

# Book review

## **Book Details: Frequencies. International spectrum policy**

*Edited by Gregory Taylor and  
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McGill-Queen's University Press  
Montreal & Kingston, Canada*

**Review DOI**  
**10.1108/DPRG-09-2020-117**

“Frequencies. International Spectrum Policy”, edited by Gregory Taylor and Catherine Middleton, is one of a few unconventional, and much needed, contributions to the literature on radio spectrum. It is an interdisciplinary piece of work that distances itself from many publications where the radio spectrum is often confined to a merely technical and economic discourse. This book puts into the spotlight people, politics, geography, history, traditions as well as innovative policy ideas and management practices for the creation of a granular approach to spectrum management that matches the multi-faceted nature of radio waves.

*Frequencies* was mostly written in 2018, when the hype surrounding 5G was at its highest (p. 290). In these times of great uncertainties surrounding the evolution of mobile communications, *Frequencies* invites the reader to look away, for a moment, from the 5G hysteria and reflect upon current real-world challenges and untapped possibilities to manage and use spectrum. If the overall goal of radio spectrum policy is to provide equitable and affordable mobile communications to people, are we going towards the right direction? By offering concrete experiences and discussing novel concepts, *Frequencies* focuses on “the other side of the coin”, showing that effective spectrum governance is much more than developing the best possible auction design.

*Frequencies* is a collection of 11 chapters authored by 16 leading radio spectrum experts from across the

globe, with different backgrounds and expertise in various disciplines. The book is organised into three sections. The first section, which is, in my opinion, the most interesting, includes seven chapters and illustrates local struggles to tackle common issues such as urban–rural digital divides and mobile market concentration. The second section is based on Chapter 8, which is a call for spectrum-sharing solutions against the dominant exclusive licence model. The third section includes three chapters, Chapters 9–11, which propose a novel representation of spectrum policy, respectively, discussing new technological possibilities, innovative governance models and potential changes in market structures [1].

The first part of the book has a fascinating country coverage, narrating experiences from New Zealand, Finland, Africa, Canada, Mexico and India. Through the pages of Chapter 1, the reader will learn that, for the Maori people of New Zealand, the radio spectrum is a taonga, a treasure, which was given by the gods to men to perpetrate knowledge and education. The reader will also learn about the Treaty of Waitangi, which challenges the undisputed right of the Crown of New Zealand to assign radio spectrum rights of use. In Chapter 2, the reader will move to Finland, where the radio spectrum for mobile use is neither scarce nor expensive, and where auctioning the radio spectrum remains an unattractive alternative. Here, the reader will also understand why Finland is sometimes referred to as “Nokialand”. Finland and its homegrown company Nokia are tied by a rather unique bond. Like a successful marriage, Finland and Nokia have gone through good and

bad times together. This also means that the destinies of the nation and business are so intertwined that one may lose sight of the general public's interest.

From cold Finland, the reader will next land in warm Africa in Chapter 3. In spite of the explosive growth of mobile telephony, Africa is a continent where the digital divide between urban and rural areas, as well as between the rich and the poor, is sadly substantial. Providing affordable services in underserved areas torments service providers whose financial capabilities to invest in network infrastructure are restricted by the high reserve prices of spectrum auctions and diminishing revenues from increasing low-income customers. The entrepreneurial spirit of African countries has motivated them to look outside of the traditional spectrum management box, hoping to combine unlicensed, dynamic and licensed spectrum, for a pervasive and affordable access to mobile communications.

In Chapters 4 and 7, the reader will learn about developments in Canada. Chapter 4 narrates the evolution of the Canadian regulatory approach, from *laissez faire* to interventionist, between 2006 and 2017, to tackle the long-standing issues of the mobile market's high concentration, high prices and low adoption rate. In particular, the effectiveness of radio spectrum policy to increase competition is questioned. This comes as no surprise. When the market reaches maturity, consolidation is considered the norm. In mature wireless oligopolies, regulators should not expect increased competition from simply setting aside spectrum for new entries. As the author of this chapter argues, spectrum policy initiatives should be combined with other interventions to create a concerted support mechanism for new entrants to achieve through doing so the desired competitive outcomes that benefit the general public.

Chapter 7 shows that the urban–rural digital divide can also be a serious problem for developed countries. Canada suffers from a “national connectivity gap” ([Innovation, Science and Economic Development Canada, 2019](#)), which results in rural Canadians [who are 19% of the country's population, [The World Bank \(2019\)](#)] being digitally excluded. In particular, the author of this chapter focuses on a distinctive policy initiative called Remote Rural Broadband Systems (RRBS) that sought to provide fixed wireless broadband access to remote and sparsely populated areas of Canada via unused analogue television spectrum, i.e. television white spaces, on a licensed shared basis. The Canadian initiative was tailored to the unique combination of geography and demographics that characterises the country. Rural Canada finally saw the emergence of small-market actors willing to provide services to the underserved. Sadly, the RRBS initiative crashed shortly after a promising take-off, because of several issues including cross-country coordination concerns and lack of economies of scale in equipment. Could stronger governmental support have saved RRBS from a rapid decline (p. 177)? The author of this chapter may think so.

The journey continues. Chapter 5 brings the reader to Mexico, where the government has put the fate of the country's mobile market in the hands of Red Compartida, a wholesale mobile network. In a country such as Mexico, where over half of the population lives in poverty, ([GSMA, 2016](#)) mobile service's high prices have kept the mobile penetration rate low. To turn the tables on an extremely anti-competitive mobile communications market, Mexico took the radical and unique decision to reserve the entire digital dividend, i.e. the 700 MHz band, to create Red Compartida. An avant-garde or naive approach to close the digital divide? Only time will tell. Certainly, Mexico's unusual approach challenges

common assumptions about the management of the public airwaves” as wanted by the editors of *Frequencies* (p. 6).

While in developed countries the rural population is generally numerically smaller than the urban population, the opposite can be observed in developing countries. In India, the protagonist of Chapter 6, two-thirds of the population live in more than 600,000 villages (p. 139). Like many African countries and other emerging economies, India owes its digital transformation to mobile technology. In spite of the widespread availability of smartphones and high-speed connectivity, India has to fight against a titanic urban–rural digital divide. Adoption in rural India is a critical issue because of a combination of low levels of digital literacy, low income, lack of infrastructure and low-quality services. By retracing some of the milestones of the growth of mobile connectivity in India, the author of this chapter advocates for the continuous engagement of public authorities to bring connectivity to all. In spite of ambitious government initiatives, there is still a long way to go. The digital divide in India is not only about the gap between urban and rural; it also has a bitter taste of politicisation, marginalisation and gender discrimination (Chakraborty, 2020).

Moving into the middle section of this volume, Chapter 8 is dedicated to spectrum sharing. In spite of being the topic of many research contributions, spectrum sharing is presented in this chapter in a very pedagogical fashion. Not only is the author convincing when explaining why spectrum sharing will be critical in the future and how it can be implemented, but he also ventures to touch upon policy governance issues, including political influence, which are rarely discussed in research on spectrum policy.

In the last section of *Frequencies*, the reader is presented with somewhat unconventional conversations about

radio spectrum. In Chapter 9, the concept of polycentric governance, initially developed by Elinor Ostrom and her collaborators, is applied to spectrum. The authors of this chapter stretch the boundaries of generally accepted practices to include a vision where governance of radio waves is largely decentralised and access to spectrum is obtained via local negotiations. The authors of Chapter 10 propose the creation of an open access capacity market, which is based on a combined understanding of spectrum and infrastructure, to cope with increasing spectrum demands. According to the authors, trading capacity rather than spectrum is a more dynamic, efficient and fair way to respond to technology and market changes.

Chapter 11 concludes this collection with an unavoidable discussion around 5G. In line with the general trend of this book, the authors of this chapter suggest essential transformations of existing management practices “to move to a position where all licence are shared” (p. 280), especially in consideration of the emergence of private networks to serve verticals. In addition, the authors discuss the potential disruptive nature of 5G for the structure and regulation of the mobile market. They examine novel 5G structural network components, i.e. network slicing, and possible consequences for existing mobile operators.

Together the experiences included in the first section of this volume expose the socially constructed nature of radio spectrum policy and management. Common connectivity issues are addressed differently in different countries, depending on domestic factors, including history, geography and demographics, which ultimately shape and are shaped by the policy and regulatory environment. The second section is a recognition that spectrum sharing is not only feasible, but also needed to access valuable idle spectrum. Nevertheless, cooperation between all relevant spectrum

stakeholders is key. The third and last section offers distinctive food for thought. Along with technology, public policymaking also needs innovation. Regulatory experimentation is required to move away from policy inertia and discover how the future of radio spectrum management and use may look like.

The introduction and conclusion sections, co-written by the editors, do a decent job of highlighting the threads that connect the different chapters. The book is written in an easy-to-read format and it is suitable for different audiences, including non-experts. On a personal note, I believe the book would have gained additional credibility and consistency, had it purely been a collection of case studies. Also, some of the chapters are re-worked versions of already existing contributions published by the authors elsewhere. Overall, this book adds value by bringing together radio spectrum experts from different disciplines. I hope *Frequencies* will inspire more collaborative and interdisciplinary research on radio spectrum.

#### Note

1. The editors include Chapter 7 under the second section of the book (p. 14).

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