Wireless Mesh Network Project

Information and Communication Technology (ICT) as tool for development and poverty reduction

Conference on Innovation for Poverty Alleviation
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Project sponsored by EU through sector budget support to the SA Department of Science and Technology
In this presentation

- Background and context
- The need: Case of public schools connectivity
- The approach: Village Operators

- Key achievements and outcomes:
  - Research translated into tangible outputs for rural communities
  - Technological transfer to communities
  - Impact and sustainability of the initiative
Background and context

- Aim: Benefit through increasing the uptake and usage of ICTs by government and individuals

- This project, supported by the Dept of Science and Technology with sector budget support from the European Union, is a large scale demonstrator of the wireless mesh networks R&D at the Meraka Institute of the CSIR, and evaluated the community based approach to local economic development, infrastructure establishment and service delivery.

- Broadband for All™ aim to achieve:

  Affordable broadband connectivity in areas that are currently not connected utilising low-cost, locally-owned and locally-supported infrastructure to create socio-economic and commercial opportunities.
Need: The case of schools connectivity

- South African Schools Connectivity Challenge: Estimated 17,000 of total of 26,500 public schools are RURAL and outside any foreseen 3G/LTE/fibre or other broadband plans...
- Still using couriers in some cases to deliver official messages!
Key technological challenges: Rural South Africa

• Technological skills:
  • No skills to provide technology and infrastructure support
  • Lack of end-user technical literacy (how to use ICTs, e-safety risks)

• Funding:
  • Limited access to (development) capital
  • Very high levels of unemployment – limited ability to pay for services

• Infrastructure:
  • Unreliable electricity
  • Difficult to get access – roads and poor building structures
  • No broadband access or broadband backbones

• Remoteness:
  • Logistics and travel (i.e. high cost of support)

• Environmental
  • Extreme (high) temperatures
  • Dust
  • Lighting
The approach - DIY

Community based networks
- Aggregate local demand
- Keep costs local
- Develop local skills and local ownership

Wireless Mesh Networks
- No expensive 'high sites'
- Low cost equipment
- Autonomic, auto-configuring, and self-healing
Wireless Mesh Network demonstrator – project area

185 schools
97 500 learners
15 “clusters” of schools in the different villages
>>50% unemployment
Achievements and outcomes
From ICT R&D into local technology into local production lines

Developed a wireless mesh radio (HPN)

Developed a wireless network management system that is used by the local technical support (or VO) to manage and evaluate the mesh network.

Developed ability to update the software of the devices in the network over the air.

Developed secure desks for storage of the Village Operator equipment.

Developed high site monitoring device to monitor power, lightning, backbone network stability.
Established a working broadband infrastructure

Deployed 210 wireless mesh nodes at schools and other facilities in the Nkangala and Sekhukhune area.

Created a large test-bed for further research and development
People and jobs

- VOs have grown as individuals to such a point that they are able to get other jobs:
  - Work at Police Office
  - Financial advisor
  - Administrative job at the local municipality

- Very high VO retention rate compared to other community (ICT) projects. After 3 years, of the original 19 VOs, we still have 15 operating the wireless network; 3 left for other jobs; and one went on to do further studies.

- VOs are creating other employment:
  - Mpho (Dennilton) is employing 2 people, "his little sister" and another young man – caretaker in his office, and technical support.
  - Nombulelo has her sister helping her while she is out.
  - Tumelo uses one person to help while he is out of the office.
  - Phila uses one person to help while he is out of the office.
Impact

• VOs are making a difference in their communities, e.g.
  • Mpho is running a "job market". Several people found repeat temporary employment by connecting local people to job offers.
  • He checks people's email for them and tell them when they have a job offer.
  • Advertise in community on how to use the Internet to get jobs.
  • Keep copies of job related and other forms - government Z83 application form, SAPS, ESKOM, Dept of Social Services, etc.
  • Continuously update his information through the growing network of customers and advertising jobs to the wider community – with the Village Operator providing the technical (e-mail, forms) support.
Business

• VOs are learning about **customer service.**
  • “Their happiness is our responsibility” - Jacob Mhlangu

• VOs are helping **other small businesses** in their communities.
  • Building “cooperative” networks – e.g. collaborate on keeping office supplies or client referrals.
  • Providing marketing materials and an online presence – e.g. local business catalogue (hotel, funeral parlour), registering email addresses, training on use of mobile gmaill.
  • Helping schools with training in the use of Internet – e.g. for teaching and research material.

• VOs are **supporting each other:**
  • Using complementary skills to build new business - Abel is better at video editing, while Timothy is better at numbers and report writing. Together they bought a special equipment, like lights for use in video making, and now produce movies and distribute local DVDs.
  • Collaborate on procuring supplies - one VO responsible for consumables.
  • VOs with stronger technical abilities have emerged and contract to others for support.
  • Share and exchange lessons learned – successes in business
• Village Operators have found sustainable employment and became proud change agents in their communities stimulating development enabled through ICTs.

• Schools, and the greater community, benefit from the broadband Internet connection.

• CSIR is now using the lessons learned to advise national government on rural broadband, economic development and schools connectivity.

• The project has made a noticeable and catalytic difference.
Thank you for listening...

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