Chapter 3
Exploring the Possibility of Using TV White Spaces in Africa

Benny Nyambo
University of Zimbabwe, Zimbabwe

Benard Mapako
University of Zimbabwe, Zimbabwe

Michael Munyaradzi
University of Zimbabwe, Zimbabwe

ABSTRACT

The people living in remote parts of the underdeveloped world usually do not have access to affordable internet, either because it is too expensive to lay fibre to these areas or mobile data is just too expensive to use every day. There has always been a need to find a way to bring fast, cheap, and reliable internet access to these people. This is where the TV white spaces (TVWS) or unused TV band spectrum comes in. TVWS refers to the gaps found between TV channels. It can be used to provide cheaper and reliable broadband to remote areas. Wi-Fi typically covers short distances and has trouble passing through obstacles. TVWS, on the other hand, can travel long distances and can penetrate obstacles. This makes TVWS suitable for long distance internet provision in remote areas. This chapter explores the possibilities and advantages of delivering broadband to remote areas of underdeveloped nations using TVWS with the intention of poverty reduction. The concept of TV channels digitalization also frees the whole analogue TV spectrum and allows it to be used in TVWS technology.

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INTRODUCTION

Full participation in today’s society is heavily reliant on access to modern information and communication technologies (ICTs). Thus, a well-developed, well-maintained and affordable information infrastructure that allows access to, and manipulation of the dematerialised economy is the backbone of a knowledge society. The eradication of poverty and other development challenges will require a transformation of all our basic institutions and this can be expedited with the use of ICT. It is unfortunate that over 3.9 billion people around the world do not have access to fixed regular Internet (Darkwa, 2016). However finding lasting solutions for this problem is difficult because of the cost associated with providing Internet to remote, rural and sparsely populated areas.

One of the most feasible technology for such areas would be wireless communication networks. In wireless communication networks, the radio frequency (RF) spectrum is a very expensive resource that is mostly regulated with the main aim of reducing interference between devices. Various wireless technologies that can be used include wireless cellular networks, Wi-Fi, microwave, WiMax and TV White Spaces (TVWS). Whilst the other technologies have been found feasible, they have high costs associated with their installation and operation. This would make them not very applicable to rural Africa were capital is very limited. TV White spaces is being considered widely as a possible solution to supplying affordable and reliable Internet access to rural, remote African locations.

TVWS refers to the unused frequencies that have been left lying idle after the migration of TV broadcast from analogue to digital. Previously, these were kept clear to avoid interference with neighbouring channels. TV networks would place these spaces of unused spectrum in between their channels in order to protect broadcasts from interference. These low-signal frequencies, can penetrate walls and can travel long distances without the need for amplifying the signal. These features make TVWS spaces a very suitable candidate to end the connectivity problem in Africa. This is because they enable TVWS based connectivity to reach wide areas and larger populations than GSM and LTE mobile base stations that are currently being used by Mobile Network Operators (MNOs).

Bridging the Digital Divide in Africa

In every country, there exist two classes of people in terms of access to information and communication technologies. The first group are those people who have access to the best information and communication technology as well as relevant training to use the technology. The other group consists of those people who, for one reason or the other, have limited access to information and communication technology or even
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