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Christoffel Kotze

# A Broadband Apparatus for Underserviced Remote Communities

Connecting the Unconnected

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# Preface

*We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before.*

—Klaus Schwab<sup>1</sup>

Access to broadband Internet is the key to participation in the emerging Fourth Industrial Revolution (4IR), with those on the wrong side of the digital divide automatically excluded. This book investigates how broadband Internet can be provided to remote and isolated communities through the use of satellite and other enabling technologies, in the form of a self-contained broadband apparatus. It discusses how the proposed design can help bridge the digital divide by removing one of the main hurdles to adopting technologies: infrastructure. In turn, the book explores how the lack of infrastructure, especially with regard to connectivity and electricity, can be addressed by exploiting new technological advances in a number of fields, notably the newly proposed large broadband satellite constellations. In closing, it uses concrete examples to demonstrate the potential positive impacts of a “broadband ecosystem” on economics, governance and society, and on achieving the United Nations’ Sustainable Development Goals.

Yzerfontein, South Africa

Christoffel Kotze

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<sup>1</sup>World Economic Forum. 2016. The Fourth Industrial Revolution: what it means, how to respond <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond> accessed 18 April 2017.

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# Introduction

Unlike the three industrial revolutions that preceded it, which followed a linear evolutionary pace, the Fourth Industrial Revolution (4IR) is developing following an exponential path driven by simultaneous rapid breakthroughs in almost all fields of technology, creating a global transformative disruption across virtually every industry. A key characteristic of the 4IR is the creation of cyber-physical systems (Griffor 2017)—the result of the integration of intelligent networks, systems and processes. The key enabler of the 4IR is broadband Internet connectivity.

Currently, almost 3.4 billion people across the globe are not connected to the Internet. Such connectivity is the primary measurement of a twenty-first-century scenario of inequality—that of the “digital haves and have-nots”—commonly referred to as the “digital divide”<sup>2</sup>. Individuals and communities on the wrong side of the digital divide will by default be excluded from partaking in the 4IR and any future benefits, it could bring, exacerbating existing inequalities. A 2014 McKinsey study concluded that a target user will adopt broadband Internet service on the condition that it is readily available, accessible, affordable and applicable—to the community or the individual concerned (Sprague 2014). It, therefore, stands to reason that the entry point for bringing any underserved community “online” is to ensure, first and foremost, that the infrastructure to support the service is available. The enabling infrastructure needed includes electricity, hardware and communication service to solve the so-called last-mile challenge (Thota 2013). The last-mile challenge is the result of a number of factors, with remoteness and lack of infrastructure typically being the primary barriers to connection. The World Economic Forum cites lack of infrastructure to be the main reason why almost a third of the global population cannot connect to the Internet, with 31% having no 3G coverage and 15% being without electricity, which includes almost a third of sub-Saharan Africa<sup>3</sup>. This study aims to address these challenges by investigating potential

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<sup>2</sup>Internet World Stats. 2018. *INTERNET USAGE STATISTICS - The Internet Big Picture, World Internet Users and 2018 Population Stats*. <https://www.internetworldstats.com/stats.htm> accessed 17 November 2018.

<sup>3</sup>Biggs, P. Ed. 2018. *The State Of Broadband 2018: Broadband Catalyzing Sustainable Development*. First ed. Geneva: UN Broadband Commission.



BARC Logo—Broadband Apparatus for Underserved Remote Communities

technological solutions to provide access to broadband Internet services in a novel way to remote, isolated communities in the form of Broadband Apparatus for Underserved Remote Communities (BARC).

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## About the Author

**Christoffel Kotze** established a boutique technology strategic advisory company in 2012 after a successful corporate career spanning two decades. This company specialises in providing assistance to digital transformation projects within organisations, with a special interest in the use of technology resources to support sustainable development. Current research interests include space technology, dematerialisation through digital transformation and solutions to the “digital divide”. He is an M.Phil. (Space Science) candidate at the University of Cape Town. Other qualifications include a Bachelor of Commerce with Honours (Information Systems) at the University of Cape Town, Bachelor of Science (Physiology and Microbiology) at the University of Pretoria, Diploma in Data-metrics (Computer Science) at the University of South Africa, and a number of strategy-focussed executive management courses at the Graduate School of Business from the University of Cape Town, and also ISACA Certified in the Governance of Enterprise IT (CGEIT) and TOGAF 9 Certified (Enterprise Architecture) —[chris@noez.co.za](mailto:chris@noez.co.za) (+27 83 627 9392).