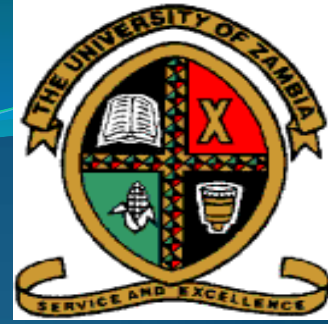


Paper Presentation for UbuntuNet- Connect on:



The Potential For Unified Backbone Optical Transmission In Zambia: The Analysis

Presented By:
Chanda Mulenga

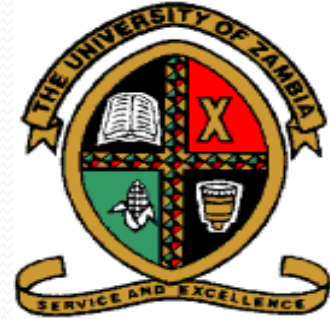
UNZA

Meng. Telecom Systems

Intercontinental Hotel 12-14th November, 2014.

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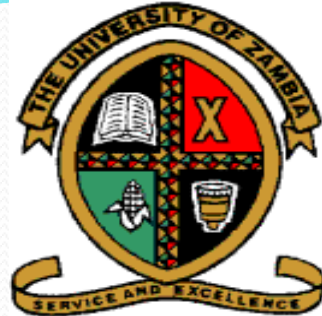
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1.0 Introduction



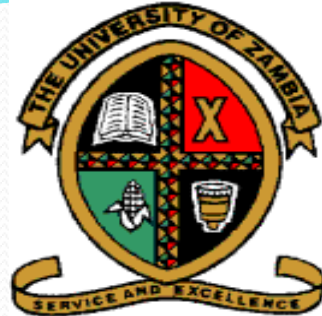
- ICTs and Telecommunication service provision in developing countries is undergoing speedy progress and inspiring numerous deployments.
- Regardless of the multiple benefits of what ICTs and Telecommunications can do in developing countries such as Zambia we currently facing numerous challenges.
- It is therefore necessary for Engineers to identify such problems and design solutions or models that are capable of promoting socio-economic development.
- In this presentation, Mobile and Internet Service Providers providing backbone Transmission, telecommunication services as well as ICT services are considered.



2.0 Objectives

- Identify major problems or hindrances of why mobile communication and ICT is not accessed by the majority of the population.
- Establish the challenges encountered by service providers by examining their regulatory frameworks and infrastructure.
- Recommend an appropriate solution.

3.0 Methodology

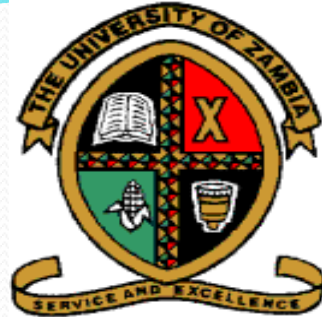


- An Analytical research method will be used in this research as facts or information will be analyzed to come up with recommended solutions.
- This process will be divided into:
 - Data collection and Analysis
 - Ethical considerations

4.0 Literature Review



- Unified optical backbone transmission is generally defined as a high speed, high capacity transmission medium that can carry multiple independent network carriers.
- Globally, the recognized benefits of ICT's and a unified communication system cannot be over-emphasised since they have contributed to most countries Gross Domestic Products (GDP) in the 21st century (Zambia National Broadband Strategy, 2014).
- This paper looks at Zambia, and on lighter comparison to South Africa and Kenya in the analysis of optical infrastructure unification.

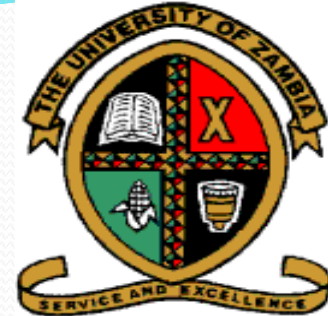


4.1 Comparative Analysis

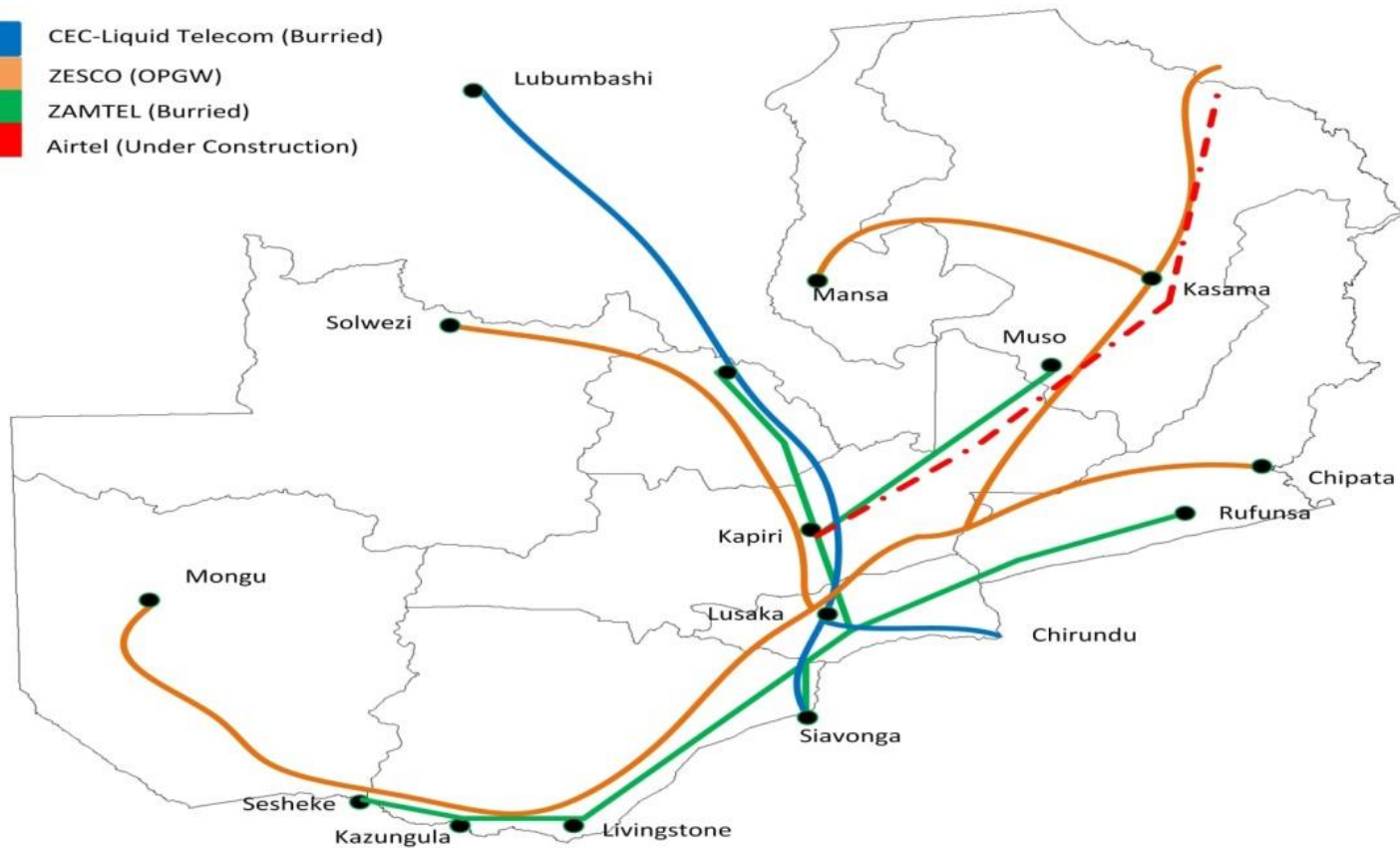
4.1.1 Zambia Broadband Infrastructure

- Zesco, Zamtel, CEC Liquid, MTN Zambia and Airtel laid their own BB infrastructure.
- Geographically covers 10,000 Km countrywide connecting 46 districts.
- Laid mainly along the line of rail in metropolitan areas
- Zambia's infrastructure network covers less than 47% of country's coverage.
- Less than 8% of total population has an average access to internet and telecommunication facilities.

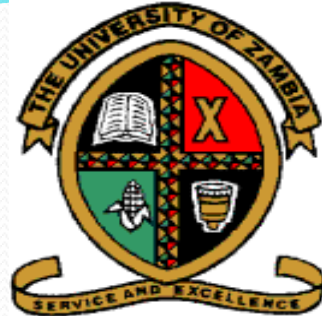
Figure 1: Optical Fiber of Zambia



- CEC-Liquid Telecom (Burried)
- ZESCO (OPGW)
- ZAMTEL (Burried)
- Airtel (Under Construction)



4.1.2 South Africa Broadband Infrastructure overview

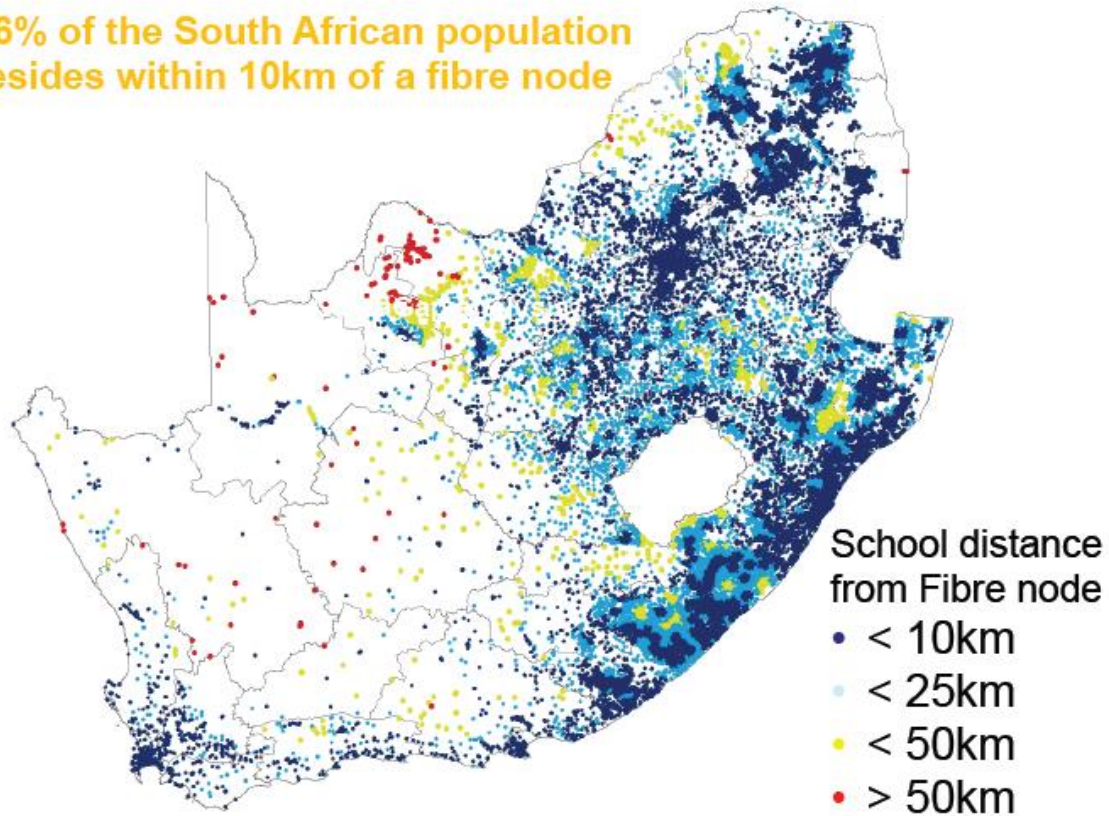


- The biggest gap in the national broadband infrastructure in South Africa is currently in the access network.
- 86% of the population is within 10 Km from a fibre access point.
- Until 2009, South Africa was connected to the rest of the world by a single international submarine cable (SAT3).
- By the year 2013, four submarine cables were in place with a combined capacity connectivity of 11.5 Tbps to the international community.
- This capacity was available to at least five (5) service providers at a wholesale price.
- With construction works underway of additional cables, the anticipated capacity will be 29.5 Tbps.(South Africa Broadband Policy, 2013).
- This development has resulted in prices of ICT services to drop drastically going by demand and resulting in better use of available capacity.

Figure 2: Fiber Distribution

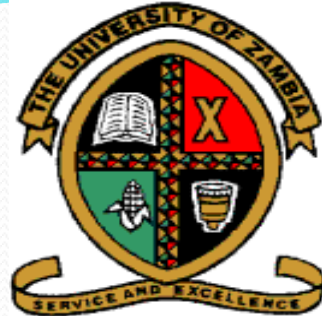


86% of the South African population resides within 10km of a fibre node



4.1.2 Kenya Broadband Infrastructure overview

- Its government motto on broadband “build it and they will come” .
- leveraged its advantage by playing a major role in increasing its fiber optic backbone capacity .
- In the last five years, three undersea optic have been installed giving an access capacity of 4 Tbps international connectivity.
- This has contributed to 80% decrease in whole sale bandwidth costs.



6.0 Regulatory framework for unified backbone in Zambia



- Different types of ICT Acts have been developed to propel the Zambian infrastructure development to great heights.

(1) Information and Communication Technology Act No. 15 of 2009.

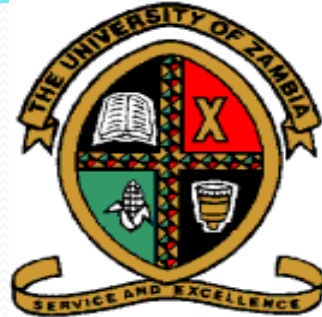
The Act provides for the economic and technical regulation of information and communication technology; facilitates access to ICTs; "protects the rights and interests of service providers and consumers"; and regulates and manages radio spectrum. The ICT Act also renamed the CAZ to the Zambia ICT Authority (ZICTA).

(2) Electronic Communications and Transaction Act No. 21 of 2009.

The ECT Act, 2009 provides for the development of a safe, secure and effective environment for the consumer, business sector and the government to conduct and use electronic communications. Additionally, the ECT Act of 2009 aims to promote legal certainty and confidence, and to encourage investment and innovation in the electronic communication industry. Also, it facilitates the creation of secure communication systems and networks; and allows the legal interception of electronic communications and admissibility of intercepted communications.

Contd.

- The mobile operators, the utility company now own and control the bulk of transmission backbone capacity. .
- Despite this, regulation and competition between operators have largely prevented shared use of infrastructure in terms of such emerging transmission backbones.
- Most of network infrastructure companies tend to concentrate in areas where the perceived rate of return exceeds their initial investment capital in infrastructure.
- Zambian working draft on broadband clearly states that “The Government shall take a broader perspective and focus on infrastructure as well as creation and nurturing of various elements in the broadband ecosystem.



7.0 Problems of Non-Unified backbone infrastructure



7.1 Network destruction

- The most common cause of fibre cuts come from construction companies who do not follow procedures and laid down municipality by-laws.

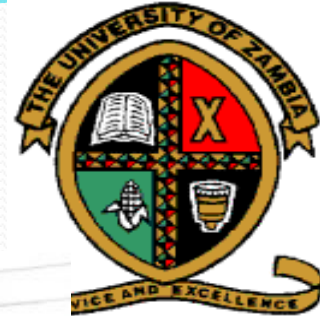
7.2 Heavy CAPEX on infrastructure laying

- Network companies or the government itself will have to lay out the infrastructure which is very costly. For example the Zambian country report states that infrastructure objectives for Zambia would cost \$1.6 billion per year over the next decade.

7.3 Uncoordinated Regulation

- It is important to come up with flexible clauses in the regulatory structure so that the laws are in line with the current market demands to attract foreign direct investment in the telecommunications and ICT industry.

Figure 3: Construction works on Direct Optical Fiber in Ndola.



Contd.



7.4 Under usage of bandwidth.

- Transmission systems are not fully riding on an IP transport layer platform but rely on the synchronous digital hierarchy (SDH) or wavelength division multiplexing (WDM), which does not give proper and required bandwidth to a customer.

7.5 Constrained investment opportunities

- Open access means that optical backbone facilities and bandwidth should be provided to all interested parties on equal and transparent terms. This implies that access charges should be cost effective and affordable based.
- Optical fibre cables are often assumed to be the best transmission media, and the general opinion is that the costs of fibre would be very low.
- In business terms, open access essentially means that all operators agree to compete only on the service layer and not on the infrastructure layer.

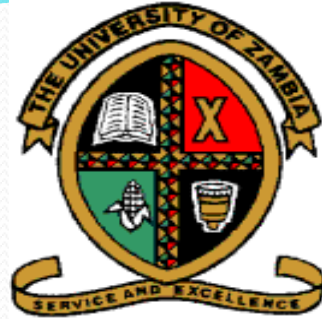
8.0 Benefits of Unified Optical Backbone optical Transmission

8.1 Economic magnitudes of network sharing

- Infrastructure sharing between operators and service providers undoubtedly leads to a reduction of the investment made by each operator involved in the network sharing process.
- Further help operators in realizing better coverage.
- Operators may reinvest the capital realized from such savings in upgrading their networks and providing better roll out .

8.2 Promotion of social and Economic benefits

- Will include social interactions, business to business (B2B), business to government (B2G) and business to citizens (B2C).
- Reduce inequalities in opportunities between rural areas, the urban and peri-urban areas.
- Internet Services, and may deliver educational, health programmes to remote locations.
- Increase network availability in rural areas increasing the chances on adopting telemedicine in rural areas.



9.0 Conclusion

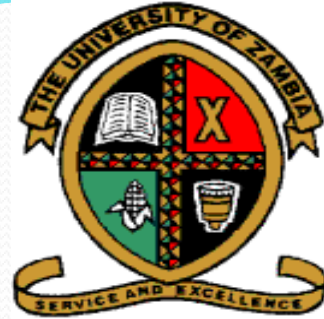
- From the context of this study, a sound conclusion can be drawn with emphasis that telecommunication and ICT policies in its economic and social development role, are just facilitators meant to help national development. Having a unified optical backbone transmission in Zambia will yield, the benefits of ICT policies to a national economy.



10.0 References



- Doc 'ICT Sector Legal and Regulatory Framework vis-à-vis Opportunities for Growth ZICTA's vision for the sector" pp.5-12.
- Djamel,L, Gourhant,Y. &Tinku,R (2011). 'On the role of infrastructure sharing for mobile network operators in emerging markets'. Computer Networks. The journal.www.elsevier.com/locate/comnet [accessed 14 August 2014], pp.9-16.
- Habeenzu,S.(2010). 'Zambia ICTSector Performance Review2009/2010'. Towards Evidence-based ICT Policy and Regulation Volume Two, Policy Paper 17.pp. 24-26.
- Mayer.R, Figueredo.K, Jensen.M, Kelly.T, Green.R & Federico.A.B.'Costing the needs for Investment in ICT infrastructure in Africa'. www.eu-africa-infrastructure-tf.net/attachments/library/aicd-background-paper-3-ict- [accessed 31st October, 2014].pp.7-9
- Msimang,M.(2011). 'Broadband in Kenya: Build it and They Will Come'.<http://www.infodev.org/publications> [accessed 10th October, 2014] pp.3-5.
- Ozioma,A,O.(2011). 'The Economic and Social Benefit of ICT'. www.webpages.uidaho.edu/~mbolin/anie.htm [accessed April 18, 2014]
- Savory,B. (2012). 'Fiber Optic Network Reliability & Securityfor NRENs: The Threat and Potential Solutions'.http://www.ubuntunet.net/ubuntunet-connect_proceedings [accessed 20th, October, 2014].p2
- South Africa's Broadband Policy. 'South Africa connect: Creating Opportunities, Ensuring Inclusion' [accessed 19th, October, 2014].
- Ministry of Transport, Works, Supply and Communications. 'Zambia National Broadband Strategy' [accessed 19th, October, 2014].



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