one.
- Mobile price has become more and more affordable for users for example $5/month in Cambodia.
- It is Faster to build wireless network than the fixed.
- Wireless access can be fixed and mobile.
- Now, Wireless broadband Internet is available.
4. Some Restrictions

• Social Disparity (Internal and External)
  – Affordability and sustainability are yet to be discussed

• Technical considerations
  – Many versions of CDMA, 3G, compatibility to be solved.
  – Many types of wireless tech: WiFi, WiMAX, UMTS, OFDM then need careful selection
4. Some restrictions (Continued)

- Satellite lease price has been lowered but it is still not low enough to be affordable to the poor yet.

- It is fair to lease higher capacity rental with lower price but generally developing countries do not need very high capacity.
5. Conclusion

• “Wireless” becomes more and more cheaper than “fixed” and its popularity has been increased significantly. However mobile phone penetration is still low about much more than half of the Population (most in developing countries) are yet in the missing link.

• Cambodia has more than 90% of population without access. Therefore there is a great opportunity to build Telecom infrastructure for bridging the Digital Divide and Wireless Tech may be taken to fill this big hole.
Thank You!