Top ICT4D Hardware Challenges

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Potential Technology Mismatch

• 95% of hardware is designed for the Top of the Pyramid

• Products are not designed for the BoP, but ICT is in great demand there

• Results in / contributes to numerous project failures
Purpose of This Study

• We were seeking to:
  • Uncover the major ICT hardware challenges
  • Present them to the technology developers, designers, and manufacturers
  • Promote design and development for emerging regions

• USAID & ARM
Overview of the Project

• Three-part study using mixed methods
  1. Industry based Technology Salons (3)
  2. In-depth interviews with ICT4D practitioners, experts and academics (36)
  3. Macro-level online survey for experts, academics, and end-users (460)

• Published White Paper
In Your Own Words, What Are the Top ICT4D Challenges?

- Energy-related
- Cost
- Durability/Ruggedness
- Connectivity
- Environmental Issues
- Maintenance
- Local Infrastructure
- Availability of Technology
- Interoperability
- Reliability
Findings: The Top 5 Hardware Challenges

- Electricity/Power/Energy
- Cost/Affordability
- Connectivity
- Environment-Related Issues
- Maintenance & Support
Findings: Robust Across Globe

- Responses similar across respondents’ demographic characteristics
  - Gender
  - Age
  - Geographic location
  - Area of work/experience/expertise
  - Length of experience
Electricity/Power/Energy

- Low power
- Long battery life
- Renewable (mainly solar) energy/chargeable on 12V/DC
- Avoid DC-AC inverters
- Where possible, devices should be power-smart
  - Example: a server could power down if not used overnight
In terms of POWER/ENERGY/ELECTRICITY, how important are the following features or characteristics relating to hardware for ICT4D?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be Resistant to Voltage Spikes, Dips, etc. swings, brownouts, etc.</td>
<td>4.5</td>
</tr>
<tr>
<td>Use Extremely Little Power</td>
<td>4.2</td>
</tr>
<tr>
<td>Little Use of Passive Cooling</td>
<td>3.8</td>
</tr>
<tr>
<td>Uses 12-Volt DC Power / Renewable energy ready</td>
<td>4.1</td>
</tr>
<tr>
<td>Have Longest Battery Life Possible</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Cost/Affordability

• Everyone wants low cost
• Balance needed between lowest cost and solid, reliable, functional ICT
• Extremely difficult to calculate long term cost of a device in the developing world
Environment & Related Issues

• Reliability/ruggedness/durability
• Screens easily get scratched, smudged, or cracked
• Screens difficult to read in direct sunlight
• Devices should be waterproof or water resistant, humidity resistant, extreme-heat resistant
• No moving parts and passive cooling important to avoid harm from dust, dirt, and bugs
• E-Waste: Recyclable and/or reusable devices needed
From an ENVIRONMENTAL standpoint, how important are these ICT4D Issues?
Connectivity

- Essential to usefulness of nearly every device
- Connectivity itself creates value for entire ICT4D ecosystem
- Should be able to connect to Internet/data. Via WiFi
- Should also be able to cache information b/c “always connected” is not a reality
- Software & OS only available online
  - Only area it was pointed out that connectivity is not essential is in education
When it comes to NETWORK CONNECTIVITY, what level of importance would you assign:

- Offer Multiple Ways to Connect: 4.5
- Offer 3G Connectivity: 4.0
- Offer 4G Connectivity: 3.0
- Offer WiFi Connectivity: 4.5
- Offer an Ethernet Port: 3.0
- Not Require Electricity to Be Useful: 3.0
Maintenance & Support

- The best technology needs no support. Transportation is expensive if someone needs to travel for repairs or support.
- Spare parts sourcing is a true challenge for most developing world locations.
- If technology is not locally repairable, it is not sustainable.
- Lack of local technology experts (also relevant in terms of training).
Rate the following hardware features:
Top-Rated ICT4D Hardware

Issues within Categories

<table>
<thead>
<tr>
<th>Electrically Robust to Power Spikes, Swings, Brownouts, etc.</th>
<th>Uses Little Power</th>
<th>Runs on 12-volt power</th>
<th>Long Battery Life</th>
<th>Upfront Price</th>
<th>Longrun Price</th>
<th>Withstands Heat, Humidity, Dust, Sand, etc.</th>
<th>Have a Long Life Span</th>
<th>Connects in Multiple Ways</th>
<th>Connects with WIFI</th>
<th>Easy to Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity/Energy-Related</td>
<td>Cost</td>
<td>Environment</td>
<td>Connectivity</td>
<td>Maintenance</td>
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</table>
Conclusion

• This paper intends to launch a critical discussion of how ICT4D hardware can better meet the needs and challenging conditions found in the developing world.

• Understanding what works and what does not is of paramount importance to improvement.
For More Details

Read the paper here:

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