The benefits of developing a spectrum roadmap for realising regulatory policy objectives

A discussion of the role a spectrum roadmap can play in realising the efficient use of spectrum and promoting investment and innovation

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Contact

Graham Friend, M.A., M.Phil. (Cantab), ACA
Managing Director,
Coleago Consulting Ltd

Tel: +41 79 855 1354
graham.friend@coleago.com

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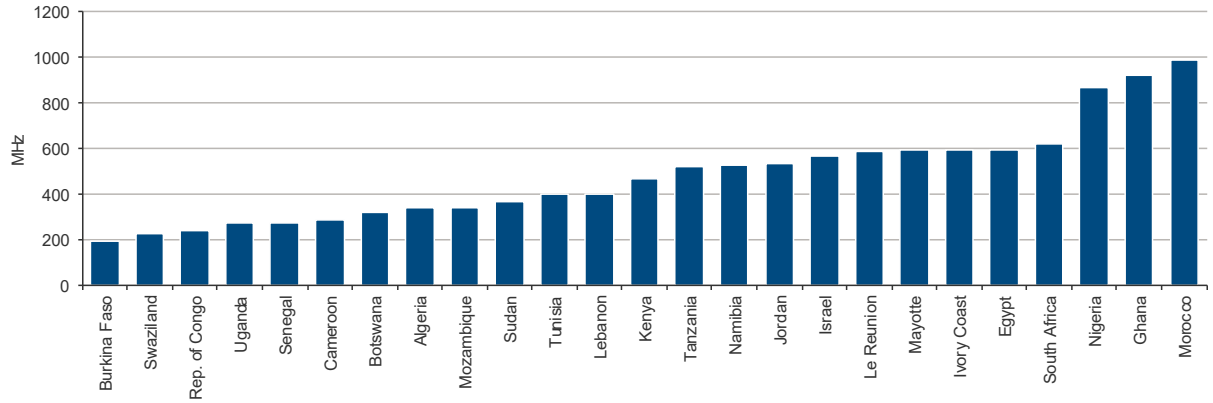
Introduction

Regulators should seek to ensure that the industry has access to adequate spectrum in a timely manner

Spectrum plays a vital role in achieving a wide range of regulatory and governmental policy objectives. One of the key roles is helping to achieve national broadband plan. The socio-economic benefits of affordable broadband access are well documented[1]. Promoting widespread and affordable mobile broadband with good quality of service depends crucially on operators having access to adequate spectrum. Generally, the more spectrum operators have available, the better the quality of their networks and the lower their cost of operation. Provided markets are competitive, lower operational costs should result in lower consumer prices[2]. A lower cost base will also support better financial returns potentially resulting in increased levels of investment and innovation. Benefitting consumers through lower prices and promoting investment and innovation are common regulatory policy objectives. Regulators should therefore seek to ensure that the industry has access to adequate spectrum resources in a timely manner.

LS Telecom in their study "*Analysis of the World-Wide Licensing and Usage of IMT Spectrum*" identified how much spectrum had been assigned across Africa and compared it with how much spectrum had been identified for IMT use by the ITU and how much of it had been harmonised. A total of 1,090 MHz of harmonised spectrum has been identified for Africa and yet the average amount assigned is 477 MHz, less than 50%. Africa is far behind other regions such as Europe in making spectrum available. In Europe, regulators have assigned an average of 757 MHz, almost 60% more than the African average.

Exhibit 1: Spectrum licensed for IMT service in Region 1



Source: Analysis of the World-Wide Licensing and Usage of IMT Spectrum, LS Telecom, 5th April 2019

1 Waverman, Meschi and Fuss (2005) estimate that a 10 percentage-point increase in mobile penetration in a developing country could boost GDP growth by 0.59 percentage-points. Qiang (2009) refers to a more recent World Bank study that correlates GDP growth with fixed, mobile, internet and broadband adoption27. This research suggests that a 10 percentage point increase in mobile penetration could generate a 0.81 percentage point increase in GDP growth in low-to-middle income countries, and a 0.60 percentage point increase in high-income countries. The result for broadband adoption is even more dramatic: a 10 percentage point increase in penetration yields a 1.38 percentage point increase in GDP growth in low-to-middle income countries, versus 1.21 percentage points in high-income countries.

2 In a competitive market, prices should be competed down towards their marginal cost although some economists argue that managers actually set prices based on average costs. Irrespective of the basis for pricing decisions, lower costs can support lower consumer prices.

Inter-regulator competition

Regulators are in competition with each other to attract the investment from large multi-national telecoms operators

Micro-economic theory implies that, provided an opportunity creates value for shareholders, well-functioning capital markets will ensure the investment can be funded. However, the reality is very different. Companies often face budget constraints due to existing high-levels of debt which reduce the scope for borrowing, commitments to shareholders in terms of dividend payments or periodic failures of the capital markets. The absence of unlimited funds means that multi-national telecoms companies cannot fund every new spectrum acquisition opportunity and they have to make choices as to in which country they invest. In deciding in which country to invest the mobile operator will look at the expected returns on new spectrum but crucially, also the risks. When faced with two investments of similar return, they will choose the market with the lower level of regulatory uncertainty and risk and an environment which is most business and investment friendly. Regulators are therefore in competition with each other to attract the investment from large multi-national telecoms operators which typically playing a leading role in most markets in Africa.

In order to ensure that adequate spectrum is made available on a timely basis and to create an investment friendly environment by reducing regulatory uncertainty, regulators should develop and publish a spectrum roadmap.

Uncertainty and the chilling effect on investment

The greater the regulatory certainty the regulator can provide then the higher the price the operator will be prepared to pay for spectrum

CEO's hate uncertainty and it has a chilling effect on investment. The mobile operator's CEO's response to uncertainty is to reduce their expectations of the value of new opportunities. When an investment is considered risky, the mobile operator "discounts" the value of that investment. If a regulator, for example, wishes to maximise the revenue that it generates for assigning spectrum then the objectives of the regulator and the CEO are aligned. The greater the regulatory certainty the regulator can provide then the higher the price the operator will be prepared to pay for spectrum.

Expectations of future spectrum and spectrum values

The value of spectrum being acquired today depends on what spectrum may be acquired in the future

The value of spectrum being acquired today depends on what spectrum may be acquired in the future. Indeed, expectations about future spectrum awards can be one of the biggest drivers of spectrum values. If a regulator has not published a spectrum roadmap then the operator has to guess what spectrum will be made available in the future and when. The need to guess creates enormous uncertainty and the operator's response will be to reduce the value of the spectrum they are acquiring today. Uncertainty will reduce the amount the regulator raises from assigning spectrum. However, forcing the operator to guess can also impact other policy goals such as efficiency.

Spectrum is assigned efficiently when it is awarded to those operators who generate the greatest value from it[3]. Imagine two operators seeking to acquire new spectrum and operator A has a bigger network and will generate more socio-economic value from the spectrum than operator B. However, if A and B have different assumptions about what spectrum will be available in the future, then B might easily estimate a higher value than A. Guessing might result in B winning the spectrum when it should have been assigned to A and as a result, there is a loss of economic efficiency.

Regulators should avoid "drip-feeding" spectrum into the market

"Drip-feeding" spectrum may not increase government revenues and can cause significant harm

In some markets, regulators have adopted a strategy of "drip-feeding" available spectrum into the market in an attempt to create artificial scarcity in an attempt to

3 In a competitive market it is assumed that the operator that creates the greatest private value from the spectrum is also the one who will create the greatest socio-economic value from the spectrum.

generate higher government revenues. Such a strategy imposes many costs on the people and economy of the country.

First, if spectrum is held back, then if it is not being used and it is not generating any benefits for society and therefore is not an efficient use of spectrum. Secondly, by restricting available spectrum the competitive dynamics of the market can be negatively affected with adverse consequences for customers such as higher prices. Thirdly, restricting spectrum increases the costs of the industry which impacts future investment as well as end-user prices.

Worse still, the strategy of "drip-feeding" spectrum into the market will not only damage the industry and harm consumers, but it may also fail to elicit the higher revenues governments are hoping to achieve. There are a number of reasons why holding back spectrum may not generate the high prices the government hoped for.

Mobile operators will recognise the government will have to release the spectrum to the market at some point and probably sooner rather than later as the government will not want to delay indefinitely. Furthermore, spectrum awards are not "one off" events but a repeated series of "transactions" between the industry and the regulator.

If an operator expects that more spectrum will be released in the future it may decide not to participate in the current auction in the hope of potentially acquiring the spectrum at a lower price in the future. This will reduce competition and revenues in the current auction. In addition, if the regulator imposes spectrum caps, then those that did secure spectrum in the first auction may not be able to participate in the second auction which will also be less competitive resulting in lower revenues. If all the spectrum in a particular band, for example, were assigned simultaneously, then all bidders would know this was their "only chance" to acquire the spectrum and they would all participate, giving rise to greater competition and increased revenues.

The repeated nature of spectrum awards will also result in operators "learning" that they should expect the regulator to "hold back" spectrum and that this spectrum will eventually be released. They will factor these expectations into their valuations leading to lower valuations and lower award proceeds.

Drip-feeding spectrum into the market may not necessarily result in higher auction proceeds and will certainly impose costs on the industry, economy and people of the country. Furthermore, the regulator will not create an investment friendly environment and may suffer from an overall reduction in investment if budget constrained operators choose to invest in markets where the regulatory regime is more transparent, open and predictable.

However, it is not always possible to assign all available spectrum simultaneously due to incumbent migration, interference and cross-border coordination issues, for example. When spectrum is to be made available over time then providing a spectrum roadmap will increase regulatory certainty.

The role of the spectrum roadmap in spectrum management

Most leading regulators publish a spectrum roadmap which covers a forward-looking time horizon of three to five years

Most leading regulators publish a spectrum roadmap which covers a forward-looking time horizon of three to five years. Hong Kong publishes a three-year plan, Canada and Australia, for example, publish five-year plans. The plans vary in length from ten pages (Hong Kong) up to or 80 pages (Australia).

The content of the plans varies considerably and some provide detailed discussions on developments in technology and the market which may impact the release of spectrum. At the very least the spectrum roadmap should set out which bands will be released and when and where possible, any additional information relating to the frequencies such as the band plan and any technical licence conditions likely to be attached to the spectrum. A roadmap will deliver significant benefits for the telecoms industry and the customers they serve.

Reducing regulatory uncertainty to improve the incentives for investment

We have already discussed the general benefits of increased regulatory certainty for promoting investment. A roadmap also provides some practical and specific benefits which supports investment. These include:

- operators can adopt a more strategic approach to network planning to ensure that spectrum is used as technical efficiently as possible;
- operators can better plan for the deployment of new technology to support a faster and more cost-effective roll-out; and
- operators may need to raise additional capital to fund the acquisition of high-value spectrum and its deployment – a roadmap will all them to manage their capital-raising activities more effectively.

Meeting the spectrum needs arising from increased traffic growth

Data growth remains undiminished and as data traffic grows, so additional spectrum will be required to meets the capacity needs of operators' networks. A spectrum roadmap, especially one which has been subject to industry consultation, will ensure the industry has the spectrum resources it needs to deliver a high-quality network experience.

Planning regulatory activities

Regulators in Africa are often not as well funded nor as well staffed as regulators in markets such as Europe. A spectrum roadmap is therefore vitally important for the regulator themselves to plan their own activities and how best to allocate resources.

Increasing the value of spectrum and government revenues

We have already discussed the benefits of increased government revenues that arise when regulatory uncertainty is reduced. A spectrum roadmap is one of the most significant things a regulator can do to reduce regulatory uncertainty.

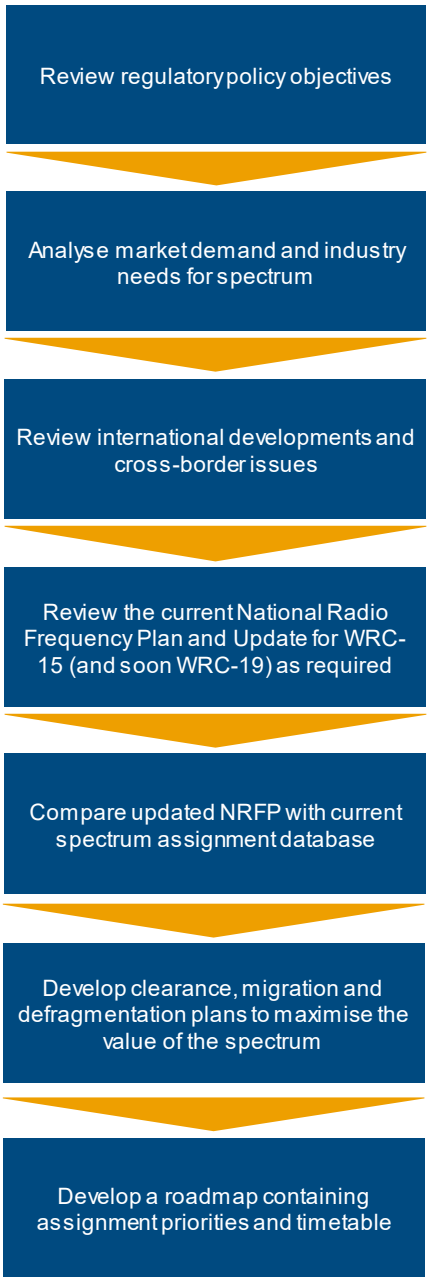
Ensuring a more efficient allocation of spectrum

We have also previously discussed how clarity over the release of future spectrum helps improve the accuracy with which operators can value spectrum. Accurate spectrum values contribute towards ensuring spectrum is assigned efficiently.

The steps in developing a roadmap

There are a number of different approaches that can be adopted for developing a roadmap, but the following steps provide the basis for most approaches. The approach should take account of policy goals as well as local market conditions. However, the international perspective is essential to ensure the harmonised spectrum is made available in a manner which makes it as valuable as possible. Another key aspect of the process is to plan for the migration of incumbent users, potentially to new frequencies and to take any measures which can de-fragment the spectrum to offer potential users the largest possible available contiguous blocks of spectrum.

Exhibit 2: Developing a spectrum roadmap



Source: Coleago

A roadmap should be accompanied by a spectrum management strategy

A spectrum roadmap should be accompanied by the regulator's spectrum management strategy which sets out the principles by which the spectrum will be made available and managed. The key topics covered the spectrum management strategy include:

- licensing regime;
- assignment approaches;
- renewal procedures;
- pricing policies;

- spectrum trading; and
- spectrum sharing.

How Coleago can help

An understanding of spectrum from an operator's perspective is key to developing appropriate spectrum management strategies

Coleago has recently delivered spectrum management and spectrum roadmap projects for Tanzania and Botswana. Our experience of the challenges facing African regulators, as well as our experience in working with mobile operators, makes us ideally placed to assist other regulators in reducing regulatory uncertainty. We can help in developing your own spectrum management strategy and a spectrum roadmap.

About Coleago Consulting Ltd

Graham Friend, M.A., M.Phil., (Cantal), ACA, is an economist and the Managing Director and Founder of Coleago Consulting. Coleago is a specialist telecoms strategy consulting firm and advises regulators and operators on issues relating to spectrum, regulation and network strategy. If you would like to discuss any of the issues raised in this paper, then please contact Graham.

Email: graham.friend@coleago.com

Mobile: +41 798 551 354

