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# STUDY OF BROADBAND COMPETITION IN SELECTED COUNTRIES: LESSONS FOR CANADA

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A study for the Bureau of Competition Policy's Inquiry into Competition in  
Broadband Services



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INTERNET SOCIETY CANADA CHAPTER  
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## Introduction

This paper addresses the following questions asked as part of the Competition Bureau's Market Study on Competition in Broadband Service<sup>1</sup>:

- How do other countries manage and regulate broadband competition?
- Do Canadian regulations diverge in any meaningful way from those employed by other countries?
- Are there significant differences between Canada and other jurisdictions that explain any divergence?
- Are there lessons to be learned from how other jurisdictions regulate broadband?"

Examples of regulatory approaches to managing and/or encouraging competition in broadband services for this paper include Australia, New Zealand, United Kingdom, Japan, South Korea, and the European Union. All of the example countries are advanced economies and indicate that there is much to be learned in Canada from their experience and examples.

At a high level, the answer to the above questions is a "yes", as Canadian regulations and its regulatory approach diverge significantly from those employed by several other significant OECD countries. This paper explores those differences.

It should be noted that differences of size or population density between Canada and other jurisdictions fail to explain these policy differences. Countries as different in population density and physical expanse as Australia, France, Korea, Japan, Finland, and Germany have embraced similar ideas as to how to get more competition and better service, and these ideas differ significantly from Canada.

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<sup>1</sup> <http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/04360.html>

## Australia

Australia shares many of the features of Canada: a relatively small population (24.7 million in 2018) in a continent-sized country, heavily urbanized (89 per cent), with a very sparse population dispersed in the outback.<sup>2</sup>

There is a wealth of information on the history of Australia's National Broadband Network (NBN) in the public domain<sup>3</sup>. It will not be reproduced here. In the briefest of terms, Australia set out in 2006 to build a fiber-based network delivering fiber to the home from a starting point of DSL (digital subscriber line). Optical fiber was to be supplemented by satellite-delivered services in more remote areas.

In contrast to Europe's competitive 5G wireless and backhaul environment, Australia has embraced a full nation-wide monopoly in wholesale services, with competition at the retail level.

In the course of time, the ambitions for the NBN have had to be pared back from fiber to the premises (FTTP) to fiber to the node (FTTN), the result of ballooning costs and intense political turmoil.

It has also undergone significant criticism when compared to New Zealand's comparable efforts to spread broadband capacity to that country.

The NBN is a national monopoly governed by the Australian Competition and Consumer Commission (ACCC) by a "special access undertaking" that deals with design, service and charging until the year 2040<sup>4</sup>. Any organization seeking to lay new fiber must offer services at the same price as the NBN in order to prevent cherry-picking areas. They must also provide open access to retailers.

Pricing is uniform to retail service providers within each technology regardless of where the service is delivered. Extensive cross-subsidies are used to keep the price of rural services as low as feasible. Three providers, Telstra, Optus and TPG garner 83 per cent of the market.

The results are shown in Figure 1.

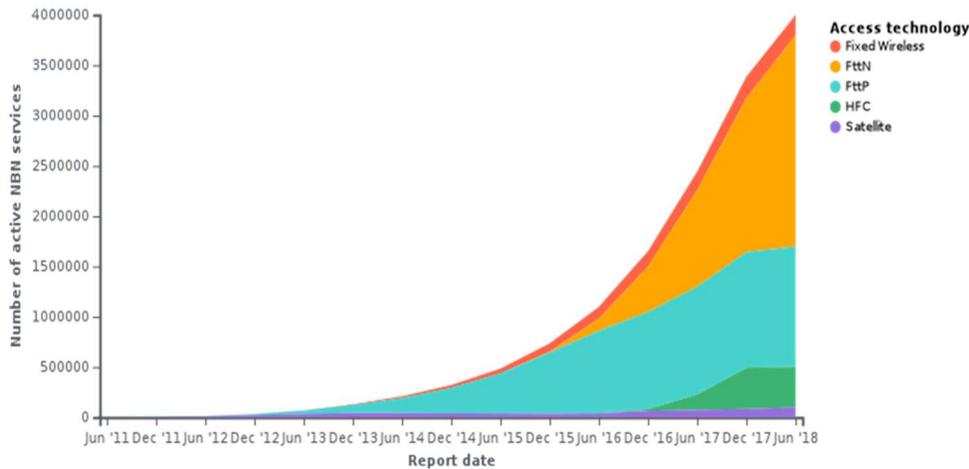
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<sup>2</sup> <http://worldpopulationreview.com/countries/australia-population/> and [https://en.wikipedia.org/wiki/Demography\\_of\\_Australia](https://en.wikipedia.org/wiki/Demography_of_Australia)

<sup>3</sup> [https://en.wikipedia.org/wiki/National\\_Broadband\\_Network](https://en.wikipedia.org/wiki/National_Broadband_Network) and [https://en.wikipedia.org/wiki/History\\_of\\_the\\_National\\_Broadband\\_Network](https://en.wikipedia.org/wiki/History_of_the_National_Broadband_Network)

<sup>4</sup> NBN Co. "Special Access Undertaking (SAU) - nbn - Australia's new broadband network".. <https://www.nbnco.com.au/sell-nbn-services/special-access-undertaking-sau>

**Figure 1:**  
**Total number of active NBN connections by access technology**  
**(June 2018)**



**Issues for consideration**

*Does a project of this size have political backing and social consensus behind it?*

The NBN was not just a telecommunications project but was conceived as a way of bringing Australia into the forefront of government services delivery and innovation. While the NBN has been endorsed by the large carriers and the significant applications providers, it has been fiercely opposed by the Liberal National coalition government that followed in 2013, in particular its Prime Minister, Tony Abbott, who was Prime Minister from 2013-2015.

The NBN has had to survive strong governmental opposition, the paring back of its ambitions, and inevitable disappointments in not producing the original vision. The board of directors and president of the NBN corporation have been subject to political removal.

*Managing public expectations*

In 2013 the government had indicated the NBN could be built for \$A25 billion and be completed by 2016. The costs are now estimated to amount to roughly \$A51 billion and be completed by 2021. Wholesale prices have had to be increased, with consequential effects on retail prices.

In addition, the Liberal-National government abandoned the idea of a completely optical fiber network for a range of fiber, coaxial, and satellite technologies, but only after some 2 million people got up-to-the-minute optical fiber connections. Many people were left with the existing copper cable, not all of which was up to standard and much of which has needed replacing. So one-third to one-quarter of Australians remain dissatisfied with their level of service.

### *Number of points of interconnection*

The number of points of interconnection by retailers will drive industry consolidation at the retail level. The fewer the points of interconnection, the greater the tendency to consolidate. Australia has over 50 retail service providers, while the big three (Telstra, Optus, and TPG) possess 83 per cent of the market. Some industry consolidation followed the creation of the NBN.

### *The company and equipment you start with*

The Australian NBN is often compared unfavourably to the equivalent monopoly wholesale arrangements in New Zealand. In New Zealand, the former monopoly, Telecom NZ, was split into a wholesale operator, Chorus, and a retailer, Spark. Chorus retained ownership of the wholesale assets. Chorus also started with a fiber to the node (FTTN) architecture and did not have far to go to get to fiber to the premises (FTTP).

By contrast, the Australian NBN started with nothing and has had to lease its assets from the Australian former monopoly, Telstra. This meant that the NBN had to take fiber on average 2.5 kilometers from a Telstra exchange to the end user. Other advantages were available to consumers in New Zealand. The age of a lot of Telstra's equipment has led to public disappointments with the level of services.<sup>5</sup>

### *Monopolies*

Legal monopolies can be an effective means for generating the ability to cross subsidize, which was the principal issue for Australian policy. Determining the extent of their boundaries is a crucial issue. Australia decided that the NBN would have a territorial monopoly in wholesale over the range of FTTx, HFC, fixed wireless and satellite technologies, rather than splitting the monopoly into three or four operating entities, as was recommended by a government panel in 2014.<sup>6</sup> It is claimed that retailers skimp on buying capacity from the wholesaler because of high costs so they can compete on price and blame NBN for the bad performance.<sup>7</sup>

Once a government-backed monopoly is established, governments seek to protect it from competition, since to lose monopoly rents is to lose the ability cross subsidize.<sup>8</sup> It is claimed that blocks are put in the way of companies like TPG from putting in fixed broadband, and that

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<sup>5</sup> "Why is Australia's national broadband network so bad?" Gary McLean, in Australian Financial Post at <https://www.afr.com/technology/web/nbn/why-is-australias-national-broadband-network-so-bad-20171111-gzj92q> and "Australia and New Zealand broadband: Comparing apples with oranges", by Bill Morrow, at <https://www.nbnco.com.au/blog/the-nbn-project/australia-and-new-zealand-broadband-comparing-apples-with-oranges>

<sup>6</sup> "Why is Australia's national broadband network so bad?" Gary McLean, in Australian Financial Post at <https://www.afr.com/technology/web/nbn/why-is-australias-national-broadband-network-so-bad-20171111-gzj92q>

<sup>7</sup> Ibid.

<sup>8</sup> Think of the treatment that competition authorities have given to regulated industries, as an example. See "regulated conduct defence" as a defence against prosecution under competition law, which exists in all regimes of competition enforcement under different names. <http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/eng/03273.html> Or consider the regulatory history surrounding the introduction of long distance voice competition in North America.

Australian telcos are turning to 4G and soon 5G wireless alternatives to beat the monopoly. Telstra estimates it can reach 30 percent of the Australian population by wireless methods<sup>9</sup>.

### *Compensatory price and write-downs of corporate value*

According to a prominent Australian telecommunications analyst, the NBN cannot sell its services at a compensatory price as long as it is priced at its current value.<sup>10</sup> The NBN will have to write down its capital value in order to be able to sell at a price that returns a sufficient profit.

### **Conclusions**

“You break it, you own it”. It seems also that if government builds it, or ordains that it be built, it will own the results. The NBN generates considerable dissatisfaction in various quarters in Australian society. It suffered from possibly overly ambitious goals at the beginning, and it will always have the benefits and drawbacks of its monopoly status. The costs of upgrading to fiber to the node were not sufficiently appreciated.

Yet the chief problem with the NBN is that it began as idea promoted by one party in the run-up to an election and was ideologically opposed by the party and particularly the Prime Minister that subsequently ruled Australia during its formative stages. Accordingly, this case shows that any high-profile project of this nature must have the broad approval of all major political parties, and it must be planned as much as possible on the basis of a realistic assessment of the costs of moving from older to newer technologies, across many types of previously installed equipment. Absent a bipartisan consensus on the issue, building and managing Australia’s National Backbone Network has been contentious, politically charged, and inevitably disappointing to some and a scandal to others.

The construction of a national broadband network will require a significant measure of support from all political parties likely to form a government in the time it takes to build one, which can take up to twenty years to complete.

For competition policy, the Australian strategy shows that the creation of a monopoly will engender the problems consistently associated with legal monopolies: higher prices for urban and richer regions that will cross-subsidize services to remote areas. The benefits of being able to cross-subsidize services in remote regions depend on limiting the competition to the source of the revenues, which is a monopoly.

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<sup>9</sup> Ibid.

<sup>10</sup> Conversation with Paul Budde, 26 November 2018, His website is <http://paulbudde.com/>

## The United Kingdom

The United Kingdom presents a useful record of attempts to disengage the underlying transport - infrastructure arm of the former monopoly, British Telecom (BT), from its service arm, called Openreach. The salient feature of British telecom policy is that the underlying infrastructure company was separated from its services arm, never entirely to the satisfaction of the competitors, but well enough that competitors readily use the infrastructure of BT.

The separation took place in two stages, in 2006 and 2017.

The first separation saw British Telecom, which held then 82 percent of Britain's 25 million strong telephone market, consent to the demands of the telecom regulator, Ofcom. Ofcom had threatened BT with a referral to the UK Competition Commission and the ultimate threat of a forced break-up. BT created a new unit, called Openreach, which promised equal access to BT's principal rivals. At this point Openreach was a separate division of BT.

Openreach manages BT's local access network, which connects customers to their local telephone exchange, and in turn connects the central office (CO) to the BT wholesale local loop unbundling termination points in the CO.

As time passed, the terms of access to Openreach continued to generate complaints from rivals, which include Sky, Vodafone, and TalkTalk. Parliamentary inquiries had been made and there was some cross-party dissatisfaction with the state of telecoms and Openreach's role in it. Specifically, the Infrastructure group of MPs found in January 2016 that some 5.7 million households did not have Internet connections that met Ofcom's acceptable minimum standards of 10 Mbit/sec. In 2017, after a two-year battle with the regulator, BT settled for the following arrangements:

- Openreach was to be established as a legally separate company from BT under the ultimate ownership of BT's holding company.
- BT was to transfer 32,000 staff into a legally separate company, Openreach, which will be run by an independent board for setting its strategy and operations.
- BT would continue to own all of Openreach's network. The stated reason for this was that BT needed to own the network to undergird its responsibility for paying some 9.2 billion pounds of pension debt.
- BT said Openreach's board would set medium-term and annual operating plans and determine which technologies were deployed. BT would also define the strategic and financial framework.
- BT would also continue to hold a veto over the appointment by the board of Openreach of its chief executive officer, on the condition that BT notify Ofcom of its intention.

Safeguards were to be put in place to ensure that Openreach treats all customers equally, which addressed a series of complaints from BT's rivals that Openreach favoured BT's service arm over their interests. These included changing employee incentives that would be affected by

customer satisfaction, codes of practice and training for employees, backed up by a largely independent board of directors of Openreach, legal independence from BT and a strong drive to instill a customer-focused ethos.<sup>11</sup>

The speeds Britons currently receive for fixed line services are largely in line with European peers, but the country ranks 27 out of 28 when it comes to connecting fiber to the home or business.<sup>12</sup>

A review<sup>13</sup> by Ofcom in June 2018 of Openreach found that there was broadly satisfactory progress towards legal separation, though some steps had yet to be taken. On the topics of rebranding Openreach and equal treatment of customers, Ofcom was highly satisfied. Full legal separation had not then been achieved, owing to complexities with BT's pension scheme. Ofcom was moderately satisfied with Openreach's plans for investing in an additional one million fiber deployments, scheduled to reach 3 million locations by the end of 2020.

Ofcom was less satisfied with the degree of Openreach's actual independence from BT and would monitor that situation closely.

Ofcom's opinion of Outreach's obligation to the equal treatment of customers is of importance to Canada. From its report:

3.22 The Commitments require Openreach to treat all customers equally. This means Openreach must act in a way that ensures all customers receive fair and equal treatment that has regard to their individual circumstances and does not unduly favour any one customer over another. However, equal treatment does not mean that all customers must always be treated identically. Openreach customers will have different requirements dependent on their characteristics, and these should always be taken into account.

3.23 Openreach has acknowledged the need to put the treatment of their customers at the front and centre of their strategy. Openreach Chairman Mike McTighe has highlighted that Openreach's ultimate aim is to provide access services to all its customers in a fair, reasonable and transparent way.

3.24 The Commitments require Openreach to consult with its customers on significant investments relating to the future development of its networks and products. In May 2017 Openreach published proposals on the new consultation processes for all future industry changes, whether instigated by Openreach or CPs. This included details about how Openreach consults with industry, details on a new confidential engagement phase, and changes to the Statement of Requirement ("SOR") process. Openreach then followed this

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<sup>11</sup> Ofcom, "Progress on delivering a more independent Openreach", 14 June 2018,

[https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0019/114814/openreach-implementation-report-2018.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0019/114814/openreach-implementation-report-2018.pdf)

<sup>12</sup> BT Resolves two-year old broadband battle with Openreach deal" Kate Holton, Paul Sandle, March 2017, <https://www.reuters.com/article/us-bt-ofcom/bt-resolves-two-year-regulatory-battle-with-new-openreach-deal-idUSKBN16H0QK>

<sup>13</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0019/114814/openreach-implementation-report-2018.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0019/114814/openreach-implementation-report-2018.pdf)

up with a number of industry workshops with CPs to discuss these proposals. We observed one of these workshops and found that Openreach had taken on board stakeholder suggestions. Openreach has also conducted several product consultations since March 2017. We are also aware that Openreach is already engaging with CPs using the confidential phase of the consultation process.

3.25 We consider Openreach has taken positive steps to improve communication with CPs, and most stakeholders broadly welcomed the increased level of engagement from Openreach and the product consultations conducted since March 2017.

## **Conclusions and Observations**

The most impressive thing about these measures is that the British did them at all. The regulators and the public observed the problem of the treatment of rival telecom carriers, saw the futility of facilities-based competition, saw the inadequacy of regulatory oversight of interconnection by business rivals to the incumbent, and resolved to follow a different course.

Would Canada have greater difficulty following a similar course, because telecommunications services are offered by four or five major companies: Bell, Telus, Rogers, Shaw, and Videotron? There is no reason to presume that the kind of structural separation used in Britain (outside of Northern Ireland) could not also be applied domestically to more rather than fewer companies. The precedent exists in the world's fifth largest economy.

However, as with the case of the National Broadband Network in Australia, some sort of political or social consensus is desirable before an equivalent program of structural and legal separation could be implemented in Canada. It would be resisted strongly by incumbents. Equally certain is that structural and legal separation of networks is not a radical or untried remedy to stimulate competition in telecommunications.

## **Korea**

Korea<sup>14</sup> is instructive insofar as deliberate planning and appropriate regulatory measures can be shown rapidly to increase the uptake of broadband services. Korea ranks tenth in the world in the number of mobile broadband subscriptions per 100 population.

South Korea is about the size of the province of New Brunswick and home to about 45 million people.

The most relevant and comprehensive information about South Korea comes from a 2009 report called "Broadband Policy development in the Republic of Korea, A Report for the Global

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<sup>14</sup> The Republic of Korea or more commonly South Korea is meant in all cases where the term Korea is used.

Information and Communications Technologies Department of the world Bank, October 2009”<sup>15</sup>, hereafter referred to as the Report.

The Report was prepared by a British consultancy, Ovum, on the basis of interviews with Korean officials and businesspeople and reflects what they believe to have been the key factors of Korea’s transformation. The lessons drawn from the Korean experience are still timely, and the regulatory and policy decisions the Koreans have made remain relevant for any consideration of telecommunications policy oriented towards economic and social development.

Fixed broadband penetration by household went from nearly nothing in 1999 to 95 per cent by 2009; mobile broadband reached 97 per cent of a subscriber base of 47 million people as of June 2009.<sup>16</sup>

Many factors contributed to the rapid growth of the Korean broadband markets. The regulatory and other governmental decisions will be emphasized in this section.

Korea has been able to pursue its goals in ICT for several reasons, according to the Report. They include:

- Political centralization
- Close cooperation of government and business
- Deliberate government planning, through expenditures and through regulation, ensuing from ....
- A debt crisis in the mid-1990s, which led to a decision of the Korean authorities that the country had to switch to a knowledge-based economy.

## **Overall**

The Korean approach has been characterized by government planning, setting large goals, and consecutively amending those plans as goals have been achieved, all while holding officials responsible for implementation. These have been called “informatization master plans” which run over a number of years. The government has laid out the objectives and their supporting policies, including:

- Plans for investment in broadband infrastructure and incentives for private investment;
- Initiatives to aggregate and expand demand;
- Policies to promote universal access; and
- Supporting industrial policies.

## **Regulation**

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<sup>15</sup> Source: [http://www.infodev.org/infodev-files/resource/InfodevDocuments\\_934.pdf](http://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf)

<sup>16</sup> This is a believed truth of competition policy. <https://arielkatz.org/federal-court-appeal-reminds-competition-acts-concern-protecting-competition-competitors/>  
For a general overview, covering US, Canadian and European approaches, see [https://www.mcgill.ca/iasl/files/iasl/aspl614-competition\\_and\\_antitrust-laws.pdf](https://www.mcgill.ca/iasl/files/iasl/aspl614-competition_and_antitrust-laws.pdf)

Korea consolidated various sections of government that had been in different departments and placed them in one organization. More significant, the regulatory regime underwent three phases in one decade.

The first regulatory phase saw light regulation of the incumbent, Korea Telecom. This was seen as a means of promoting competition in the introductory stages of broadband. When this led to bankruptcies of some of the competitors, price regulation was re-imposed in the period 2005 - 2007, the second phase. As the market has matured, a return to lighter regulation has been practiced in some areas, but it has not returned to the laissez-faire system of the early 2000s.

Broadband services were originally categorized as “value-added services” – a less regulated category - in order to stimulate their introduction. As Korea Telecom’s dominance grew in the mid-1990s, price regulation was introduced.

The government maintains performance monitoring schemes, announcements of connection speeds, and the introduction of service level agreements.

It is to be noted that the Korean government took active measures to sustain competitors when the dominance of Korea Telecom, the former monopolist, was growing<sup>17</sup>. Many orthodox economists hold that it is the goal to save competition, not competitors<sup>18</sup>, but the Koreans and others have not hesitated to interfere in the market in order to get where they wanted society to go.

The results show<sup>19</sup> declining market concentration, declining entry level prices for broadband, and sharply lower monthly prices per megabyte per second in the period 2000-2009.

Ovum concludes that a combination of low-priced business models and too light regulation in the early phase before 2005 led to some business failures, and that as a result industry consolidation and tighter regulation came in.<sup>20</sup> An entity attracts regulation according to whether it is judged, on an annual basis, to have significant market power (SMP), and to date only Korea Telecom and the mobile operator originally hived out of Korea Telecom have been found to possess it.

## **Private investment**

The picture so far presented is incomplete in two respects. First, because it has not yet mentioned the role of private investment in realizing Korea’s plans, and second, because though it portrays

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<sup>17</sup> “Broadband policy development in the Republic of Korea: a Report for the Global Information and Communications Technologies Department of the World Bank, October 2009” Ovum Consulting, at pages 6, 11 and 100 see [http://www.infodev.org/infodev-files/resource/InfodevDocuments\\_934.pdf](http://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf)

<sup>18</sup> This is an assumed truth of competition policy, or anti-trust policy as it is called in the United States. A typical ruling would be found at <http://www2.ca3.uscourts.gov/opinarch/171871p.pdf> Philadelphia Taxi association et al. versus Uber Technologies Inc. Third Circuit Court of Appeal, November 14, 2017, “Allegations of purportedly anticompetitive conduct are meritless if those acts would cause no deleterious effect on competition.” at page 12 of the judgment.

<sup>19</sup> The Report, at page 15 and 16

<sup>20</sup> Ibid., see pages 6, 11, and 100

Korea engaging in government planning, new legislation and reorganization, it has not yet mentioned the degree to which the 1997 International Monetary Fund (IMF) economic crisis forced a broader response in Korean government and society<sup>21</sup>.

With regard to fixed networks,<sup>22</sup> Korea modernized its telecom networks within a significantly compressed time period in comparison with other countries. Most of the investment necessary for this modernization came from private sources, despite the fact that the government in several cases set prices so as to be conducive to mass take up by a society that at the time had limited disposable income.

Conditions for private investors have generated complaints. Players within industry and government have complained of the difficulty of making money when the Korean government has encouraged intense competition between broadband access providers. Bearing the burden of making investments, while still making money, and still conforming to government timescales for infrastructure targets, has not been easy.

As regards mobile networks, the same tight relations between government and private players have been observed.

### **Government policy generally**

New legislation has been enacted frequently, as particular cases have required. Planning – “informatization master plans” – has been explicit, and has included:

- Plans for public investment in broadband architecture and incentives for private investment.
- Initiatives to augment and aggregate demand, as in the delivery of government services electronically.
- Policies to promote universal access to broadband.
- Industrial policies such R&D promotion, and incentives to promote venture capital.

Funding has been organized by creating an investment fund, whose sources of income are spectrum fees and levies on the revenues of carriers. “The informatization promotion fund” as it is called, is aimed at making sure that profits from the ICT industry remain within the industry. It appears to be used for the more difficult projects involving cross department coordination, long-term projects, and projects that require the validation of new technology. The fund generated US\$7.8 billion between 1993 and 2002.

A Framework Act on Informatization Promotion governs the creation, execution and evaluation of the achieved performance in the respective plans of each responsible agency. It requires annual review and the creation of a plan for the next year of goals to be achieved. All this overseen by the KCC, the Korean Communications Commission. The KCC issues an

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<sup>21</sup> See <https://www.imf.org/external/np/seminars/eng/2006/cpem/pdf/kihwan.pdf>

<sup>22</sup> The Report, at page 72

Implementation Guideline every year that explains where overall IT policies are going, how projects will be evaluated, and any special requirements for the year<sup>23</sup>.

### **Observations and lessons**

Korea stands 10th in the world for mobile broadband subscriptions per 100 people, and 5th for fixed broadband subscriptions per 100 people.<sup>24</sup> Canada stands at 30th and 12th respectively.<sup>25</sup>

Three lessons can be learned from Korea:

- Planning and purpose are vital
- A crisis can focus attention wonderfully
- To have competition you must have competitors
- Making services equally available is the most difficult task

If planning and purpose were the sole reasons for getting to high penetration of broadband, Korea would probably lead the world. That a few other societies show higher penetration rates complicates this simple picture. Obviously, many factors are involved in whether government planning will be found acceptable, heeded, or successful in any given society. All of these factors seemed to have been present in Korean society.

The second major factor in Korea's rise to world prominence in telecommunications has been the reaction to the shock inflicted by the IMF debt crisis of 1997, and the turn that Korean society seems to have made towards more software-driven businesses as a matter of preference, and away from reliance on metal-bending industries. Hence the networks that favoured this direction had to be quickly developed.

The third observation concerns the balance between a facilities-based policy that sought a lot of investment, and the flexibility of the means chosen to regulate competition. When two major start-up broadband competitors went under in 2005, the government reacted quickly to impose price regulation on the industry, and since only those companies with significant market power are regulated, and only Korea Telecom and its mobile offshoot are deemed to have SMP, price regulation fell on the major fixed incumbent. In that case the regulator acted to save competitors in order to save competition, which is a heresy in some quarters.

Finally, it appears that of all the goals, the most difficult to achieve has been making services uniformly available across all the mountainous surface of a country no larger than the province of New Brunswick. Promotion and regulation were thought to have worked well. But getting broadband services distributed equally or used universally at the same level of consumption by all classes or regions have not worked as well.

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<sup>23</sup> The role is analogous to Canada's Treasury Board, but the reviewing agency is specialized and somewhat akin to the CRTC

<sup>24</sup> See Appendix A for the actual data. The source is the OECD Broadband Portal. The results are for 2017

<sup>25</sup> Ibid.

## The European Situation

The European Union (EU) comprises 28 Member States. It acts through a European Commission (EC), a Council of Ministers, and a European Parliament. In order to produce coherence and some measure of conformity, the European Commission must engage the national authorities of Member States, with limited powers of requiring conformity.

In general, what you plan for is what you get. The state of competition five or ten years in the future results from decisions and actions taken now.

### The present

In dealing with Europe, we face somewhat the same issue. Europeans experience dense mobile networks, high rates of mobile and fixed broadband penetration, and cheaper rates for data than Canadians do. Nevertheless European authorities are planning extensively for a future that involves 5G technologies: extremely high frequencies, much smaller cell sizes, and, as they see it, a much greater need for pan-European coordination of efforts. It is my contention that what is to be learned at the EC level concerns more the planning for 5G than competition policy

Competition policy is used to rule on mergers in the telecommunications sector which is governed by the EC Competition Commission. The Europeans have high rates of mobile and fixed broadband penetration in their markets.<sup>26</sup> They strive with European and national subsidies to extend services to remoter regions. They examine merger proposals with a view to sustaining competition in their markets. European competition policy remains ambiguous about the use of MVNOs (mobile virtual network operators) to stimulate competition in mobile markets and the EC adopts a case by case approach to determining mergers in national mobile markets. There appears to be no fixed formula whereby some mergers that reduce the number of competitors from four to three in a given market are approved, and other 4-to-3 mergers are disallowed.<sup>27</sup> In several cases the European competition authority has used the existence of an MVNO as a way of permitting a 4-to-3 merger. Some such attempts have been successful (Austria) and some not (Ireland).<sup>28</sup>

However the MVNO lobby group claims in a presentation to BEREC that MVNOs operate plus or minus 10% of all the SIM cards used in European mobile phones.<sup>29</sup> Other information claims that MVNOs hold 15-20% of the European mobile market in some places. Two thirds of the European MVNOs are found in five countries: Germany, the UK, France, Netherlands and

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<sup>26</sup> See Appendix A, Comparative national data on broadband penetration

<http://link.springer.com/article/10.1007/s40319-018-0677-3//www.oecd.org/sti/broadband/broadband-statistics/>

<sup>27</sup> Four-to-Three Telecoms Mergers: Substantial Issues in EU Merger Control in the Mobile Telecommunications Sector, Kalpana Tyali, <https://link.springer.com/article/10.1007/s40319-018-0677-3>

<sup>28</sup> MVNO Europe submission to BEREC, 5 July 2017, [file:///C:/Users/avata/Downloads/7355-contribution-by-mvno-europe-to-the-berec\\_0.pdf](file:///C:/Users/avata/Downloads/7355-contribution-by-mvno-europe-to-the-berec_0.pdf)

<sup>29</sup> Ibid

Spain.<sup>30</sup> Clearly telecom policy in several European national jurisdictions differs from Canada's insofar as MVNOs are permitted in some countries.

### **Planning for the advent of 5G**

The focus in this section is on planning for 5G deployments. Europe has problems similar in some respects to Canada's and in some cases many more difficulties: multiple jurisdictions, the requirement to achieve common outcomes in spectrum assignments, and a need to push along a common vision if any large project is to be achieved. While the position of the European Commission is not exactly analogous to that of the Canadian federal government, there are enough similarities for the discussion of planning for 5G deployments to be relevant for how competition in service delivery will take place in the future.

The main point of the European considerations of 5G is that it is expected to be a disruptive technology and a key infrastructure for Europe and a core asset to support future competitiveness.

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The European Commission thinks that the next generation of mobile wireless communication, will allow European entrepreneurship to create large, European-based businesses that could potentially rival globally dominant US-based companies such as Google and Facebook.<sup>31</sup>

Their goals are ambitious. They seek to provide speeds at a minimum of 30 Mbps. More specifically:

1. Gigabit connectivity is to be available for all main socioeconomic drivers such as schools, transport hubs and the main providers of public services, as well as digitally intensive enterprises, in all major urban areas and along transportation corridors by 2025.
2. 5G coverage for all urban areas and major terrestrial transport paths by 2025.
3. Internet connectivity with a downlink of at least 100Mbps, upgradable for all European households, by 2025.<sup>32</sup>

Broadband competition in 5G requires that countries prepare for the effects of the shorter range of Gigahertz frequencies, which lead to much more frequent emplacements of passive facilities, than is the case in 4G technologies currently used.

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<sup>30</sup> "What defines the European MVNO Market?" <http://telecoms.com/opinion/what-defines-the-european-mvno-market/>

<sup>31</sup> The study takes no position on this idea: venture capital is required for innovation and Europe is less well developed than the United States in this regard.

<sup>32</sup> <https://ec.europa.eu/digital-single-market/en/policies/improving-connectivity-and-access>

Since 2014, measures have been undertaken to simplify and make regular access to passive physical infrastructure<sup>33</sup> for those authorized to carry electronic communications. This measure responds to the requirements for physical access that are generated when cell sizes shrink, which is caused by the higher frequencies associated with 5G technologies.<sup>34</sup>

The EC set aside €700 million for 5G-Public-Private-Partnership with the aim of making sure 5G is available in Europe by 2020.<sup>35</sup>

The EC has been planning for uniform or compatible spectrum assignments within Member States, and generally making sure that legal rules are consistent with the deployment of 5G applications.<sup>36</sup>

The EC is proposing a comprehensive European Electronic Communications Code<sup>37</sup> aimed, in part, to establish a compatible set of rules for electronic communications. To this end, the Board of European Regulators of Electronic Communications (BEREC), as a coordinating - possibly dominant - regulator across the multiple European jurisdictions was established.

## Deploying High Speed Electronic Communications Networks

The European Commission began their preparations for 5G in May 2014 when they adopted the [\*Directive 2014/61 EU “on measures to reduce the cost of deploying high-speed electronic communications networks”\*](#).<sup>38</sup> While there have been delays, the policy is being gradually implemented across all 28 EU Member States.

Significantly, the obligation to allow access to *passive* physical infrastructure does not apply merely to telecommunications carriers, who in Europe are referred to as those authorized to offer “electronic communications services”. The obligation extends to every kind of public installation: roads, ports, railways, airports, to physical infrastructure for gas, electricity, public lighting, heating, water and sewerage, and all forms of transport services.

Second, “network operators have the right to offer to undertakings providing electronic communications access to their physical infrastructure with a view to deploying elements of high-speed electronic communications networks”. Reciprocally electronic communications

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<sup>33</sup> Passive physical infrastructure refers to lampposts, railings, towers, walls, emplacements and so forth that are not electronically active.

<sup>34</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014L0061>

<sup>35</sup> <https://ec.europa.eu/digital-single-market/en/news/communication-5g-europe-action-plan-and-accompanying-staff-working-document>

<sup>36</sup> European Electronic Communications Code, <https://ec.europa.eu/digital-single-market/en/connectivity-european-gigabit-society>, and [https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM\\_2016\\_0590\\_FIN](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM_2016_0590_FIN)

<sup>37</sup> [https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM\\_2016\\_0590\\_FIN](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM_2016_0590_FIN)

<sup>38</sup> <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32014L0061>

providers may have the right to offer access to infrastructure for the purpose of deploying networks other than electronic communications networks<sup>39</sup>.

Third, and more relevant than the right to offer access, is the obligation on network operators to provide access to an “undertaking providing or authorized to provide public communications networks” on reasonable terms, including price.<sup>40</sup>

Fourth, every network operator has the right to negotiate agreements concerning coordination of civil works with those authorized to operate electronic communications networks<sup>41</sup> and every network operator performing civil works, whether fully or partly financed by public means, is obliged to meet every reasonable request to coordinate civil works with operators of electronic communications networks with a view to deploying elements of high-speed electronic communications networks.<sup>42</sup>

Fifth, consequential measures for information points, permits, dispute settlements, standards setting, and delays have been established.

The scheme established in Directive 2014/61/EU, known as the “cost reduction measures” directive, was illustrated in the report of 27 June 2018 on the same subject.<sup>43</sup>

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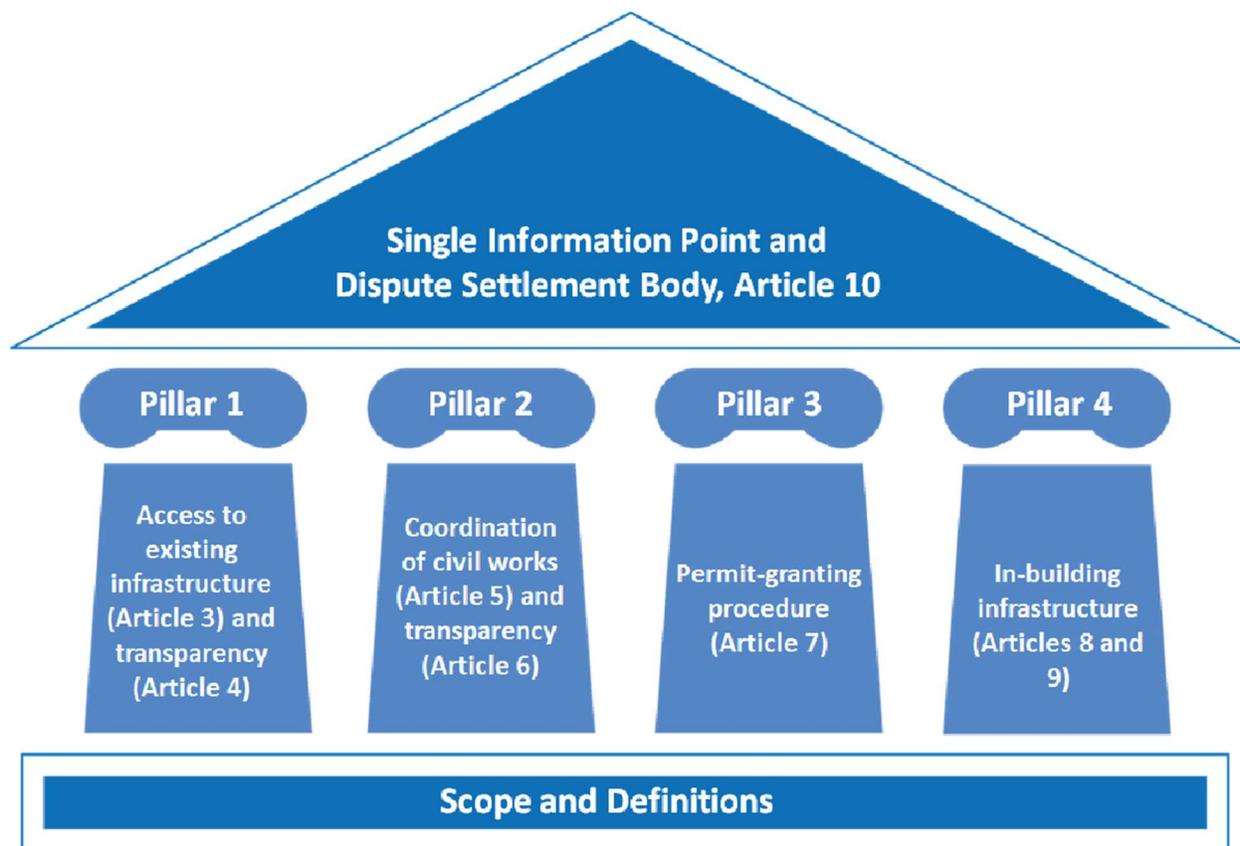
<sup>39</sup> Directive 2014/61 Article 3.1

<sup>40</sup> Same, Article 3.2

<sup>41</sup> Article 5.1

<sup>42</sup> Article 5.2

<sup>43</sup> Report from the Commission to the European Parliament and the Council on the implementation of Directive 2014/61/EU on measures to reduce the cost of deploying high-speed electronic communications networks, at <https://ec.europa.eu/digital-single-market/en/news/report-implementation-broadband-cost-reduction-directive>



How is it working? The EC reported on 27 June 2018 that:

Survey responses show that electronic communications operators believe that there have been improvements in access to physical infrastructure (including in-building infrastructure) and information provision since the Directive was applied. However, there is still room for improvement, with operators indicating that limited progress has been made in supporting the coordination of civil works, easing the process of applying for civil works permits, or facilitating access to buildings for the installation of in-building infrastructure.

The Commission made recommendations for improving the process in the report itself at page 13-14<sup>44</sup>.

### **Towards a European Gigabit Society 14/9/2016**

The next significant document issued by the EC is “Connectivity for a Competitive Digital single Market – Towards a European Gigabit Society”<sup>45</sup> The document links to two pdfs, a general policy document of the same name and an accompanying staff document.

<sup>44</sup> <https://ec.europa.eu/digital-single-market/en/news/report-implementation-broadband-cost-reduction-directive>

<sup>45</sup> <https://ec.europa.eu/digital-single-market/en/news/communication-connectivity-competitive-digital-single-market-towards-european-gigabit-society>

The policy document establishes ambitious goals. It envisages that, by 2025, Europe will have:

- Gigabit connectivity for places driving socio-economic developments.
- 5G coverage for all urban areas and all major terrestrial transport paths.
- Access for all European households to Internet connectivity offering at least 100 Mbps.

It foresees a world of billions of interconnected objects, most of them by wireless, and foresees the need for significant deployments of optical fiber backhaul to sustain the wireless connectivity. It expresses dissatisfaction with the current state of European broadband connectivity. It seeks stable and consistent conditions for investors, with the promise that “regulatory intervention will weigh no more heavily than necessary on operators’ investment decisions, while ensuring competitive outcomes.”<sup>46</sup> It does not exclude “other wholesale remedies”, nor does it explicitly state they shall be imposed. The document also envisages co-investment by rival operators where infrastructure-based competition may not be realistic:

“Business models based on selling wholesale network access to retail operators can reduce competition risks, attract “patient” capital which supports longer term investment... This new but relatively growing business model deserves a clearer and simpler regulatory treatment in cases where such operators are found to have significant market power”

The policy document exhorts Member States to efficiently coordinate their public grants to achieve the EC’s objectives.

The document concludes:

Internet access is today as important as electricity was for the second industrial revolution, for the economy and for society. Very high-capacity Internet connectivity is essential to unleash the next wave of competitiveness and innovation and to allow Europe's businesses and citizens to harvest the full benefits of the Digital Single Market. This Communication and the accompanying measures are intended to provide Europe with the tools needed to bring this about.<sup>47</sup>

## **5G for Europe: An Action Plan 14/9/2016**

Two years after the cost reduction directive, the Commission issued its *5G for Europe, an Action Plan* on 9 September 2016<sup>48</sup>, basically a press release, with two detailed accompanying documents of the same date: a Commission staff working document called *5G Global Developments* and *5G for Europe, an Action Plan*.

The *Action Plan* also emphasized the paramount importance of standards in ensuring the competitiveness and interoperability of networks. It spoke of the need “to foster the emergence

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<sup>46</sup> At page 9 of the policy document cited above

<sup>47</sup> At page 15

<sup>48</sup> <https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

of global industry standards under EU leadership for key 5G technologies (radio access network, core network) and network architectures. It also recognises the particular challenges raised by the need to bring together communities of stakeholders with very different standardisation cultures in order to enable the innovative use cases of key industries” and actions that were being taken to achieve this goal.

The *5G Global Developments* paper<sup>49</sup> accompanied the *5G Action Plan*, and covered 5G developments. It saw that 5G would be driven by or drive:

- Six times higher traffic volumes per device in North America and Europe after 2020.
- The advent of machine-to-machine communications.
- Very low latency applications for remote surgery, manufacturing process or detection of faults in energy grids, for example.
- Fiber-like radio access with data rates above 10 Gbps.
- Network function virtualization, where network functions are realized by software running on generic hardware, with attendant possibilities for radical innovation.
- Software defined networking, which allows the control of network resources to opened to third parties. “This possibility goes much beyond the management capabilities offered to today’s MVNOs”.<sup>50</sup>

### **The new Electronic Communications Code, draft of 2018**

The EU has also proposed and agreed on a draft Electronic Communications Code<sup>51</sup> to replace an earlier set of rules. It has not yet been finally approved and is under active discussion. The draft directive proposes measures that:

“aim at incentivising investment in high-speed broadband networks, bring a more consistent single market approach to spectrum policy and management, deliver conditions for a true single market by tackling regulatory fragmentation, ensure effective protection of consumers, a level playing field for all market players and consistent application of the rules, as well as provide a more effective regulatory institutional framework.”

The Code is not intended to cover such issues as content, or broadcasting.

It is a fair if rough generalization to say that the Code is intended to produce greater consistency in regulatory decisions and regulatory regimes across the 28 Member States of the EU. It solidifies the position of BEREC, the Board of European Regulators of Electronic Communications, atop the system of national regulators.

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<sup>49</sup> The paper is hyperlinked off

<https://ec.europa.eu/digital-single-market/en/news/communication-5g-europe-action-plan-and-accompanying-staff-working-document>

<sup>50</sup> At page 5 of the document cited above

<sup>51</sup> [https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM\\_2016\\_0590\\_FIN](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=comnat:COM_2016_0590_FIN)

It aims at creating a single market in spectrum policy and management. It seeks to tackle the existence of regulatory fragmentation (28 national authorities) to allow for economies of scale. It also seeks to incentivize investments in high-speed networks, and to engender a more effective regulatory framework. This last phrase is Euro-code for strengthening the role of BEREC. The goals are to reinforce the regime that regulates when significant market power (SMP) is present, and to promote infrastructure-based competition.

Though a deeper consideration of the Code's actual provisions might be useful, especially to the Canadian Broadcasting and Telecommunications Legislative Review<sup>52</sup>, the purpose in citing it is to show that once again that Europe is planning for the future of electronic communications in a coherent, far-sighted and systematic way.

### **Issues with European Union Policy<sup>53</sup>**

This paper has had to rely on the European Union's own documents, which are aspirational and exhortatory in nature. They may distort or exaggerate the extent to which the EU's Member States have prepared for the advent 5G which, in essence, means a much more intense use of high frequency, short range wavelengths and much more ubiquitous emplacement of base stations, antennas, and backhauls.

The following are a few of the issues to be concerned about, for which answers are not yet available:

- *Competition:* There is a risk that spectrum assignments for 5G may reduce the possibilities for competition. The direct management of 5G pioneer bands will be entrusted to few players. The extent to which provisions for unlicensed and shared spectrum may alleviate these concerns, nor is it yet clear what role software-defined usage may enhance competitive possibilities.

It is expected that spectrum pioneer bands will be awarded exclusively to a small number of operators per country to operate the 5G networks. The spectrum will be virtually sliced through software-defined networking for the use of different industry verticals (auto, health etc.)

The EC admitted<sup>54</sup> that the planned deployment model will be a challenge to the European operators, who will have to forge new partnerships and deliver new types of services. The deployment of edge computing devices is essential to the capabilities of 5G. Integrating edge computing capabilities with radio access networks is a new area of

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<sup>52</sup> <https://www.ic.gc.ca/eic/site/110.nsf/eng/home>

<sup>53</sup> Courtesy of papers and discussions with Maarit Paalovirta, of the Internet Society, Brussels. Her information was derived from a conference on 5G in Brussels in February 2018

[https://eu-ems.com/summary.asp?event\\_id=4348&page\\_id=9347](https://eu-ems.com/summary.asp?event_id=4348&page_id=9347)

<sup>54</sup> The European 5G Conference 2018, February, Brussels, at [https://eu-ems.com/summary.asp?event\\_id=4348&page\\_id=9347](https://eu-ems.com/summary.asp?event_id=4348&page_id=9347)

cooperation and service development between carriers and the suppliers of edge computing capabilities.<sup>55</sup>

Optical fiber will continue to be vital to backhauled to save spectrum for mobile uses.

- *Net neutrality*: The same software-defined network slicing allows capacity to be assigned to prioritized sectors, and not others.
- *Scale of investment*: The EU's gigabit society vision will require massive investment, possibly of the order of 660 billion Euros. The European Electronic Communications Code, which has been agreed upon in 2018, may help to make uniform the respective national approaches to telecoms. Issues of liability are being worked on by the European Commission.
- *Assignment of spectrum, and terms of use*: A term of 25 years has been proposed for 5G spectrum. Whether this is long enough has been disputed. Schemes for shared access to spectrum by various players are under active consideration.
- *Coverage*: As the immediate focus of 5G will be densely populated areas, the usual problems of covering less densely populated areas will remain.

## Conclusion on the EU

Consideration of European policy has been divided into two: how the Europeans handle competition, where the predominant issue concerns 4-to-3 mergers in mobile services. The second aspect is how they are planning for what competition will look like in the future, which revolves around the characteristics of 5G technologies. A complete assessment of the prospects for 5G is beyond the scope of this paper. Nonetheless, it has obvious characteristics given to it by spectrum in the Gigahertz range, and the equipment density that ensues from smaller cell sizes. It is equally clear that many civil engineering problems can be made soluble or insoluble according to the planning which precedes 5G, and in this activity governments have a natural advantage, aptitude and responsibility.

## Conclusions for Canada

The inferences that Canada could draw from foreign experiences of regulating broadband depend on the direction or directions that Canada chooses. The lessons are not mutually exclusive. Canada is not confined to only one course of action.

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<sup>55</sup> ETSI White Paper #28, MEC in 5G Networks, at [https://www.etsi.org/images/files/ETSIWhitePapers/etsi\\_wp28\\_mec\\_in\\_5G\\_FINAL.pdf](https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp28_mec_in_5G_FINAL.pdf)

The first and most generally applicable lesson is that foreign societies have engaged in planning and regulation to achieve more competition. Where state privileges have been handed out to some players and not to others, in the form of spectrum rights, rights of way, or monopolies, achieving and maintaining competition is a conscious act of policy. The struggle to contain the market power of some incumbents requires constant vigilance.

The lessons that could be drawn from the experiences of the United Kingdom, Australia and New Zealand<sup>56</sup> concern access to the backbone network for resellers of underlying capacity.

A second set of lessons could be drawn from countries like Korea or Japan or treaty organizations like the EU, as regards planning. Roughly speaking, you get the competition that you had planned for a decade earlier. Actions taken in the 1990s and early 2000s bore fruit by the late 2000s and in the decade after 2010.

A third set of lessons concern policy towards MVNOs.

### **Access to backbone networks**

I think that there are two major lessons to be drawn here.

The first lesson is that any attempt to build out a national backbone network will take much more time than anticipated. Consequently, it will be necessary that a consensus be developed in the particular society that extends past the lifespan of particular governments. Fifteen-year long projects will normally last longer than the duration of any given party in power. If there is not consensus around projects of this size and duration, there will be trouble, which the Australian experience attests to.

The second lesson is this. If you do not get it right the first time, try again. In the United Kingdom, access to underlying facilities for rivals of British Telecom was taken seriously, to the extent that BT had to hive off a part of the organization and dedicate it to serving rivals of the former monopoly carrier. Dissatisfaction with the first attempt led to a second and more far-reaching set of rules for Openreach.

### **Planning for competition**

The lessons to be drawn from Korea are that, in general, the transition to a broadband society involves private sector investment and a measure of government planning to get to an adequate state of competition and investment.

What is planned for now becomes the state of competition a decade later. The high states of broadband access in those countries arose from deliberate measures and foresight. Spectrum has to be allocated and rules have to be worked to ensure that competitors are able to survive. When Korea's third and fourth largest carriers went bankrupt in the mid 1990s, the Korean government reacted by re-imposing price regulation on Korea Telecom, the dominant carrier. They did what

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<sup>56</sup> Time and space did not allow a deeper look at New Zealand, which also has implemented a national broadband backbone. See for example [https://en.wikipedia.org/wiki/Internet\\_in\\_New\\_Zealand](https://en.wikipedia.org/wiki/Internet_in_New_Zealand)

competition policy says should not be done, which is to protect competition not competitors. In the Korean experiment, the government changed tack and protected the second largest competitor, reasoning that there would be no possibility of competition without at least one significant competitor to Korea Telecom.

## **MVNOs**

European policy has never failed to preach the desirability of investment and the benefits of facilities-based competition. At the same time, virtual mobile operators have not been excluded from the market, and rules have been established to let them have access to underlying facilities-based carriers. MVNOs hold plus or minus ten percent of European SIM cards and operate in the top 6 economies.

## **5G**

The point about covering preparation for 5G is the same as the point made about Korean and Japanese planning: you get the competition that you plan for.

Competition in telecoms does not spring from the ground like grass in spring. It involves highly deliberate arrangements: of spectrum, of investment incentives, of the ability to place devices on facilities, and a host of factors.

The shorter range of the spectrum to be used in 5G deployments necessitates a form of planning that will be multi-stakeholder if it is to be effective. Though the federal government is supposed to be supreme in these matters by reason of the Radiocommunication Act and the Telecommunications Act, the authority of the federal government to govern all communications towers, poles and emplacements, and attachments to them, is not as clear as might be needed for the purposes of 5G.

The European experience with planning for 5G is relevant for Canada in several respects. The European Commission acted in advance to clear the way with policies, model laws, and a degree of consensus-formation among the communications ministers of the European Member States. It created the law which facilitated the emplacement of passive network elements, it has made arrangements for the spectrum to be used across many jurisdictions, it has revised its model telecommunications law, and tackled regulatory fragmentation. Most important, the EC brought high-level, focused attention to the subject.