

Alternative Approaches to Broadband Policy

Lessons on Deregulation from Denmark

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Abstract

The diversity of regulatory structure between countries provides opportunities to compare government's role and performance in different settings. This study presents such an analysis, looking at telecommunications regulation in Denmark and the United States. We show that Denmark is a leader in telecom services both in Europe and around globe; however, whereas the United States has the Federal Communications Commission (FCC), Denmark lacks such a centralized, proscriptive, omnipresent regulator. We find several specific ways in which US policymakers could benefit by learning from Denmark and we recommend moving toward a more politically cooperative, market-led, and technology-neutral framework.

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Alternative Approaches to Broadband Policy:

Lessons on Deregulation from Denmark

Roslyn Layton and Joseph Kane

Pro-regulatory telecommunications advocates have recognized Denmark for its broadband competition, speed, and price.¹ The country is rated as one of the top digital nations by the International Telecommunication Union's *Measuring the Information Society Report*, which has measured countries' access to, use of, and skills in information communications technologies (ICT) since 2007.² In 2014, Denmark placed first, unseating South Korea. Given Senator Bernie Sanders's presidential campaign assertion that the United States should be like Denmark in its public provision of health and education,³ some may infer that Denmark's broadband infrastructure is government-subsidized and heavily regulated. But while the Danish government has a significant level of involvement in the health and education sectors, it has a relatively laissez-faire approach in most other markets, including telecommunications. For example, the Danish center-left government dismantled the telecom regulator in 2011 and accepted the telecom industry's proposal for self-regulation on net neutrality in lieu of heavy

¹ Nick Russo et al., "The Cost of Connectivity 2014: Data and Analysis on broadband offerings in 24 cities across the world," *New America* (Open Technology Institute), October 30, 2014; Bincy Ninan-Moses and Chiehyu Li, "An International Comparison of Cell Phone Plans and Prices," *New America* (Open Technology Institute), October 14, 2010. Note that most broadband price comparisons do not include the cost of compulsory media license fees. The 2017 fee in Denmark is about \$177 and is assessed on every Internet access subscription. It covers the cost of content from the public broadcaster Danish Radio. See "Media License: License in English," *DR*, accessed January 12, 2017, <http://www.dr.dk/om-dr/licens/licens-english>. For further discussion see Roslyn Layton and Michael Horney, "Innovation, Investment, and Competition in Broadband and the Impact of America's Digital Economy" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, August 2014), 10.

² International Telecommunication Union, *Measuring the Information Society Report, 2015* (report presented at the World Telecommunication/ICT Indicators Symposium, Hiroshima, Japan, November 30, 2015). Note that in the 2015 report, South Korea ranks 1 with a score of 8.93 and Denmark ranks 2 with a score of 8.88. Denmark ranked 1 in 2014. In 2015, the United States ranks 15 with a score of 8.19.

³ "Sen. Bernie Sanders Says US Should Look More Like Scandinavia," YouTube video, 7:55, ABC News interview, broadcast May 3, 2015, <https://www.youtube.com/watch?v=cz0u2FH5Bnk>.

regulation.⁴ These actions contrast sharply with assertions by regulatory advocates in the United States who claim that a strong and proscriptive telecom authority needs to regulate the market in order to deliver good policy outcomes.⁵ The success of the Danish model for telecom policy suggests otherwise.

This paper examines two important bodies of literature in telecom regulation and political economy in order to investigate Denmark's accomplishments and contrast Denmark's telecom policy to prevailing regulatory paradigms and conventional wisdom. This article also explores the tenets of classic regulation, paying special attention to the challenge telecom regulators face in moving their industry from monopoly to competition. The deviations from this classic regulatory model are explained with research from the school of public choice. In addition, this paper reviews the work of Morten Falch and Anders Henten at Aalborg University—academics who have studied information communications and technology (ICT) policy for some 40 years. They investigate the interplay of regulatory and developmental approaches to telecom policy⁶ and describe the dismantling of the Danish telecom regulator using primary research they conducted with the actors involved in the process.⁷ The historical background also includes

⁴ As of April 2016, EU law on net neutrality now supersedes the Danish model for self-regulation.

⁵ “The FCC should use the legal authority it possesses to relabel [Internet] services as regulated ones. Our future depends on it.” Susan Crawford, “Why Net Neutrality Matters to You,” *Newsday*, January 15, 2014. Also note the comments of Michael Weinberg: “The development of the Internet and the explosion of broadband innovation was a direct result of strong regulation against discrimination. The Internet we know today exists because broadband networks have been regulated since their inception, and continued regulation will protect everyone’s ability to innovate and communicate online. . . . Only regulation can prevent [the development of slow and fast lanes] from happening.” Michael Weinberg, “The Fast Lane to a Closed Internet,” *U.S. News & World Report*, June 23, 2014. And note the comments of Tom Wheeler: “Now, as Chairman of the FCC, I do not intend to allow innovation to be strangled by the manipulation of the most important network of our time, the Internet. . . . I am proposing that the FCC use its Title II authority to implement and enforce open Internet protections. Using this authority, I am submitting to my colleagues the strongest open Internet protections ever proposed by the FCC.” Tom Wheeler, “Remarks of Tom Wheeler, Chairman, Federal Communications Commission, to the National Cable & Telecommunications Association” (speech, Los Angeles, CA, April 30, 2014).

⁶ Morten Falch and Anders Henten, “European Broadband Policy—Regulation vs. Facilitation” (paper presented at the European Regional ITS Conference, El Escorial, Spain, June 27–28, 2015).

⁷ Morten Falch and Anders Henten, “The Future of Telecom Regulation: The case of Denmark” (paper presented at the European Regional ITS Conference, Brussels, Belgium, June 22–25, 2014).

statistics on the Danish telecom market, providing empirical evidence of the results of the Danish telecom policy.

The paper presents eight cases to highlight the history, decisions, and logic behind Danish telecom policy and shows how *facilitation* and *cooperation* have been employed as an alternative to expanding economic regulation. In fact, when the Danish approach is compared and contrasted with the expansion of regulation by the Federal Communications Commission (FCC) in the United States in recent years, the Danish approach is more representative of traditional intentions of classic regulation, working toward full competition and the subsequent removal of regulation and even of the regulator itself. The FCC has fulfilled its primary mission of liberalizing the telephony market; thus it is arguable that the FCC's work is complete and its staff and resources should be reassigned elsewhere.

But instead, the FCC has not only persisted, it has also expanded its role as a social regulator. This reality represents an important contradiction to the classic notion of telecom regulation. Regulation is supposed to result in full competition, followed by the removal of regulation and subsequent downsizing of the regulator. Yet the FCC is still in existence after 80 years (even longer if one considers the origin of the agency in the Federal Radio Commission), which suggests that either the classic notion of regulation is flawed or the FCC simply does not adhere to that paradigm.

Danish telecom policy is encoded in the 1999 "Teleforlig" (Telecommunications Agreement), a standing agreement across all political parties to pursue a no-subsidy, market-led, technology-neutral approach to telecommunications.⁸ The effect of the settlement is a codification of a commitment to cooperate and seek consensus solutions. Such long-term

⁸ "Telecom Settlement from September 1999," *Erhvervsstyrelsen.dk*, Danish Business Authority, accessed January 12, 2017, <https://erhvervsstyrelsen.dk/file/teleforliget-fra-september-1999pdf>.

planning provides regulatory certainty and supports investment. The goal is to transition telecommunications away from sector-specific regulation to full competition under a general ex post antitrust regime. So far, Denmark has surpassed the United States in achieving this vision.

However, this is not to say that the Danish government has no involvement in the market. Rather than regulate communications prices and technologies, the Danish government *facilitates* the market by being a key buyer of information and communications technologies, digitizing government services, and providing a set of digital assets that individuals and enterprises can use to lower transaction costs. This paper describes other developments to illustrate the Danish approach, including the self-regulatory regime for net neutrality, the framework to fast-track mobile infrastructure, the dismantling of the telecom regulator, and the continued efforts to remove outdated and obsolete telecom regulation, accepting the effective competition that comes from third parties offering substitute services (also called “over the top” or OTT services) for network owners’ proprietary services.

The so-called Nordic model⁹ of free-enterprise policies, combined with a social safety net, is a helpful reference, but it does not fully explain Danish telecom policy. Indeed, Denmark’s telecom policy differs significantly from the policies of its Scandinavian neighbors. Sweden, for example, is known for its government-funded fiber projects and partially state-owned incumbent. In comparison, the Danish government (notably with a Social Democrat majority at the time) completely privatized the national telephone monopoly by selling it to Ameritech, because it did not see a strategic national interest in owning a telecom company and believed the market could produce better results. Moreover, Denmark generally eschews subsidies. To be sure, most nations employ some degree of facilitation and cooperation in

⁹ Gøsta Esping-Anderson, *The Three Worlds of Welfare Capitalism* (Princeton, NJ: Princeton University Press, 1990); Kristoffer Granov, “Velfærdsstaten,” *Faktalink*, November 2013.

telecom policy, but the Danish model is worthy of study for the deliberate choices made by policymakers, their expectations, and the outcomes.

This approach was vindicated in 2014 by the Danish Productivity Commission, a group tasked with making an independent assessment of the government's infrastructure policies.¹⁰ The group, comprised of the nation's top economists and industrial experts, surveyed the country's various infrastructures. Regarding telecommunications, they concluded that the market-led, technology-neutral approach was justified and that under such an approach, government targets for broadband (speed requirements, for example) were inconsistent. Indeed, if consumers are to decide for themselves their preferred speeds and technologies, they should not be second-guessed by regulators. Moreover, companies should not be expected to absorb inefficiencies that come from overbuilding to ensure a government-imposed target.

To be sure, there are Danish actors who favor more government support of telecommunications. The Danish energy industry, for example, lobbies for financial support to supplement their electricity networks with fiber optics.¹¹ However, EU rules restrict public money from being deployed to locations where there is already private investment.¹² In Denmark's history there are only three instances of telecom subsidies, and they are for extremely small amounts targeted to remote areas. Given that at least one municipality has become subject to an EU lawsuit for inappropriately directing subsidies to an area with existing private investment,¹³ it appears that this kind of market intervention will be even less popular in the future.

¹⁰ Infrastructure Analysis Report 5, Danish Productivity Commission, January 2014.

¹¹ Thomas Woldiderich, "Bedre bredbånd kan skabe arbejdspladser i hele Danmark," *Dansk Energi*, September 7, 2015; Martin Jensen, "Sverige: Regering afsætter 2,8 mia. kroner til bredbånd," *Dansk Energi*, March 31, 2014.

¹² European Commission, "EU Guidelines for the Application of State Aid Rules in Relation to the Rapid Deployment of Broadband Networks," *Official Journal of the European Union*, January 26, 2013; Roslyn Layton, "Municipal Broadband: A Wolf in Sheep's Clothing?," *TechPolicyDaily.com* (American Enterprise Institute), November 7, 2013.

¹³ See European Commission, "EU Guidelines for the Application of State Aid Rules." See also "Fibernet-Sag Havner I EU," *Ringkøbing-Skjern Dagbladet*, May 17, 2016.

Importantly, as this paper shows, “good” telecom policy is not the domain of a single political party. Positive outcomes can be driven by cooperation across parties. Additionally, the paper shows that dismantling the telecom regulator helped reduce incentives for regulatory capture. This has had a positive impact on government employees who believe that the move has successfully depoliticized telecom regulation and, ironically, strengthened telecom policy.

Background and Literature Review

The 2016 Index of Economic Freedom ranks Denmark 12th in the world, just behind the United States.¹⁴ Denmark is described as having open-market policies, a transparent and efficient legal environment, and a high degree of regulatory efficiency (indicating the ease with which one can start a business, hire workers, and so on). The index notes a high degree of public spending financed by a variety of direct and indirect taxes. Financial sector practices are called stable and prudent.

Statistics on the Danish Broadband and Telecom Market

To appreciate the bigger picture, it is helpful to have some statistical background information on Denmark’s broadband and telecom markets. This paper includes the most recent government information on the topic. There are a variety of technologies for broadband, and Denmark displays competition among different facilities and technologies. These facilities include both fixed-line (xDSL, cable, fiber, and fixed wireless) and wireless technologies (such as 3G and 4G mobile networks). Denmark stands out compared to most other European nations. These other nations have less fixed-line competition (most fixed-line broadband comes

¹⁴ “Denmark,” *2016 Index of Economic Freedom*, Heritage Foundation, accessed February 16, 2016, <http://www.heritage.org/index/country/denmark>.

from DSL) and less coverage for multiple 4G networks. In its most recent ranking (December 2015), the Organisation for Economic Co-operation and Development (OECD) ranked Denmark first among EU nations for fixed broadband penetration (subscribers per 100 inhabitants).¹⁵ Even in the OECD countries, Denmark is notable for the high penetration of fiber networks, to which almost half of households and businesses have access. Remarkably, this was achieved without subsidies.

Denmark's broadband metrics typically equal or exceed those of countries with more regulated markets and activist telecom regulators. Noted telecom scholar Christopher Yoo investigated broadband metrics in the United States and the European Union in 2014.¹⁶ When looking at total availability of next generation access, he found that Denmark's performance significantly exceeded the EU average, 73 versus 54 percent. Denmark's average price for 12–30 Mbps packages is \$23.40, compared to \$27.64 for the European Union and \$28.76 for the United States. When it comes to broadband investment per household, Denmark's average is one of the highest in Europe. At \$457 per household, it is almost double the EU average of \$244. The US average is \$562.

Similarly, another paper found that Denmark outperformed the EU in metrics from the European Commission, the OECD, and the International Telecommunication Union.¹⁷ Denmark is a leading country on nearly every European Commission measure, including 4G mobile broadband coverage and mobile broadband take-up.¹⁸ As will be shown, the low prices in

¹⁵ Organisation for Economic Co-operation and Development, "OECD Fixed Broadband Penetration and GDP per Capita," *OECD Broadband Portal*, 2015, <http://www.oecd.org/sti/broadband/1.9-BBPenetration-GDPperCap-2015-12.xls>.

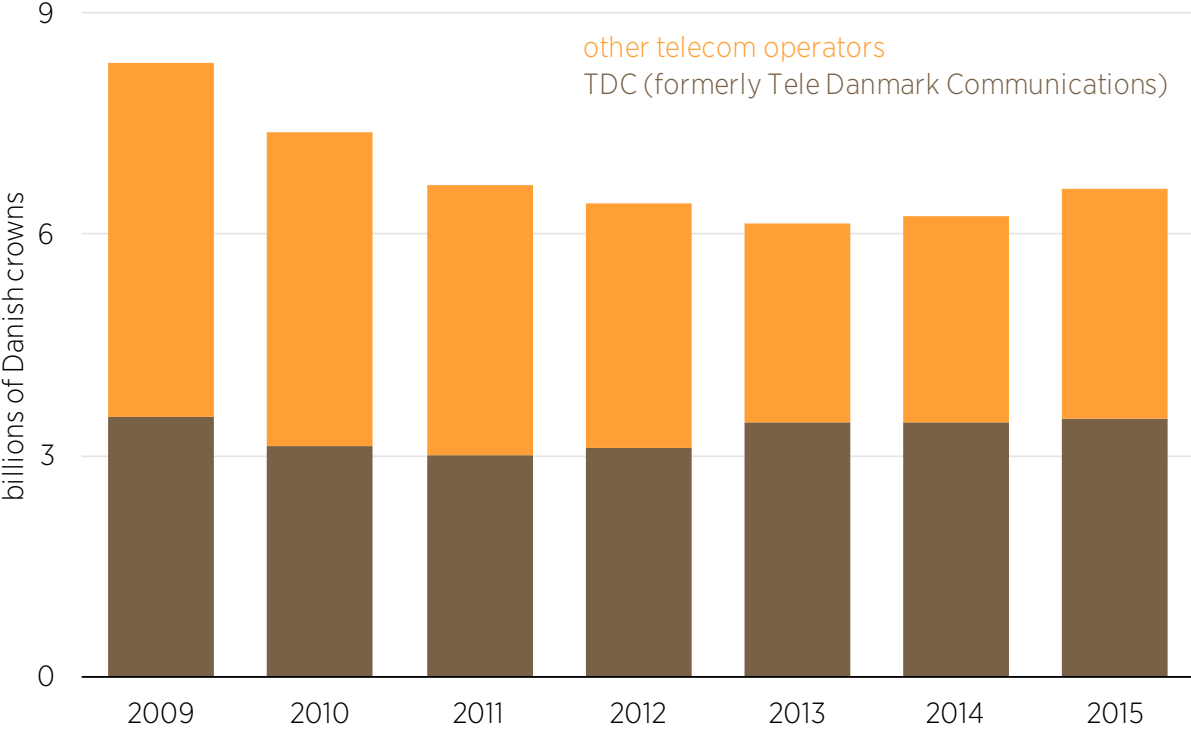
¹⁶ Christopher S. Yoo, "U.S. vs. European Broadband Deployment: What Do the Data Say?" (Center for Technology, Innovation and Competition, University of Pennsylvania Law School, Philadelphia, PA, June 2014).

¹⁷ Layton and Horney, "Innovation, Investment, and Competition," 14–22.

¹⁸ "Country profile for Denmark," *European Commission*, accessed April 11, 2016, <http://digital-agenda-data.eu/charts/country-ranking-table-on-a-thematic-group-of-indicators>.

Denmark are largely the result of competing technological development at the infrastructure, facilities, and service levels.

Figure 1. Capital Expenditure by Telecom Operators in Denmark



Source: “Danish Business Administration Telecom and Competition Regulation: An Overview of the Danish Telecom Market,” Danske Bank Markets, Danske Bank Investment Research, November 2015.

Figure 1 shows the capital expenditure in Danish crowns by fixed-line and wireless network operators from 2002 to 2014. Note that Danish incumbent TDC spends about half of the total. While the years 1996–2001 are not shown graphically, note that they were also significant in terms of investment marked with record levels of spending on the 3G spectrum auction and the subsequent issuance of new mobile licenses. The capital expenditures of 2000 and 2001 were higher as single years than any in the graph below. The 2000–2008 period reflects the time when utility companies invested in fiber; 2007–2011 was a time when TDC was owned and managed

by private equity funds; 2009–2013 was a period in which the utilities reduced their investments in fiber; and 2012 marks the year in which Telenor and Telia made a joint venture for network sharing, hoping to leverage cost savings of 500 million Danish crowns while extending network coverage. In 2012 TDC began to increase its capital expenditure in response to competitors’ investments, resulting in a capital expenditure to sales ratio which is high by international standards, especially when considering the industry’s low prices and falling average revenue per user. Note that this high level of investment has happened despite falling telecom prices and major economic and technological disruptions, such as the 2008 financial crisis and the disruption of revenue by OTT providers.

It is worth mentioning that there is essentially no capital investment from virtual operators and resellers of telecom services in Denmark. Investment comes from the private sector, driven by technological development, facilities-based competition, and a political environment which supports a stable, long-term telecom policy framework.

Table 1 discusses broadband coverage based on fixed-line technologies, showing that about half of all households and companies have three separate fixed-line facilities to their premises (DSL, cable, and fiber). When it comes to cable and DSL, at least two-thirds of locations have two facilities. Note that “other locations” refers to vacation properties (holiday camps, hostels, etc.), sports halls, swimming pools, clubhouses, and the like.

Table 1. Coverage Distributed on Fixed Technology

Type of coverage	Houses and companies	Houses	Companies	Other locations
xDSL	96%	97%	83%	70%
Cable	63%	68%	12%	6%
Fiber	51%	51%	50%	26%
Fixed wireless	2%	2%	3%	10%

Source: “Broadband Mapping 2015,” *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, February 2016. Translation by Roslyn Layton.

While Denmark has ample fixed-line facilities, as is shown below, the real story of the country is mobile broadband, as shown in table 2. The country has 5.7 million people and some 7 million mobile broadband subscriptions. While not a statistic collected by the government, it is estimated that already some 15 percent of the country's subscribers use 3G or 4G connections as their main, if not their only, source of broadband.¹⁹

Table 3 shows more detail of the mobile broadband market. The country has three suppliers of 4G networks: incumbent TDC, the shared network of Telenor and Telia, and the network of Hutchinson 3, which together account for 95 percent of all subscriptions. Note that leading mobile virtual network operators (MVNOs) are not broken out specifically in the data because they are owned by the network operators.

Table 4 details broadband subscription by speed and shows that some 42 percent of all subscriptions are for speeds of 10–30 Mbps; this is the range for a typical 4G mobile subscription. The next highest percentage, 35 percent, is for subscriptions of 30–100 Mbps, a category which has steadily grown. Speeds of 100 Mbps or higher, typical of fiber, comprises just 11 percent, but this was the fastest-growing category from 2014 to 2015.

However, table 4 is telling in that almost 90 percent of subscriptions in the world's most digital nation are under 100 Mbps. These speeds are also available on facilities other than FTTP (fiber to the premises). Notably, people may get broadband from an FTTP facility, but they do not necessarily subscribe to the highest tier. This is simply to say that speeds have risen faster than consumer demand. Even though gigabit speeds are available, consumers do not necessarily feel the need to buy them.

¹⁹ Danish Energy Agency, *Telestistik: Første halvår 2016* (Telecom statistics: First half of 2016), 2016. Translation by Roslyn Layton.

Table 2. Mobile Broadband by Subscription Type, 2010–2015

Subscription type	First half 2010	First half 2011	First half 2012	First half 2013	First half 2014	First half 2015	First half 2016
Standard	1,922,858	2,570,795	3,467,435	3,720,438	4,381,145	4,895,464	5,501,057
LTE standard						3,799,374	4,812,636
Add-on data subscriptions	396,974	833,098	637,631	723,826	393,481	298,677	227,642
LTE add-on data						164,329	172,264
Dedicated data	739,982	853,721	979,619	1,038,389	1,135,047	1,261,793	1,312,135
LTE dedicated data						932,186	1,135,958
LTE total						4,895,889	6,120,858
Total	3,059,814	4,257,614	5,084,685	5,482,653	5,909,673	6,455,934	7,040,834

Source: “Mobile Background Sheets 2h15,” *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, 2015, https://ens.dk/sites/ens.dk/files/Tele/mobil_baggrundsark_2h15.xlsx.

Table 3. Mobile Broadband Subscriptions by Company, 2014–2016

Company	Subscriptions			Year over year change	Market shares		
	First half 2015	Second half 2015	First half 2016		First half 2015	Second half 2015	First half 2016
DLG Tele	68,444	54,694	51,405	-24.89%	1.32%	1.01%	0.90%
Hi3G	793,765	826,848	870,055	9.61%	15.28%	15.24%	15.19%
TDC	2,014,257	2,177,459	2,408,852	19.59%	38.78%	40.13%	42.05%
Telenor	1,142,899	1,177,674	1,213,623	6.19%	22.00%	21.71%	21.18%
Telia	924,810	935,384	873,456	-5.55%	17.80%	17.24%	15.25%
Others	249,966	253,603	311,308	24.54%	4.81%	4.67%	5.43%
Total	5,194,141	5,425,662	5,728,699	10.29%	100.00%	100.00%	100.00%

Source: “Mobile Background Sheets 2h15,” *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, 2015. Translation by Roslyn Layton.

Table 4. Broadband Subscriptions by Downstream Capacity, 2010–2016

Speed	Second half 2010	Second half 2011	Second half 2012	Second half 2013	Second half 2014	Second half 2015	First half 2016	Share of first half 2016
Under 10 Mbps	240,604	161,637	129,586	376,263	302,989	232,957	209,377	8.51%
10–30 Mbps	905,591	1,197,306	1,310,239	1,321,004	1,347,128	1,094,072	1,033,669	42.03%
30–100 Mbps	87,014	202,164	295,063	531,209	616,587	817,934	877,122	35.67%
Over 100 Mbps	16,602	16,140	27,984	38,119	75,055	264,422	309,651	12.59%
Total specified speeds	2,120,504	2,148,289	2,182,886	2,266,595	2,341,759	2,409,385	2,429,819	98.81%
Unspecified speed	29,716	37,182	33,964	33,711	37,891	30,773	29,333	1.19%
Total	2,150,220	2,185,471	2,216,850	2,300,306	2,379,650	2,440,158	2,459,152	

Source: “Internet Baggrundsark 2h 2015,” *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, 2015. Translation by Roslyn Layton.

There is a robust wholesale market in Denmark for both fixed-line and wireless networks. TDC has an oversized market share to be sure, as shown in table 5. It may be the case that some observers desire more balance in market share among competitors; but even if the regulation is justified, that does not mean that the market will produce balanced market shares. If regulators intervene in such a way as to produce a balanced outcome, they may be unfairly aiding inferior competitors. Regulation is not supposed to compensate for poor management. Indeed, regulators must resist the call from companies to regulate their competitors in such a way as to compensate for their own mistakes and shortcomings.

Table 5. Broadband Subscriptions by Company, 2014–2015

Company	Subscriptions			Year over year change	Market shares		
	First half 2015	Second half 2015	First half 2016		First half 2015	Second half 2015	First half 2016
Dansk Kabel TV	69,678	72,036	73,159	5.00%	2.90%	2.95%	2.97%
DLG Tele	38,256	37,987	36,367	-4.94%	1.59%	1.56%	1.48%
Stofa	274,590	296,694	296,615	8.02%	11.43%	12.16%	12.06%
Stofa Erhverv A/S	12,820				0.53%		
TDC	1,291,468	1,281,862	1,271,462	-1.55%	53.75%	52.53%	51.70%
Telenor	168,023	159,617	154,895	-7.81%	6.99%	6.54%	6.30%
Telia	91,644	99,019	93,531	2.06%	3.81%	4.06%	3.80%
Others	456,224	492,943	533,123	16.86%	18.99%	20.20%	21.68%
Total	2,402,703	2,440,158	2,459,152	2.35%	100.00%	100.00%	100.00%

Source: “Internet Baggrundsark 2h 2015,” *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, 2016. Translation by Roslyn Layton.

Regulators may create perfect and efficient regulation, but this does not mean that companies will be managed well. In the Danish case, TDC’s competitors have made a number of strategic mistakes that caused negative financial consequences.²⁰ Moreover, as will be

²⁰ Jens Hansegard, “Telenor Mulls Withdrawing from Denmark Due to Intense Price Pressure,” *Wall Street Journal*, October 28, 2015; Strand Consult, “The Consequences of the Failed Telenor Telia Merger in Denmark and What It Means for Mergers in the UK, Italy and the Global Telecom Market—Post Mortem Part II,” *Strand Consult Press*

discussed below, EU politics deterred smaller competitors from merging in a move that likely would have made them a more potent competitor to TDC. While some of TDC's success could be attributed to the residual benefits of having been the state incumbent, the fact remains that TDC took advantage of market opportunities that its competitors chose not to act on.²¹ Today, TDC is the only quadruple play provider on the market; this means that it can leverage economies of scale in marketing and distribution across broadband Internet access, television, telephone, and wireless services. TDC's competitors are pure plays, meaning they can only compete on prices within single markets. In any case, TDC still faces regulatory obligations that its competitors do not.²²

Interestingly there is a similar situation in the United Kingdom in which incumbent British Telecom merged with Everything Everywhere (EE), allowing two large fixed and mobile providers to gain scale economies with quadruple play services. However, the European Commission rejected the merger of two entrant mobile operators in the United Kingdom, O2 and Three, consigning them to being pure play operators. These mobile operators do not have the scale economies to compete with the new larger player, but it appears that the European Commission felt it important to protect the number of mobile operators for the sake of numbers. It did so even though the reality of today's market is that consumers purchase an integrated set of services delivered from a variety of network technologies, and that triple and quadruple play providers have distinct advantages.

Room, last modified September 2015, <http://www.strandreports.com/sw6656.asp>; and Kim McLaughlin, "TeliaSonera to Take \$844 Million Uzbekistan, Denmark Charges," *Bloomberg.com*, January 14, 2016.

²¹ Poul Jessen, "Danish Business Administration Telecom and Competition Regulation: An Overview of the Danish Telecoms Market" (Danske Bank Investment Research, November 2015).

²² "TDC fortsat forpligtet til at levere taletelefoni til alle," *Energistyrelsen* (Danish Energy Agency), December 15, 2016; "Forsyningspligt forlænget til 2016," *Erhvervsstyrelsen* (Danish Business Authority), December 19, 2013; "Prisregulering," *Erhvervsstyrelsen* (Danish Business Authority), 2013; and "Bekendtgørelse om forsyningspligttydelser," *Retsinformation* (Ministry of Energy, Utility, and Climate), May 31, 2015.

A final and important point about the Danish market is that even though the incumbent has a large market share and prices are low, consumers exhibit a high degree of switching between plans to get a better price. This is the assessment of the Danish Competition and Consumer Authority, which notes that the mobile market in particular has a high degree of switching.²³ The agency's 2012 report explains, "Consumers who switch providers on an informed basis are sure to get the best deal. It is also crucial for the companies that are trying to gain market share by developing new, cheaper, or better products so that consumers can switch to the companies that create the most value for them."²⁴ The report concludes that Danes exhibit the highest degree of switching among Europeans, with one-third of Danes switching their mobile provider annually. Seeking a lower price is generally the reason for switching, and there is robust marketing to advertise alternative plans.²⁵

Literature Review

Falch and Henten discuss the interplay between regulatory and developmental approaches to telecom policy.²⁶ They describe the ostensible goal of regulation to create a stable policy framework for a liberalized telecom market with real competition. The tools include rulemaking and instruments to correct so-called market failure (price controls, certification and licensing, and others). They cite Pablo Spiller and Mariano Tommasi, who suggest that a stable regulatory environment reduces transaction costs and stimulates investment.²⁷ The developmental approach, on the other hand, looks to government to stimulate investment in and use of ICT through

²³ Danish Competition and Consumer Authority, *Forbrugernes skift af mobil- og forsikringsudbydere* (Consumers switching mobile and insurance providers), 2012.

²⁴ Ibid. Translation by Roslyn Layton.

²⁵ Ibid.

²⁶ Falch and Henten, "European Broadband Policy."

²⁷ Pablo T. Spiller and Mariano Tommasi, "The Institutions of Regulation: An Application to Public Utilities," in *Handbook of New Institutional Economics*, ed. Claude Ménard and Mary M. Shirley (Berlin: Springer, 2008).

various activities, such as demand stimulation (digitizing public services) or public-private partnerships for infrastructure development. They cite Joseph Stiglitz on industrial policy and Chalmers Johnson on his concept of the developmental state.²⁸ They note that both approaches are in play across a number of countries, and to various degrees at different times.

We review the literature of the school of public choice, which helps to explain why governments pursue regulatory or developmental approaches to different degrees. Aside from privatization of national telephone monopolies during the 1980s and 1990s, there has been a parallel track of re-regulation with the emergence of mobile wireless technologies and the Internet. A key finding in the review is the reluctance of regulatory authorities to implement the final stage of regulation, that of full competition; regulators delay the implementation of full competition and removal of regulation in favor of expanded regulation. The review also includes a description of how the FCC has expanded regulation in recent years while Danish authorities have removed it. The trend in convergence of regulatory authorities is discussed as well.

The final section of the report explores the concept of regulatory capture—when political actors leverage regulatory regimes to reward particular constituencies under the guise of serving the public—and George Stigler’s observation that regulation is acquired by industry and operated for its benefit.²⁹

The challenge of achieving the classic ideal of regulation and competition. On account of the high fixed costs and entrance barriers, fixed-line telephony was run as a government monopoly.³⁰

²⁸ Joseph Stiglitz, “Towards a New Paradigm of Development” (United Nations Conference on Trade and Development, 1998); Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925–1975* (Stanford, CA: Stanford University Press, 1982).

²⁹ George Stigler, “The Theory of Economic Regulation,” *Bell Journal of Economics* 2, no. 1 (1971): 3–21.

³⁰ Adam D. Thierer, “Unnatural Monopoly: Critical Moments in the Development of the Bell System Monopoly,” *Cato Journal* 14, no. 2 (1994): 273–74.

Many governments associated networks with national security and wanted to control the means of communications. Having multiple firms erect their own telephone poles and wires was problematic, so governments typically furnished those necessities in order to provide communications under the notion of a natural monopoly. However, the rise of new networks and technologies, including mobile communications, challenged the traditional model of telecommunications, and it has become increasingly clear that government provision of telephony is inefficient.

As monopolies were privatized in a number of countries, governments created telecom regulators to discharge specific tasks such as spectrum management, interconnection, universal service provision, licensing of new firms, and numbering. Tasks may also include assessing market performance and intervening on price and service quality. It was asserted that sector-specific telecom regulation was necessary because the market itself could not create an efficient outcome. However, the emergence of multiple communications networks and technologies has challenged that assumption.

For example, mobile wireless networks require spectrum, infrastructure, terminals, and subscriptions. Under a traditional natural monopoly telecom model, these inputs would be vertically integrated, or offered by the same provider. Mobile networks, on the other hand, are highly diversified with a number of competing firms at each level. To begin, the finite resource of spectrum must be allocated. A number of firms may compete in an auction for different bands, or in a less efficient way, the government may award spectrum based upon application. A mobile operator will typically contract with an infrastructure provider to build mobile infrastructure including masts and towers to provide coverage for a given area. Makers of mobile terminals will offer equipment to end users, either directly or through a resell agreement with operators.

Subscriptions can be offered directly to consumers or through wholesale agreements. Services can be provided by either network or virtual operators, or they can be offered by third parties in so-called “over-the-top” (OTT) or pass-through services.

The path of regulation. The *10th Anniversary Edition of the Telecom Regulations Handbook*, a publication from the International Telecommunication Union in collaboration with InfoDev and the World Bank, describes the need for regulation and its ideal evolution.³¹ Taking the genesis of telecommunications as the national telephony company, there is an understanding that telecom regulation should support the market’s evolution through a linear process from public monopoly (the first stage) to full competition (the fourth and final stage). In the second or partial monopoly stage, the regulator provides oversight to ensure the operator fulfills its obligations. In the third or partial competition stage, regulators police anti-competitive practices, provide licensing frameworks, and ensure universal service. Finally, in the full competition stage, regulation is reduced, if not removed altogether, as general ex post competition law then governs the market.

The handbook authors observe,

Regulation has potentially high costs. The regulatory process is inherently time-consuming to administer and requires considerable expenditure of resources. In addition, regulation can have unintended consequences which may be detrimental to customers and the public interest. No matter how capable and well-intentioned regulators are, they will never be able to produce outcomes as efficient as a well-functioning market.³²

The academic literature describes the value of deregulation and regulatory modernization and why competition brings about superior outcomes for consumers and innovation. Briefly put, competition is preferable because it offers lower prices, higher efficiency and output, easier

³¹ Colin Blackman and Lara Srivastava, eds., *Telecommunications Regulation Handbook*, 10th ed. (World Bank, InfoDev, and the International Telecommunication Union, 2011), 9.

³² *Ibid.*, 30.

market entry and exit, and reduced regulatory capture.³³ For example, the partial deregulation of the airline industry with the sunset of the Civil Aeronautics Board and its outdated regulation is associated with a 45 percent decline in consumer airline ticket prices from 1978–2008, a major increase in productivity, and the emergence of low-cost carriers.³⁴

It may also be the case that some industries are disrupted before they are deregulated. The taxi industry is a case in point in which taxi substitutes such as Uber and Lyft have personalized the ride experience while regulation ensured a homogenized, commoditized, and frequently poor customer service experience. Taxi regulators controlled “not just the quantity of cabs and the prices that they may charge, but also the paint colors and exterior lighting schemes they use, the passenger notices they post, the car models they drive, the payment methods they employ, and much more.”³⁵ Regulation is also known to artificially increase prices by controlling supply. As Christopher Koopman, Matthew Mitchell, and Adam Thierer document, “In 2006, there were only 12,799 licensed taxicabs in New York City, compared with 21,000 in 1931, when the city had about 1 million fewer inhabitants.”

Telecom regulators engage in similar homogenization of services by insisting that broadband must be sold by volume and speed rather than allowing providers to differentiate on quality of service, content offerings, cross-selling, and bundled offers. The net effect is that such controls designed to ensure “equitable” service tend to reward the providers with the largest networks, as they can therefore best absorb commodification. By stifling differentiation,

³³ Alfred E. Kahn, *Economics of Regulation: Principles and Institutions*, rev. ed. (Cambridge, MA: MIT Press, 1988).

³⁴ Alfred E. Kahn, “Airline Deregulation,” in *The Concise Encyclopedia of Economics*, David R. Henderson, ed., 1993, *Library of Economics and Liberty Online*, <http://www.econlib.org/library/Enc1/AirlineDeregulation.html>; and subsequently, Fred L. Smith Jr. and Braden Cox, “Airline Deregulation,” in *The Concise Encyclopedia of Economics*, David R. Henderson, ed., *Library of Economics and Liberty Online*, 2008, <http://www.econlib.org/library/Enc/AirlineDeregulation.html>.

³⁵ Christopher Koopman, Matthew Mitchell, and Adam Thierer, “The Sharing Economy and Consumer Protection Regulation: The Case for Policy Change,” *Journal of Business, Entrepreneurship & the Law* 8, no. 2 (2015): 537–38.

particularly from entrants, regulators unwittingly insulate incumbent firms from competition that would otherwise benefit consumers.³⁶

Defining Competition

As perfect competition rarely exists (and in many cases might not even be desirable), effective competition is presumably the standard by which telecom markets are judged.³⁷ The *Handbook* defines effective competition by four market conditions:

- 1) Buyers have access to alternative sellers for the products they desire (or for reasonable substitutes) at prices they are willing to pay.
- 2) Sellers have access to buyers for their products without undue hindrance or restraint from other firms, interest groups, government agencies, or existing laws or regulations.
- 3) The market price of a product is determined by the interaction of consumers and firms. No single consumer or firm (or group of consumers or firms) can determine or unduly influence the level of the price.
- 4) Differences in prices charged by different firms (and paid by different consumers) reflect only differences in cost or product quality and attributes.

It is important to note that effective competition can occur even in markets with relatively few firms that differ substantially in size, market share, and tenure, provided that barrier to entry and exit is limited. Competition is not a static state of a market. It is a process of discovering and contesting opportunities.

³⁶ For a potent example of how net neutrality squashed the competition created by MetroPCS and ultimately forced the company to be acquired rather than grow as an independent operator, see Brent Skorup, “If You’re Reliant on the Internet, You Loathe Net Neutrality,” *RealClearMarkets*, February 12, 2014.

³⁷ Blackman and Srivastava, *Handbook*, 29.

While the *Handbook* is clear about the path of regulation, the path of the *regulator* is not defined. It would follow that if competition is achieved and regulation is removed, there is no need for a regulator. The telecom authority should thus be decommissioned, but this rarely happens. Indeed, expanding scope and authority appears to be the order of the day among the world's 200 telecom regulators, as they have taken on new roles to regulate content, intellectual property, neutrality, privacy, and cybersecurity, and to promote such goals as creating "Green ICT," closing the "digital divide," and increasing diversity in media.

The ladder of investment. A number of telecom authorities have been engaged in regulating service-based competition with the objective of increasing the number of resellers of service on a given network. This is particularly the case when it comes to fixed-line facilities. One of the theories underpinning the practice is the ladder of investment (LOI) by Martin Cave. This theory suggests a means of artificial stimulation of competition by offering access to the network at a regulated price.³⁸ The theory posits that as entrants earn revenue, they "climb the ladder" and use profits to invest in their own network.

The LOI is perhaps the most misunderstood and misapplied of all telecom policies. Even its author has noted this misapplication in practice, calling it "regulator-promoted arbitrage which allows resellers to buy cheap at wholesale prices and attack the incumbent's margin."³⁹ Cave was inspired by the natural competition among mobile networks (on account of the lower start-up costs relative to wireline technologies) and proposed LOI as a way to achieve dynamic infrastructure competition in wireline networks. His ultimate goal was to support dynamic,

³⁸ Martin Cave, "Encouraging Infrastructure Competition via the Ladder of Investment," *Telecommunications Policy* 30, no. 3-4 (April 2006): 223-37.

³⁹ *Ibid.*

facilities-based competition in which different kinds of broadband technologies compete to give users access to the Internet by different facilities, such as mobile wireless, DSL, cable, fiber, and satellite. Cave wanted to foster network competition to promote innovation.⁴⁰

Realistically however, the ladder does not work for practical and political reasons. There is no incentive to invest in a new network if one can be leased at a cheaper price. To get it right, regulators must set forth clear expectations and an exit strategy for entrants and then enforce those requirements. Cave says that climbing the ladder should be “demanding but feasible.” The problem is that regulators do not increase the access price, and entrants do not climb the ladder. Thus “regulator-promoted arbitrage” invites actors that specialize in reselling, not in long-term investments in networks. Resellers’ goal is to build a customer base that can be sold at a premium. The proliferation of LOI regulation has perpetuated a state of regulatory capture, and the desired investment in next generation technology has not occurred. The definitive academic conclusion is that LOI has not worked in practice.⁴¹

⁴⁰ Ibid.

⁴¹ There is ample academic evidence for the failings of the ladder of investment (LOI) to stimulate investment in the telecom sector. A sample of research includes Mark Bourreau, Pinar Doğan, and Matthieu Manant, “A Critical Review of the ‘Ladder of Investment’ Approach,” *Telecommunications Policy* 34, no. 11 (December 2010): 683–96. Bourreau et al. find that the assumptions of the LOI are too difficult to implement and that LOI does not work in practice. Competition comes from different networks, not LOI, according to Jan Bouckaert, Theon van Dijk, and Frank Verboven, “Access Regulation, Competition, and Broadband Penetration: An International Study,” *Telecommunications Policy* 34, no. 11 (December 2010): 661–71. Another study concludes that the assumptions are not realized and that the ladder does not work: Hans Friederiszick, Michal Grajek, and Lars-Hendrik Röller, “Analyzing the Relationship between Regulation and Investment in the Telecom Sector” (ESMT white paper 108-01, European School of Management and Technology, Berlin, Germany, March 2008). Additionally, research into mandatory unbundling reveals no transition from service-based competition to facilities-based competition. See Jerry A. Hausman and J. Gregory Sidak, “Did Mandatory Unbundling Achieve Its Purpose? Empirical Evidence from Five Countries,” *Journal of Competition Law & Economics* 1, no. 1 (2005): 173–245. See also Robert W. Crandall, Robert E. Litan, and William Lehr, “The Effects of Broadband Deployment on Output and Employment: A Cross-Sectional Analysis of US Data” (Issues in Economic Policy, Brookings Institution, Washington, DC, June 1, 2007). Crandall et al. found that entrants stay on lower rungs of ladder and want government to subsidize. In addition, entrants do not invest in a new network. See Maya Bacache, Marc Bourreau, and Germain Gaudin, “Dynamic Entry and Investment in New Infrastructures: Empirical Evidence from the Fixed Broadband Industry,” *Review of Industrial Organization* 44, no. 2 (July 31, 2013): 179–209. Finally, see Thomas W. Hazlett and Anil Caliskan, “Natural Experiments in US Broadband Regulation,” *Review of Network Economics* 7, no. 4 (2008). Hazlett and Caliskan find that subscribership increased 65 percent once LOI mandates were lifted.

Convergence. It is common among policymakers to discuss convergence—the coming together of computing, communication, and content that has been happening for the last 50 years⁴²—but they frequently fail to update regimes accordingly to reflect new technological realities. In 1999 the European Commission recognized that convergence demands a new regulatory approach. “From the point of view of communications infrastructure and related services, convergence makes the traditional separation of regulatory functions between these sectors increasingly inappropriate and calls for a coherent regulatory regime,” noted the Commission at the time.⁴³ But nearly two decades later, outmoded regulations still have not been removed. The problem can also be understood by looking at the taxi industry; the rise of Uber and Lyft can be seen as a result of *government failure* or regulators failing to update the regime.

Rather than drive toward full competition of their regulated markets and subsequent removal of regulation and transition to full competition, the trend among regulators themselves appears to be the convergence of various regulatory agencies. A number of nations have opted to merge a variety of sector-specific and utility regulators into a single entity. The corresponding regulations, however, are not necessarily rationalized in the process, creating new converged authorities while remnants of other institutions with a mishmash of laws and rules remain, leaving inefficient and distorting overlap.⁴⁴

Public choice explanations of regulation. There is significant evidence that many of the goals established for the Federal Communications Commission have been achieved; but the role of the

⁴² “Media Convergence,” *Encyclopedia Britannica*, accessed April 11, 2016, <http://global.britannica.com/topic/media-convergence>.

⁴³ European Commission, “A New Framework for Electronic Communications Services,” *EUR-Lex*, November 10, 1999, last updated February 12, 2003, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:l24216>.

⁴⁴ Janet Hernandez, “Technological and Institutional Convergence” (Telecommunications Management Group presentation to the Communications Regulation Commission, August 30, 2016).

FCC, rather than diminishing, is growing. The monopoly telephone network it was created to regulate no longer exists, and other goals, such as universal service and competitive media markets, have been achieved. Other American economic regulators, such as the Civil Aeronautics Board and Interstate Commerce Commission, achieved their missions and were then dismantled. But the FCC persists, defending its continued life by bending statutory definitions of its authority and evolving its mission into social, rather than economic, regulation.

Both the International Telecommunication Union⁴⁵ and the OECD⁴⁶ show that mobile telephony is competitive in most countries, including the United States. Mobile telephony is the world's fastest-growing technology by adoption, surpassing even the Internet.⁴⁷ But there are few examples of telecom regulation being removed when competitive markets are achieved. In fact, more regulation is being added. A case in point is Open Internet regulation, which has been adopted in some 50 countries on mobile networks.⁴⁸

Regulators seem reluctant to pronounce a market competitive even though they are engaged in measuring and reporting on the marketplace. For example, the FCC has tracked wireless competition for almost two decades. Despite publishing reports that describe at length the competitive and dynamic aspects of the mobile system, the Commission still has not deemed the market effectively competitive.⁴⁹ Indeed, it has been reluctant to even define the term “effective competition.”⁵⁰

⁴⁵ “ICT Statistics,” International Telecommunication Union, last modified 2017, <http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>.

⁴⁶ “OECD Broadband Portal,” Organisation for Economic Co-operation and Development, last modified 2016, <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm>.

⁴⁷ Nicholas Felton, “How Americans Spend Their Money,” *New York Times*, February 10, 2008.

⁴⁸ Roslyn Layton, “Which Open Internet Framework Is Best for Mobile App Innovation? An Empirical Inquiry of Net Neutrality Rules around the World” (PhD diss., Aalborg University, Copenhagen, Denmark, 2017).

⁴⁹ Federal Communications Commission, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services*, August 27, 2009, 14–15.

⁵⁰ Federal Communications Commission, *19th Mobile Wireless Competition Report*, September 23, 2016, 4.

It is concerning that regulators are unable to determine whether the market they regulate is competitive, especially because this is their very reason for existing. If, after two decades of regulation and measurement, the outcome still cannot be considered a competitive market, then one may surmise that the regulation (or the regulator, or both) is not working to create the promised competition. Another possibility is regulators may be disinclined to pronounce a market competitive as such a pronouncement could necessitate a downsizing of agency responsibility.

Public choice theory provides an explanation for why there is a reluctance to rationalize telecom authority, even though there would be significant benefits to downsizing or eliminating obsolete regulatory bodies. Indeed, public choice theory suggests that such bodies will seek to expand, not contract, and bring new areas and functions under their jurisdiction.

Jonathan Macey observes ways in which agencies seek to avoid obsolescence by expanding their jurisdiction and how, in such a state, they become more vulnerable to capture.⁵¹ Joseph Kearney sees this process playing out in US telecom regulation at the turn of the century.⁵²

Prior research has taken a more detailed look at how telecom regulation in the United States has developed in a manner consistent with the public choice narrative on agency obsolescence.⁵³ According to this view, regulators generally seek to maximize their agency's budget and influence. When an agency becomes obsolete, it has an incentive to be all the more

⁵¹ Jonathan Macey, "Administrative Agency Obsolescence and Interest Group Formation: A Case Study of the SEC at Sixty," *Cardozo Law Review* 15 (1994): 913–14. Macey states, "Agencies that are not obsolete often can count on some significant measure of public support for their continued existence. By contrast, an agency that has been rendered obsolete by exogenous changes in the form of technological development or new marketplace developments will find that it must provide favors to discrete constituencies in order to preserve some measure of support for its continued existence."

⁵² Joseph Kearney, "Will the FCC Go the Way of the ICC?," *University of Colorado Law Review* 71 (2000).

⁵³ Brent Skorup and Joe Kane, "The FCC and Quasi-Common Carriage," *Minnesota Journal of Law, Science and Technology* (forthcoming, Spring 2017): 34–40.

steadfast in expanding its authority in order to acquire a function that will make it appear indispensable. This incentive structure has contributed to the FCC's use of the increasingly murky silos of the Communications Act to apply quasi-common carriage and pursue broad social goals rather than narrow economic regulation.⁵⁴

So regulators may be incentivized to create complicated regulatory schemes to increase the barriers to declaring the market competitive, thereby ensuring their continued role as regulators. For if they deem markets competitive, they need to remove regulation, and thus reduce, if not remove, their own power. Kearney's point also supports the aforementioned evolution of the agency's goals to social regulation. Instead of being concerned with the real nature of market conditions, the FCC can justify its existence with regulating "other concerns." With the notable exception of Denmark, few countries have followed regulation as it has been described in textbooks.

The problem of sector-specific telecom regulation—including how its policies have conflicted with the doctrine of free speech—has been observed at least as early as 1959.⁵⁵ Alfred Kahn, who provided the intellectual and administrative ballast to deregulate the aviation industry in the 1970s, noted that a similar case could be made for the move from sector-specific telecom regulation to antitrust.⁵⁶ The Heritage Foundation made this observation in *Mandate for Leadership*, describing how telecommunications was already ripe for deregulation in 1981.⁵⁷

⁵⁴ Ibid.

⁵⁵ Ronald Coase recounts the checkered legal history of FCC licensing with respect to regulation of content. He concludes that the FCC's use of its licensing authority shaped the content of broadcast speech in favor of speech that conformed with the Commission's own agenda. He adds, "The threat to freedom of the press in its strictest sense is evident." Ronald H. Coase, "The Federal Communications Commission," *Journal of Law and Economics* 2 (October 1959): 11.

⁵⁶ Alfred E. Kahn, "Telecommunications: The Transition from Regulation to Antitrust," *Journal on Telecommunications & High Technology Law* 5, no. 1 (2006): 159–88.

⁵⁷ Charles L. Heatherly, ed., *Mandate for Leadership: Policy Management in a Conservative Administration* (Washington, DC: Heritage Foundation, 1981).

But it is not only leading intellectuals and Nobel Prize–winning economists who have observed the problems of atavistic regulation. The regulators themselves have also noticed. Indeed, Bill Kennard, FCC Chairman appointed by President Bill Clinton, proposed a plan in 1998 to downsize the FCC and transition the industry to competition law under Federal Trade Commission oversight.⁵⁸

Dynamics of interventionism. One explanation of this pathology is the inherent instability of limited intervention. In this respect, the FCC also exhibits the sequence of adjustments to regulation known as the dynamics of interventionism.⁵⁹ When regulators intervene in the market, they create direct and indirect distortions to the market process. These distortions often result in unintended consequences which are seen as reasons for further regulation, which breeds further distortions, and so on. An example of this phenomenon is the US government’s granting of monopoly privilege to AT&T and local television franchises. These privileges laid the groundwork for less-than-ideal competition in the now prominent Internet service market because telecom and TV incumbents had a residual advantage from the infrastructure built under the protection of monopoly.

Lack of technology neutrality. Discriminatory regulation, based on the nature of the company supplying the product or the technology being used, is another characteristic of US telecom

⁵⁸ Federal Communications Commission, “Chairman Kennard Delivers to Congress Draft Strategic Plan for 21st Century,” news release, August 12, 1999; and Federal Communications Commission, *A New FCC for the 21st Century*, 1999.

⁵⁹ Sanford Ikeda, “Dynamics of Interventionism,” in *Advances in Austrian Economics*, ed. Peter Kurrild-Klitgaard (Bingley, UK: Emerald Group Publishing, Ltd., 2004), 8:21–57; Sanford Ikeda, *Dynamics of the Mixed Economy: Toward a Theory of Interventionism* (New York: Routledge, 1997); and Ludwig von Mises, *A Critique of Interventionism: Inquiries into Present Day Economic Policy and Ideology* (Irving-on-Hudson, NY: Foundation for Economic Education, 1996 [1929]).

regulation.⁶⁰ There are a number of problems with discriminatory regulation, including the harm to consumers and the distortion of competition caused when otherwise identical services are offered with differing protection levels.⁶¹ For example, mobile operators must interconnect their SMS (short message service, i.e., text messaging) with other mobile networks. But OTT messaging services such as Skype, Line, or Telegram need not interconnect with one another; they only serve their respective registered users. SMS is also subject to privacy and data security standards that do not apply to OTT messaging. Moreover, OTT message providers can sell advertising on top of their service; but if American broadband providers want to deploy such a service, they now face a newly adopted set of privacy rules⁶² from the FCC that conflict with the consumer protection standard deployed by the Federal Trade Commission for all other digital advertising services.

In the digital age, as convergence enables multiple substitute technologies, the preferred means of regulation should be “functional.” That is to say, the regulation should be based on the appropriate policy goal and an economic assessment of how that goal can be best achieved.⁶³ If the goal is to increase the availability of high-definition video services, then instead of assuming the solution is to build entirely new networks (a possible though expensive solution), policymakers could consider employing better compression technologies to allow video to flow more efficiently over existing networks.⁶⁴ Incidentally, there are a number of start-ups working

⁶⁰ Jeffrey Eisenach and Bruno Soria, “A New Regulatory Framework for the Digital Ecosystem” (GSMA commissioned study, London, 2016), 30.

⁶¹ Rajendra Singh and Siddhartha Raja, *Convergence in Information and Communication Technology: Strategic and Regulatory Considerations* (Washington, DC: World Bank Publications, 2010), 38; Ulrich Kamecke and Torsten Körber, “Technological Neutrality in the EC Regulatory Framework for Electronic Communications: A Good Principle Widely Misunderstood,” *European Competition Law Review* 29, no. 5 (2008): 330; and Brent Skorup, Nicholas Krosse, and Brandon Davis, “Why Is My TV Bill So Expensive?,” Media Metrics, Mercatus Center at George Mason University, February 2016.

⁶² Federal Communications Commission, *FCC Adopts Broadband Consumer Privacy Rules*, October 27, 2016.

⁶³ *Ibid.*

⁶⁴ Justin “Gus” Hurwitz and Roslyn Layton, “Debatable Premises in Telecom Policy,” *John Marshall Journal of Information Technology & Privacy Law* 31, no. 4 (2015).

in video compression,⁶⁵ investment in local storage, deployment of next generation wireless networks, and the upgrade of software protocols.⁶⁶ The value of the functional approach is the cost-effective means to achieve goals, leaving scarce investment dollars and regulatory resources available for other initiatives.

Key Developments in Modern Danish Telecom Policy

The following eight developments illustrate the role that facilitation and cooperation play in Danish telecom policy. They also show a choice to follow the linear path of classic regulation to its final steps of achieving full competition and removing regulation.

Facilitating a National Strategy for Digitization: 1994

It may be the case that Denmark was less concerned about regulating telecommunications because it had a larger vision for a national ICT strategy already in 1994.⁶⁷ Unlike the United States, which had a number of large companies and enterprises that drove the adoption of ICT, Denmark's single largest buyer for ICT services was the Danish government. However, the Danish government had a vision for the nature of the interconnectedness of a digital society and recognized that networks alone were not the only, and not even the most important, factor for success. This realization may help explain why Denmark has consistently exceeded Japan on measures for its digital society, and sometimes South Korea.

⁶⁵ "Tech Talk: Technical Overview," *Mediathand*, accessed February 20, 2017, http://www.mediathand.com/tech-talk/#_technical-overview.

⁶⁶ Ibid.

⁶⁷ Christian S. Friis, "A Critical Evaluation of the Danish National ICT Strategy," *Economic & Social Review* 28, no. 3 (July 1997): 261–76.

Indeed, the World Economic Forum has for a decade calculated a Networked Readiness Index based on 10 pillars and numerous subcomponents with “broadband infrastructure and content” as just one of the 10 pillars.⁶⁸ Economic development is generated by government, businesses, and individuals utilizing advanced ICT infrastructure, not by the infrastructure itself. This partially explains that while Denmark and Japan may each have widespread broadband deployment, Japan falls short on some development and competition measures because many Japanese do not use broadband networks and technologies.⁶⁹ Similarly, South Korea experiences “jobless growth” as overinvestment in high-speed broadband networks does not translate into increased productivity.⁷⁰ Moreover, some Koreans may overconsume broadband services such that they do not function in productive roles in society (as can be the case for those addicted to online video games or other web content).

Danish political leaders believed that by defining a national digital strategy and some common digital assets, the government could kick-start ICT adoption by individuals and enterprises.⁷¹ To that end, the Agency for Digitization was established in 2011 “to speed up the digitization processes required to modernize the Danish welfare society.”⁷² Falch and Henten describe this as evidence of Denmark being on the forefront of the shift from the regulatory to the developmental approach:

⁶⁸ “Technical Notes and Sources,” part 2.3 in *The Global Information Technology Report 2015*, ed. Soumitra Dutta, Thierry Geiger, and Bruno Lanvin (Geneva: World Economic Forum, 2015).

⁶⁹ Noriko Igari, “How to Successfully Promote ICT Usage: A Comparative Analysis of Denmark and Japan,” *Telematics and Informatics* 31, no. 1 (February 2014): 115–25.

⁷⁰ Ju Jaeuk and Jung Hyun-Joon, “A Study on the Impact of New ICT Service and Technology on Employment” (KISDI Research Report, Korea Information Society Development Institute, South Korea, 2012).

⁷¹ “Digitaliseringsstrategien 2011–2015,” *Digitaliseringsstyrelsen*, last modified June 8, 2016, <http://www.digst.dk/Digitaliseringsstrategi/Digitaliseringsstrategi-2011-15>; and Local Government Denmark (LGDK), *The Digital Path to Future Welfare: The eGovernment Strategy 2011–2015* (Copenhagen: Danish Agency for Digitization, August 2011).

⁷² “About the Agency for Digitisation,” *Digitaliseringsstyrelsen*, last modified April 29, 2016, <http://www.digst.dk/ServiceMenu/English/About-the-Danish-Agency-for-Digitisation>.

ICT policies increasingly are part of a larger “package” of policy initiatives for the development of e-health, smart cities, e-learning, etc. . . . The revival of the developmental mode of governance within the ICT area is related to ICT convergence and the growing importance of access to ICT services. . . . The revival does not imply a return to Keynesian- inspired policies practiced in the post-war period. Developmental initiatives must conform to a liberal market environment, and private enterprises are involved whenever it is possible.⁷³

Because the Danish government already had a substantive bureaucracy to manage its welfare state, it used ICT to lower labor costs and make operations more efficient. It also believed that an ICT investment could minimize the administrative burden on individuals and enterprises, freeing resources for investment.

This being the case, Denmark established a national digital strategy with a set of goals and objectives: to reduce the resources consumed by the public sector, simplify the process in which the citizens interact with the public sector, improve citizens’ experience with public services, and help companies save on regulatory compliance costs so that they can devote more resources to their core activities.⁷⁴ The expected benefits included effective communication with citizens, an easier path to growth for companies (using fewer resources), efficient collaboration with patients (as healthcare professionals have the right ICT tools to access data necessary for treatment), and greater use of technology for social services, particularly for the care of the elderly, children, the disabled, and disadvantaged youth.⁷⁵

The strategy included creating a set of digital assets for all persons and enterprises in the country, including the following:

- 1) Personal ID number: given at birth at hospital (CPR, Det Centrale Personregister), 1968⁷⁶

⁷³ Falch and Henten, “Future of Telecom Regulation.”

⁷⁴ “Baggrundsnotat: Digitalisering I Den Offentlige Sektor,” *Statsministeriet*, Ministry of Statistics, accessed May 9, 2016, http://www.stm.dk/multimedia/baggrundsnotat_om_digitalisering_i_den_offentlige_sektor.pdf.

⁷⁵ Ibid.

⁷⁶ “Historien Om CPR,” *CPR: Det Centrale Personregister*, accessed January 12, 2017, <https://www.cpr.dk/cpr-systemet/historie/>.

- 2) Unique number for each business (CVR, Det Central Virksomhedsregister)
 - a) First implementation (SE-nummeret), 1985⁷⁷
 - b) Current implementation, 1999⁷⁸
- 3) Digital signature: single login for all government and financial services, as well as any business (NemID), 2003⁷⁹
- 4) Easy account: one account for personal payments to and from government (Nemkonto), 2007⁸⁰
- 5) Mailbox: digital inbox for all government and financial communications (e-Boks), 2012⁸¹

Many Americans would likely have misgivings about the government defining IT solutions and requirements for centralized information, but from the Danish perspective, there was not an a priori mistrust of the government that would lead to such a concern.⁸² The adoption of the digital assets reflected that such centralized information systems (albeit analog) were already in place; digitizing them was simply a rational decision to lower costs and improve productivity. The policy recognized the challenge of maintaining the economic growth that drives high median wages, so making public services more efficient (fewer people, lower cost, higher efficiency) was necessary. In Denmark there is a tacit understanding that the government bureaucracy should not grow bigger; it should just be more efficient.

⁷⁷ Kristian Hjulsgaard, "SE-nummer," *Den Store Danske*, Gyldendal, April 6, 2014, http://denstoredanske.dk/Samfund%2c_jura_og_politik/Samfund/Samfund_og_statistik/SE-nummer.

⁷⁸ "Bekendtgørelse af lov om Det Centrale Virksomhedsregister" (Act on the Central Business Register), "LBK nr 653 af 15/06/2006 Gældende," *Retsinformation*, <https://www.retsinformation.dk/forms/r0710.aspx?id=27293>.

⁷⁹ "Historien Om NemID Og Digital Signatur," *NemID*, Danish Agency for Digitization, accessed January 12, 2017, https://www.nemid.nu/dk-da/om-nemid/historien_om_nemid/.

⁸⁰ "Lov om Offentlige Betalinger m.v" (Law on Public Payments), "LBK nr 798 af 28/06/2007 Gældende," *Retsinformation*, 2007, <https://www.retsinformation.dk/Forms/R0710.aspx?id=6037>.

⁸¹ "Lov om Offentlig Digital Post" (Law on Public Digital Post), "LOV nr 528 af 11/06/2012 Historisk," *Retsinformation*, <https://www.retsinformation.dk/Forms/R0710.aspx?id=142234>.

⁸² Søren Skaarup, "The Mediation of Authority: How Citizens Perceive and Engage the Mediations of the Bureaucratic Service Encounter and Changes in Its Mediation Matrix" (PhD diss., Syddansk University, June 2016).

These assets have been employed in novel ways. For example, NEMID is the de facto form of digital identification for secure online registration and authentication. It is used as a digital key to reset passwords to databases with sensitive information. Similarly, the e-Boks tool is used by a myriad of companies and government agencies. For example, monthly bills and financial statements are sent to a person's e-Boks rather than a physical mailbox or personal email account. This has dramatically reduced the use of paper mail. The Nemkonto application allows a person to receive all forms of financial government assistance and tax refunds in a single account. The Nemkonto is integrated with social security and salary payments, so Danes need not complete tax returns. All tax is deducted automatically. The digital assets have been incorporated into platforms such as the universal travel card or "rejserkortet."⁸³ This card allows users to travel on all bus and subway transportation in the country and reload their balance online.

The government has imposed some soft requirements to push digitization. For example, beginning in 2016, all communication with municipalities must be digital.⁸⁴ Citizens must address their issues through digital solutions (government apps) and digital communications (email). In practice this means that human receptionists are increasingly rare.

Taken in this perspective, Danes already recognize the value of digitization and its ability to make the government more efficient. That the telecom regulator would be dismantled is not necessarily radical to Danes because they accept that the government must continually improve the way it delivers processes and services.

⁸³ "What is rejsekord?," *Rejsekort*, accessed February 20, 2017, http://www.rejsekort.dk/?sc_lang=en.

⁸⁴ Thomas Nørgaard Andersen and Johanne Haagerup, "Danskerne har en enestående verdensrekord i tillid," *Nationalt*, February 4, 2015, <http://www.b.dk/nationalt/danskerne-har-en-enestaaende-verdensrekord-i-tillid>; Niels Vedersø Østergaard, "Politisk flertal vil sløjfe offentligt bureaukrati," *Politiko*, Berlingske, April 22, 2016, <http://www.politiko.dk/nyheder/politisk-flertal-vil-sloejfe-offentligt-bureaukrati>.

At the same time, government employees are respected and well compensated, but these benefits come with the understanding that employees may be shifted to different roles over time, and even asked to move to new locations. For instance, the current government has acted to decentralize offices by moving them from Copenhagen to locations across Denmark in order to create the appearance that power and government employment are not concentrated in the nation's capital.⁸⁵

Political Cooperation to Reach a Telecom Agreement: 1999

“Cooperation across the middle” (“Samarbejde over midten”) is the hallmark of Danish politics. This important trait distinguishes Danish politics from US bi-partisanship and even the Swedish “consensus.”⁸⁶ In practice, Danish leadership roles are held by politicians from two or three major parties and four or five smaller parties. No party has won a majority in the parliament for more than a century, so politicians are accustomed to crafting solutions that cut across party lines and perspectives. The work of getting so many parties on board for decision-making tends to drive a desire for long-term planning and stability.

Danish society is also characterized by trust, transparency,⁸⁷ and accountability,⁸⁸ and this includes a set of political safeguards for citizens to check the activities of government. These safeguards make it easier for citizens to trust the government and remain willing to pay a high rate of tax in exchange for a range of government services. Given the high cost of labor, there is

⁸⁵ Danish Finance Ministry, *Bedre Balance: Statslige Arbejdspladser Tættere på Borgere og Virksomheder*, October 2015, <http://www.fm.dk/publikationer/2015/bedre-balance>.

⁸⁶ John Alexander, *Consensus: The Hidden Codes of Swedish Leadership* (London: InterMedia Publications, 2008).

⁸⁷ Denmark ranks first in Transparency International's 2016 report of the world's least corrupt countries. It has consistently scored at the top of this list. “Corruption Perceptions Index 2016,” *Transparency International*, last modified January 25, 2017, <http://www.transparency.org/country/DNK>.

⁸⁸ Paul Hegedahl and Gunnar L. H. Svendsen, “Tillid—Samfundets Fundament: Teorier, Tolkninger, og Cases” (Syddansk Universitetsforlag, 2011).

also an openness to digital and self-regulatory solutions.⁸⁹ In contrast to the United States, where challenging the government through litigation is the norm, in Denmark regulatory solutions and decisions are generally accepted.

The importance of cooperation in Denmark is a product of economic and political history. For centuries, the country employed many forms of cooperative corporations (consumer- or producer-controlled firms). There were housing cooperatives as well as cooperative farms, dairies, windmills, and utilities.⁹⁰ Moreover, the country, one of the world's oldest monarchies and (when including Greenland) the second-largest European country after Russia, experienced the tumult of turning from a major European power into a minor one following a series of events in the 19th and 20th centuries (such as the loss of Norway, the Schleswig wars, and the World Wars). The major military and political miscalculations of these conflicts cost Denmark dearly in its treasury, territory, and population. Thereafter, it evolved a political pragmatism of sorts in which cooperation prevails among political actors in the country and even across the Nordic region (as discussed in a later section). It also bears mentioning that Denmark organized politically and industrially as a result of globalization⁹¹ and was motivated to maintain its high standard of living by competing with an export-oriented economy.⁹²

⁸⁹ Martin Vith Ankerstjerne, "Nej til lobbyregister—ja til selvregulering," *Debat*, Berlingske, January 11, 2014.

⁹⁰ Steen Busck and Henning Poulsen, *Danmarks Historie: i Grundtræk* (Aarhus, Denmark: Aarhus University Press, 2002).

⁹¹ Michael Elgaard Nielsen, ed., "Globalisering," *Danmarks Statistik*, March 2014; Peter Wivel, "Danmark en af globaliseringens sande vindere," *Politiken*, April 20, 2014.

⁹² For example, Roslyn Layton's doctoral degree was sponsored by a public-private partnership between Danish industry, government, and universities, to facilitate the transfer of knowledge between Denmark and the rest of the world. "Industrial PhD," *Innovationsfonden (Innovation Fund Denmark)*, last modified January 2017, <http://innovationsfonden.dk/en/application/erhvervsphd>.

In Danish politics, two or more parties can make a *forlig*,⁹³ a negotiated but nonbinding agreement among parties with procedural rules and guidelines for a defined period or until terminated. Denmark has a number of these agreements regarding welfare, defense, media, and other subjects.⁹⁴ In 1999, a group of political parties made the *Teleforlig*⁹⁵ (Telecom Agreement), the mission and vision for the national telecom policy laid out in a mere 10 pages. In practice, all political parties have upheld the telecom settlement, even the parties that did not agree to it, and it has remained in force even when some political parties have disbanded. Such an agreement, underpinned by cooperation, makes it possible for the country to make long-term, stable policy. This also supports long-term investment, which is important for telecom operators.

The *Teleforlig* emphasizes the need for a market-based, technology-neutral telecom policy. Though the government wants to ensure that consumers can access low-cost, high-quality telecommunications, it is not for the government to decide which technologies should be used, nor should it determine prices. The agreement accepts that convergence will create competition and new market realities. When markets become competitive, the regulation should be removed. Following is a summary of the *Teleforlig*:

The agreement is made between the Social Democrats, the Radical Left, the Left, the Conservative People's Party, the Socialist People's Party, and the Center Democrats. The goal is to ensure that all Danes have access to modern communications solutions. Technologies should find their way to consumers (it is not for the political system to decide which kind of technologies consumers should use). It is important that consumers can understand the offers on the market and observe transparency. The principle of "have

⁹³ Flemming Juul Christiansen, "Politiske Forlig i Folketinget Partikonkurrence og Samarbejde" (Political Agreement in Parliamentary Party Competition and Cooperation), *Politica*, Århus University, 2008.

⁹⁴ "Det telepolitiske forlig," *Danish Energy Agency*, Ministry of Energy, Utilities, and Climate, June 20, 2007, <https://ens.dk/ansvarsomraader/telepolitik/politiske-aftaler>. For agreements regarding welfare, see Niels Nørgaard, "Historisk aftale om velfærdsreformer," *Finanministeriet*, June 20, 2008, <https://www.fm.dk/nyheder/pressemeddelelser/2006/06/historisk-aftale-om-velfaerdsreformer>. For agreements regarding defense, see Danish Ministry of Defense, "Forsvarsfoliget 2013–2017," *Forsvarsministeriet*, last modified May 25, 2016, <http://www.fmn.dk/videnom/Pages/Forsvarsforliget2013-2017.aspx>. For agreements regarding media, see Danish Ministry of Culture, "Mediepolitisk Aftale for 2015–2018," *Kum*, June 26, 2014.

⁹⁵ "Telecom Settlement from September 1999," *Erhvervsstyrelsen.dk*, Danish Business Authority, accessed January 12, 2017, <https://erhvervsstyrelsen.dk/file/teleforliget-fra-september-1999pdf>.

the best and cheapest” still holds, but equal weight should be placed on both. The 1990s were focused on breaking down old monopoly; now it is important to make the frameworks for telecom, IT, radio, TV meld together—convergence. We believe that new technologies will create competition.

It is important to ensure that regulation does not create a barrier for the possibility of new converged products; for example, telecom operators should be able to offer content if they so choose. It is also important to ensure digital signature capability, digital payment, consumer protection, and digital rights. Regulation must be technologically neutral, and technology choices are to be handled by the market. The goal is to move away from sector-specific regulation toward competition-oriented regulation. We would prefer to handle telecom with competition laws, but some special regulation may be needed in certain cases—for example, regulation for access to copper and universal service.

In the next five to ten years, all Danes should have access to the best and cheapest telecom services in the world. The digital society should be accessible to everyone, including the handicapped. The telecommunication market is not static; it needs and demands change. This agreement requires that an annual report be made about the digitization in society.⁹⁶

While the Teleforlig is the product of many political parties, it was proposed and championed by some key individuals, including Prime Minister Poul Nyrup Rasmussen. Although Rasmussen has been both the leader of the Social Democrats and the president of the European Socialists, he is still considered a top advocate for the privatization of state-owned companies. He desired and achieved complete privatization of the state-owned Tele Danmark, unlike Denmark’s Nordic neighbors, which pursued partial privatization.⁹⁷ In promoting the Teleforlig, his message was that “Denmark simply should be the best IT nation in the world.”⁹⁸

Frank Jensen, also a Social Democrat and now mayor of Copenhagen, was Minister of Research and later Minister of Justice in Nyrup’s cabinet. He designed the Teleforlig with the

⁹⁶ Ibid. Translation by Roslyn Layton.

⁹⁷ The government presented its goals on June 9, 1995 (<http://www.statensnet.dk/pligtarkiv/fremvis.pl?vaerkid=12894&reprid=0&filid=16692&iarkiv=1>), and in December 1995 the law on the liberalization of the Danish telecommunications sector was completed, with additions in July 1996 (<http://webarkiv.ft.dk/BAGGRUND/statsrev/0897.htm>).

⁹⁸ “Danmark Som Verdens Bedste IT-Nation—Vision Eller Virkelighed? Statsminister Poul Nyrup Rasmussens Tale Til IT-Brancheforeningens Årsmøde Den 7. Marts 2001,” *Statsministeriet*, March 7, 2001. Translation by Roslyn Layton.

notion that market liberalization is essential for telecommunications⁹⁹ and that competition will ensure consumers have the “best and cheapest” (“bedst og billigst”)¹⁰⁰ ICT services, thus bringing Denmark up to speed with other nations.

Another architect of the Danish policy was Birte Weiss, who served as Minister of Research and Information Technology from 1999 to 2001. Her job was to organize the political parties to create the agreement for telecom policy in 1999, a watershed moment to win consensus ICT policy in a drive for national economic development. With the privatization of Tele Danmark complete and the Teleforlig in place, the government continued to move toward a market-based telecom policy. While the government was not interested in regulating telecom operators, it did see a role for itself in facilitating the digital society.

The current government led by Venstre (the center-right party) has launched a process to revise the Teleforlig. This is not surprising, as the current agreement is almost 20 years old. It could take some months, if not years, to conclude such a revision process. Some suggest the 25 percent value-added tax on communications services is too high.¹⁰¹ Others want more attention paid to networks in rural areas.¹⁰² Moreover, there has been a significant change of parties since 1999, so it is not unreasonable to make new commitments.

Facilitating Competition by Removing Wholesale Regulation on Wireless: 2006

The following discussion of the removal of wholesale regulation on wireless is based on a 2009 report from the Danish telecom regulator concerning events that happened roughly three years

⁹⁹ Karl Erik Thomsen, “Sidste Trin Mod Fuld Teleliberalisering,” *Ingeniøren*, June 16, 1995; “Bedst Og Billigst Gennem Reel Konkurrence,” *Statens Net*, June 9, 1995.

¹⁰⁰ “Interview: Frank Jensen og telebranchen,” *Aalborg Universitet*, April 3, 2006.

¹⁰¹ Poul Noer, “Frem med guleroen,” *Fyens.dk*, December 9, 2016.

¹⁰² Jan Rytkjær Callesen, “Digitale muligheder for alle,” *JydskeVestkysten*, December 19, 2016.

earlier.¹⁰³ The telecom authority of that time regulated operators' ability to buy traffic minutes and wholesale access to mobile networks. The telecom authority also regulated call origins (the network service that carries a call from the calling subscriber's network access point to the point of interconnection). The incumbent TDC was deemed to have significant market power (SMP) with some 50 percent of the wireless retail market and therefore faced a set of special obligations in addition to regulation on its wholesale activities. The second largest operator, Telenor (formerly Sonofon), was also regulated on wholesale. However, by 2006 the telecom regulator declared the market competitive and decided to deregulate the market. Specifically, it reached seven conclusions:

- 1) The presence of three wireless network operators and a fledgling fourth operator creates a competitive market.
- 2) Entrants have access to multiple wholesale providers.
- 3) There is a range of substitute goods in the wholesale market.
- 4) Wholesale prices have decreased, and there is no evidence that customers have been denied access to networks.
- 5) The number of wholesale customers is increasing.
- 6) TDC was released from a number of ex ante sector-specific obligations because it did not abuse its SMP of 50 percent share of the retail market.
- 7) Limited spectrum can be a barrier to the wholesale market, but this will be resolved in the future as more licenses come on the market. That is to say, regulation on the wholesale market is not needed to compensate for the lack of optimal spectrum allocation.

¹⁰³ This section is an analysis of "Market Decision on TDC A/S for wholesale mobile access and call origination (Market 15)," *Danish IT & Telecom Agency*, March 30, 2009. Translation by Roslyn Layton.

The telecom regulator made this decision under the European Union Telecoms Directive¹⁰⁴—specifically for the rules pertaining to Market 15, covering access to mobile networks and traffic minutes—and in consultation with the Danish Competition Authority.¹⁰⁵

The telecom regulator’s announcement to deregulate the wholesale market in 2006 was met with opposition from the fourth operator, Three or “3” (Hi3G owned by Hutchinson Whampoa), and brought to court. The court ruled in favor of the telecom regulator. Thereafter, the telecom regulator and competition authority updated their analysis and confirmed their earlier finding of a competitive market. The EU telecom authorities concurred with the decision. The regulation of the wholesale market and a set of SMP obligations of the incumbent TDC were vacated in 2009.

The deregulation means that the telecom authority cannot compel any network operator to engage in the wholesale market, nor can it regulate access or prices. Deputy director of the regulator Finn Petersen remarked, “Actually, we are obliged to remove the regulation when the competitive situation demands it. There is no need to regulate something that market forces can take care of, and our view is that it is not going to matter to mobile prices.”¹⁰⁶ Investigation did not reveal evidence of any complaints to authorities about wireless wholesale rates since the deregulation. Diverse wholesale products are offered by all four mobile operators; all have wholesale customers; and there are many resellers, including some 40 MVNOs.

In the Danish case, the fourth (and youngest) operator, which initially appealed the regulator’s decision, is stronger today because of deregulation. In the space of five years, “3”

¹⁰⁴ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), April 24, 2002, <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32002L0021>.

¹⁰⁵ Telecommunications Complaints Board, “Afgørelse af klage indbragt af Hi3G Denmark ApS over IT- og Telestyrelsens afgørelser på engrosmarkedet for mobilaccess (marked 15) rettet mod henholdsvis TDC A/S og Telenor Danmark Holding A/S,” January 31, 2007.

¹⁰⁶ “IT–Og Telestyrelse Dropper Regulering,” *Berlingske Business*, last modified May 17, 2012, <http://www.business.dk/digital/it-og-telestyrelse-dropper-regulering>.

continued with its network build-out and increased its capacity. It has the most supply of any operator in Denmark, and it offers the lowest prices to both its retail and wholesale customers.

It bears mentioning that forcing the bigger operators with larger networks to be more active on the wholesale market may unwittingly harm smaller network providers. This can potentially demolish fledging players. Indeed this very unintended outcome came about in Denmark when the highly regulated incumbent TDC and Telenor both used their mandated wholesale strategies to squeeze Orange (earlier Mobilix), then the fourth player, out of the market. Subscribers could choose low-priced service from a reseller rather than buy from the fourth operator Orange or from Hutchinson 3, which was also trying to build a network. Orange thus sold its business to Telia and exited the market in 2004.¹⁰⁷

Separately the 2008 financial crisis proved to be the wake-up call for European governments that the open access regime did not work. Regulatory models for stimulation of artificial competition or service-based competition (reselling) did not lead to new investment.¹⁰⁸ The broadband map of Europe shows that investment in new networks only took place in parts of the European Union.¹⁰⁹ Denmark proved to be one of the countries with the highest level of investment, but not because of open access policies. The high rate of fiber to the premises networks reflects the investment made by consumer-owned energy companies that found themselves flush with financial capital after selling off hard assets.¹¹⁰

¹⁰⁷ Strand Consult, “Once Again the Danish MVNO Market Is Showing the Way: Onfone Is a Successful Danish MVNO, Has Targeted the Medium and Heavy User Mobile Customers,” *Strand Consult Press Room*, January 2012.

¹⁰⁸ Falch and Henten, “European Broadband Policy.”

¹⁰⁹ Roslyn Layton, “The EU’s Broadband Challenge, Part 6: New Map Shows EU is No Broadband Utopia,” *TechPolicyDaily.com*, American Enterprise Institute, October 25, 2013, <http://www.techpolicydaily.com/internet/broadband-maps-eu-usa-read-weep/>.

¹¹⁰ Poul Jessen, “Danish Business Administration Telecom and Competition Regulation: An Overview of the Danish Telecoms Market” (Danske Bank Investment Research, November 2015). See also Yoo (2014); and Layton and Horney (2014).

In the case of Denmark, while the country has a robust market for reselling with hundreds of providers, no reseller has become a network operator, as Martin Cave theorized would happen in his LOI theory. Denmark is in fact the birthplace of the discount mobile virtual network operator.¹¹¹ The first discount MVNO, Tele2, was launched in 1996 and was subsequently sold to Telenor. Its launch was followed by the launch of the MVNO Debitel, which was purchased by Telia. All the leading mobile resellers and MVNOs in Denmark have been purchased by the network operators. The network operators run these companies under a multibrand and discount strategy. In some cases, the service providers' brand names are removed and replaced by the network operator's name (for example, TDC purchased service provider Onfone and combined it with its cable offering, YouSee). Such service-based competition can play a role in marketing and distribution. But the fact remains that no MVNO in Denmark has transformed into a full-fledged network operator and investor in Denmark.¹¹²

Facilitating Broadband in Society by Dismantling the Telecom Regulator: 2011

Falch and Henten chronicled the process of dismantling the Danish National IT and Telecom Agency (IT og Telestyrelsen). They conducted a series of detailed interviews with regulatory staff, operators, and policymakers following the dismantlement to explore the reasons and implications for the decision.

One of the very first initiatives of the center-left government that came into power in Denmark in October 2011 was to dismantle the then Danish IT and telecom regulatory agency NITA (National IT and Telecom Agency). This came as a total surprise, as the issue had not in any way been discussed in the broader public nor the narrower telecom and IT public before the elections. It did not create much debate after the dismantlement either. Nothing much was written about it in the press—neither did the new government

¹¹¹ Strand Consult, "The Moment of Truth—A Portrait of the Discount MVNO/Mobile Operators' Success," *Strand Consult Publications*, January 2005; Strand Consult, "Number Portability Is a Huge Success—Discount Mobile Service Providers Are Great with Numbers and Figures," *Strand Consult Press Room*, February 2004.

¹¹² "Mobilabonnementer på Danmarks bedste 4G mobilnetværk," *YouSee*, 2016, <https://www.yousee.dk/mobil>.

explain its initiative. Nobody seemed to care much—except for the staff who needed to move to other authorities and a few people especially interested in IT and telecom regulation. The functions of NITA were split up between 4 different ministries: The Ministry of Business and Growth, The Ministry of Defense, the Ministry of Financial Affairs, and the Ministry of Economic and Domestic Affairs. The telecom regulatory functions were moved into the general Danish Business Authority under the Ministry of Business and Growth, and staff from NITA contributed to two new authorities: the Danish Agency for Digitalization and the Danish Agency for Modernization.¹¹³

Falch and Henten observe that in Denmark “it is not unusual that functions of ministries are reshuffled after a change of government and that this also affects agencies.”¹¹⁴ Both EU and Danish telecom laws are still in effect.¹¹⁵ To be clear, the functions of the regulator are still discharged, just by different agencies. This is how telecom regulation has operated in Denmark since the change in 2011.

Falch and Henten’s interviewees raised some issues.¹¹⁶ They noted that as a result of the dismantlement, the politicization of telecom regulation lessened and the government improved its ability to deliver the e-government agenda.

There were concerns that the existing entity did not do enough to control the power of the incumbent vis-à-vis new entrants. At the same time, there was a concern that entrants would politicize regulation to their own benefit. There was also a concern that the quality of the regulatory function was being compromised because as a sector-specific regulatory agency, it is subject to regulatory capture. Being housed within a generalized but powerful agency allows staff to have the proper distance from the industry so as not to show favoritism among firms. Distance also affords employees a view of big-picture policy goals.

¹¹³ Falch and Henten, “Future of Telecom Regulation.”

¹¹⁴ Ibid.

¹¹⁵ Danish Telecom Industry, *Telestryrelsens resultatkontrakt for 1999*, February 1999, <http://www.statensnet.dk/pligtarkiv/fremvis.pl?vaerkid=648&reprid=1&iarkiv=1>.

¹¹⁶ Falch and Henten, “Future of Telecom Regulation.”

One official involved in the reorganization observed,

If ICT is in everything, there is no reason for a specialized telecom agency. It is natural to put the regulatory function within the general business ministry in order to better coordinate business initiatives involving telecommunications. There is agreement that the potentials for strengthening a telecom agenda and for a better coordination with business policies in general are improved.¹¹⁷

Falch and Henten note the consensus among the interviewees that the decision to dismantle the regulator is consistent with the policy adopted in 1999. They state,

The general agreement is that the present type of regulation is the backbone of Danish telecom policies and there is in reality no support from any major public funding for infrastructures. The expression is that Danish telecom policies should still be centred on a market-based approach and technology neutrality. None of the interviewees favour extensive public economic funding, but some of the interviewees would favour more focus on infrastructure competition and less on service competition. The implications in terms of regulations of telecommunications could be that the regulation of the telecom area needs to be further integrated into a broader set of regulations. This could call for a change in the organization of the regulation of telecommunications away from a stand-alone regulatory position towards a greater integration into a more generalized regulatory environment.¹¹⁸

Despite that consensus from the interviewees, it can be observed that dismantlement could create some challenges for process and coordination. For example, firms might need to file different documentation to different agencies instead of a single agency. Such challenges can be overcome, and given that the new system has been in place for more than five years without debate, it appears that firms have adjusted to the change.

However, now that the telecom policies and regulation that were put in place in the late 1990s have been in force for some 20 years, the specific telecom policies and regulation do not have as prominent a position as before and can, to a greater extent, be subsumed under the more general ICT policies. This is, at least, how the argument for abolishing a stand-alone telecom

¹¹⁷ Ibid.

¹¹⁸ Ibid.

regulatory institution could be formulated. And the argument could be made even stronger by claiming that a stand-alone regulatory institution might be counterproductive under the present circumstances.¹¹⁹

Prime Minister Helle Thorning-Schmidt, who proposed the change, was asked about the dismantling of the agency in Parliament. She explained, “The purpose of dismantling the agency has not been to split or downgrade the IT area, but rather to consolidate and enhance synergy in the IT sector across ministries.”¹²⁰ While it might not occur to policy scholars, the expertise of the various regulatory officials and their functions could be leveraged with other public-sector agencies for added value. Indeed, the staff of the agencies had skills that were helpful for departments working in finance, cybersecurity, and domestic affairs, among other fields.

Cooperation among Stakeholders for Net Neutrality: 2011

Globally net neutrality has been the most debated issue in telecom policy in the last 15 years, but it has not caused so much fanfare in Denmark. Today some 50 nations have hard net neutrality rules encoded in legislation, including the member countries of the European Union. However, the Nordic countries were first in establishing soft rules through a multistakeholder approach, and they experienced success with the policy. Up to the adoption of EU-wide rules in 2016, the Nordic countries essentially had no net neutrality violations on record. In 2009 the Swedish regulator conducted an assessment of its broadband markets, found no abuse, and thus promoted

¹¹⁹ Ibid.

¹²⁰ Helle Thorning-Schmidt, “Statsministerens besvarelse af spørgsmål nr. S 109 stillet af Stine Maiken Brix (EL),” *Statsministeriet*, October 18, 2011. Translation by Roslyn Layton.

a set of nonbinding principles which operators could follow.¹²¹ The Norwegian regulator also proposed voluntary rules in the same year.¹²²

Denmark took a slightly different approach. Danish telecom operators believed they could deliver a net neutrality regime better than regulators and offer it in such a way that it improved both their brand and the quality of their services.¹²³ Therefore the Danish operators' trade association, Teleindustrien, took the initiative to create the Net Neutrality Forum,¹²⁴ self-regulation delivered through a set of net neutrality principles and a multistakeholder process. The effort was a success in part because there was already a proven case for industry self-regulation with the recent history of the rollout of premium SMS. Premium SMS has been widely adopted in Denmark with little to no consumer complaints, and the industry maintained its promised standard.¹²⁵ The Net Neutrality Forum was founded in 2011, agreed to a set of principles, and meets on an as-needed basis. The EU rules now supersede the voluntary principles that the Danish operators had agreed to uphold.

Though participation was open to anyone, the Net Neutrality Forum's key members were the Internet service providers, the Danish Consumer Council (Forbrugerrådet), Google, and a representative from the telecom section at the Danish Business Authority (a government representative from the now-disbanded telecom regulator). In the Danish net neutrality regime, Internet service providers agreed to uphold a set of consumer-centric principles similar to the

¹²¹ Swedish Post and Telecom Authority, "Nätneutralitet," *PTS*, last modified August 30, 2016.

¹²² Norwegian Communications Authority, "Nettnøytralitet: Retningslinjer for nøytralitet på Internett," *NKOM*, February 24, 2009.

¹²³ Jakob Willer (CEO, Teleindustrien), interview by authors, July 4, 2014.

¹²⁴ "Netneutralitet," *Teleindustrien*, accessed April 8, 2016, <http://www.teleindu.dk/branchesamarbejde/netneutralitet/>.

¹²⁵ "Rammeaftalen for mobile indholds- og betalingstjenester," *Rammeaftalen.dk*, June 13, 2014, <http://www.rammeaftalen.dk/om/>.

Four Freedoms¹²⁶ adopted by the FCC in 2004 with an additional commitment to the quality of the connection. Should problems arise, the forum's job was to provide a means for quick and flexible resolution. According to the industry association, there has only been one issue: at one point, one of the operators wanted to levy a surcharge for WhatsApp, but the forum advised against it.¹²⁷

Roslyn Layton's doctoral thesis investigates the Danish self-regulatory model for net neutrality in comparison to the Netherlands over the period 2010–2016.¹²⁸ The Netherlands bears some similarities to Denmark in terms of broadband development and socioeconomic factors, but the Dutch opted for hard net neutrality regulation. During the period investigated, Danes, who opted for self-regulation, generated a statistically significant higher level of mobile app innovation than the Dutch, who made the world's toughest rules. Denmark also succeeded in producing world-leading mobile apps in multiple categories, whereas the Dutch produced no such global category leaders of apps.

She investigated the sources of the 1,000 most popular mobile apps in the two countries over the five-year period, and found that only a handful of apps come from countries with hard net neutrality rules. The US apps that appeared were generally developed before the FCC imposed a new set of rules that for the first time applied to mobile networks in 2015. The apps studied overwhelmingly came from countries with either soft net neutrality rules or no rules at all.

Given the disparity between Denmark and the Netherlands in outcomes, the different regulatory regimes were examined more closely, revealing some essential differences. For one,

¹²⁶ Federal Communications Commission, *Preserving the Open Internet; Broadband Industry Practices*, May 9, 2012.

¹²⁷ Willer, interview by authors.

¹²⁸ Roslyn Layton, "Which Open Internet Framework Is Best for Mobile App Innovation? An Empirical Inquiry of Net Neutrality Rules around the World" (PhD diss., Aalborg University, Copenhagen, Denmark, 2017).

Denmark enjoyed greater commercial freedom. During the 2010–2016 period, Danish mobile operators were encouraged to partner with local content developers (essentially outlawed by net neutrality rules in the Netherlands). The Netherlands has four mobile networks and Denmark has three (one is shared by Telenor and Telia), but Denmark’s rate of post-paid penetration on 3G and 4G networks is significantly one-third greater than that of the Netherlands. This suggests that Danish operators were more successful in encouraging subscribers to adopt data packages more quickly. This was aided by early use of free data (such as Telenor’s free Facebook programs to get people to try data packages) and the wide use of flat-rate voice and SMS plans in mobile packages.

In fact the very issue that drove the Dutch Parliament to create net neutrality rules was the possibility that Dutch telecom incumbent KPN would charge a piecemeal fee for WhatsApp. This came in response to users adopting WhatsApp en masse on account of high SMS fees. In Denmark, where unlimited SMS was included in mobile data contracts,¹²⁹ there was not a great incentive to use WhatsApp. Even today, WhatsApp usage in Denmark is significantly lower compared to usage in the Netherlands.¹³⁰ Interestingly, some apps may enjoy higher adoption in countries with outdated pricing models. But this also suggests that a perceived net neutrality violation may actually indicate a marketplace that is not allowed to evolve without regulatory permission. For example, Dutch operators cannot change a tariff without pre-approval from regulators,¹³¹ a condition not required of Danish operators. Operators in Denmark have long enjoyed the ability to experiment with different offers as a means to promote adoption of mobile broadband.

¹²⁹ Peter Engels Ryming, “Telia lancerer gratis SMS,” *Computerworld*, March 20, 2003, <http://www.computerworld.dk/art/125139/telia-lancerer-gratis-sms>.

¹³⁰ For a snapshot of WhatsApp use in the Netherlands in 2014, see “Share of Mobile Internet Users in Selected Countries Who Are Active WhatsApp Users as of 4th Quarter 2014,” *Statista*, <https://www.statista.com/statistics/291540/mobile-internet-user-whatsapp/>; and for a snapshot of WhatsApp use in the Netherlands in 2016, see “Share of Individuals Using WhatsApp in the Netherlands in 2016, by Province,” *Statista*, last modified 2016, <https://www.statista.com/statistics/579087/whatsapp-penetration-in-the-netherlands-by-province/>.

¹³¹ Authority for Consumers & Markets, “Regulations Price Squeeze Guidelines,” *Regulations*, February 28, 2001.

As described in more detail below, the Danish representatives from the telecom section of the Danish Business Authority opposed efforts to make tougher net neutrality rules in the European Union, as the Net Neutrality Forum proved successful in Denmark. The Swedish regulator also opposed tougher rules, saying that the EU net neutrality rules were a step backward. In Sweden, the regulator and industry were progressing toward transparency, and consumers could decide for themselves whether they wanted to switch operators because of traffic management practices.¹³²

Facilitating Cooperation to Fast-Track Mobile Infrastructure

Regulation can play a helpful role in the market when it comes to addressing rollout challenges at the local level. For a time, there was a lack of coherent regulation in Denmark for mobile infrastructure deployment, which led to cost increases and delayed construction. Before the regulation, it frequently required 12–18 months of administration and \$250,000 in setup and rental costs for a mobile operator to establish a single mobile mast or tower. As the section describes, some 20 percent of planned structures were not built.

Mobile telephony networks require continuous updating and improvement. Around the world, operators have paid for licenses that only provide a financial return when the infrastructure is in place. Operators are now planning the next generation of mobile infrastructure. Unfortunately, the administrative process to install new masts and towers can be a bottleneck.

Demand for mobile devices has exploded, and greater bandwidth is needed to transmit the increasing volume of data. With their many functions and apps, smartphones continue to send and

¹³² “ETNO-MLex Summit 2014: Interview with Ola Bergström, Director for International Affairs, Swedish Post and Telecom Authority–PTS,” viEUws video, 3:57, July 7, 2014, www.vieuws.eu/etno/etno-etno-mlex-summit-2014-interview-with-ola-bergstrom-director-for-international-affairs-swedish-post-and-telecom-authority-pts/.

receive data even when not in use, draining network capacity even further. Given this situation and the need to maintain quality of service, network operators need more antennas and masts.

Ironically, while people desire good mobile coverage, they are increasingly opposed to the construction of mobile network structures, citing concerns over historical preservation, aesthetics, decreased property value, and health. Many are convinced that electromagnetic radiation from mobile networks is hazardous in spite of definitive studies disproving this claim.¹³³ Frequently the necessary evidence, scientific discussion, and economic analysis are missing from the public discussion. As a result, politicians and decision makers have become insecure because they cannot distinguish facts from prejudices. Thus, municipalities feel obliged to involve external parties and residents in the decision process, dragging out the approval process by months, if not years.

It is not surprising that site owners capitalize on the negative public discourse and exploit mast locations as a lucrative source of income, charging operators increasing rental fees and expensive contract renewals. Municipal landlords can do the same. The situation is also unfavorable for the deployment of small cells on which deployment of 5G depends.

To investigate the problem, Danish consultancy Strand Consult collected a number of rental contracts for masts and towers across Denmark's 98 municipalities.¹³⁴ The resulting information was compiled and analyzed, revealing that 15 municipalities had created a cartel to increase rental prices as much as possible. The case was presented to Danish competition authorities who prosecuted the issue with the police.

¹³³ Patrizia Frei et al., "Use of Mobile Phones and Risk of Brain Tumours: Update of Danish Cohort Study," *BMJ* (October 20, 2011).

¹³⁴ Strand Consult, "How Mobile Operators Can Reduce Cost for Mobile Masts and Improve Mast Regulation," *Strand Consult Publications*, 2015, <http://www.strandreports.com/sw4546.asp>.

The Danish minister for business and growth, Social Democrat Ole Sohn, called a mandatory meeting of representative stakeholders, private and public organizations, mobile operators, government officials, civil servants, community leaders, and so on. The purpose of the meeting was to discuss how to improve business conditions for mobile operators wishing to expand their mobile networks. Stakeholders then agreed to work together to explore how to ensure good mobile coverage throughout Denmark. After the meeting, the minister issued a press release that clearly showed that the meeting participants had reached a political understanding about the challenges the mobile industry had been battling in this area.¹³⁵ Sohn declared,

Denmark is one of the countries in the world that has the best mobile coverage, but this does not mean that we can't do better. Therefore, I am very pleased that we have examined all the barriers and I want to create opportunities for better mobile coverage in all parts of Denmark. . . . I am therefore pleased that all parties endorse the number of initiatives we are now putting in place to improve mobile coverage. The task can only be solved if telecommunications companies, municipalities, and the state contribute to clear obstacles out of the way.¹³⁶

Danish municipalities suddenly started approving many old mast applications, some as old as five years. A number of municipalities reduced their rental prices by anywhere from 20 to 80 percent. This was achieved by implementing a new pricing policy whereby rental prices for municipality-owned property were reduced. Some made municipal land available for free; others offered it for sale.

After four years, network operators have reduced their site rental operating expenditure by about 20 percent (about \$10 million–\$12 million annually), and they have increased the amount and speed of infrastructure deployment. These amounts are significant for a small country of 5.7 million inhabitants with some 7 million mobile subscriptions.¹³⁷

¹³⁵ “Agreement on Joint Efforts for Better Mobile Coverage,” Danish Ministry of Industry, Business and Financial Affairs, February 10, 2012, <http://em.dk/nyheder/2012/10-02-12-enighed-om-faelles-indsats-for-bedre-mobildaekning>.

¹³⁶ Ibid. Translation by Roslyn Layton.

¹³⁷ Ibid.

The European Union's Rejection of Consolidation and Failure to Facilitate Needed Network Investment: 2015

Consolidation is a widely discussed topic in business and strategy literature, but it has certain nuances and implications for the mobile industry. The arguments for consolidation include gaining more market share, deploying better business models across a larger customer base, accessing new technologies, getting better terms for financing, finding hidden or nonperforming assets belonging to a target company, and winning better bargaining power from suppliers. Another key benefit of consolidation is a reduction in administrative expenses; for example, the same sales and marketing department can serve two companies. This is significant for a mobile operator, as sales and marketing costs can comprise a quarter of revenue.

When applied to network industries such as telecommunications, consolidation can have some important benefits including reduced operating expenditures on network operations, reduced capital expenditure with fewer sites (or the removal of redundant sites), reduced marketing costs (fewer brands to market), and better utilization of spectrum and infrastructure investment. In mature economies, there are limited growth opportunities for mobile customers. Markets are saturated as nearly all subscribers have devices with data subscriptions.

For these and related reasons, in 2015, the Norwegian Telenor and the Swedish Telia petitioned the European competition authority to approve a merger of their companies in Denmark.¹³⁸ EU law prescribes that the Directorate-General for Competition (DG Comp) get involved when revenue from mergers is associated with entities outside the country, whereas if two national firms combine, review is performed by the nation's domestic competition

¹³⁸ Strand Consult, "The Consequences of the Failed Telenor Telia Merger in Denmark and What It Means for Mergers in the UK, Italy and the Global Telecom Market—Post Mortem Part II," *Strand Consult Press Room*, last modified September 2015, accessed April 14, 2016, <http://www.strandreports.com/sw6656.asp>.

authorities. Telenor and Telia already shared a network, but they wanted to reduce their costs. On account of the competition, both firms were experiencing ongoing losses.

In their petition, Telenor and Telia noted that the number of mobile networks in Denmark would not be reduced, only the number of network operators. Moreover, the combined entity would have greater ability not only to upgrade and extend the network, but also to compete with TDC, which had 51 percent market share and 95 percent of the EBITA. For example, Telenor and Telia wanted to extend their 4G network to include a larger share of Denmark. Telia wanted to extend its content offering to compete with TDC's cable network. The Swedish company is known as a technology pioneer and has been a leader in partnering with Swedish Spotify and HBO Nordic. It was the first in the region to offer a video-on-demand solution that provides unbundled cable content directly on a mobile service. These providers joined forces to offer unique content to compete with Netflix's global portfolio.¹³⁹ In any event, Denmark has some of the lowest mobile prices in Europe and extensive 4G coverage, which would seem to have been favorable for the merger.

DG Comp raised a number of concerns: that the merged entity would collude with TDC, that the number of wholesale providers would be reduced from four to three, and that the new entity would not invest in network expansion.¹⁴⁰ It is rumored that a set of remedies were proposed including having the parties spin off their spectrum and network and create a new fourth network operator in Denmark. While DG Comp may prefer such a model, it does not offer an attractive economy for a new entrant.

¹³⁹ "Service FAQ," *HBO Nordic*, accessed April 18, 2016, <https://dk.hbonordic.com/service/faq>.

¹⁴⁰ "TeliaSonera, Telenor Withdraw Danish Merger Bid," *Telegeography*, September 11, 2015; "Statement by Commissioner Vestager on Announcement by Telenor and TeliaSonera to Withdraw from Proposed Merger," *European Commission*, September 11, 2015.

Denmark, while a competitive market with low prices for consumers, is not necessarily interesting for investors. It is extremely difficult to find a buyer for Telia and Telenor's network under such conditions and when the expected returns are minimal. Moreover, if either of the players wanted to exit the network-sharing agreement by selling to Hutchinson 3 (DG Comp would not allow a sale to TDC), they would incur a "divorce fee." So while it may be uneconomic to continue under the status quo, it is even more financially distressing for either Telenor or Telia to exit the market.

Ultimately Telenor and Telia rescinded their request to merge. DG Comp indicated that they would not approve the merger anyway because they believed it would increase the mobile prices in Denmark, already some of the lowest in Europe.¹⁴¹ That belief turned out to be a self-defeating prophecy for the seemingly omnipotent competition authority. Soon after the merger was deterred, one by one, all Danish operators raised prices.¹⁴² As for DG Comp's concerns of collusion and abuse of wholesaling, Denmark's own competition authorities could have easily addressed such problems if they had ever materialized.

Ultimately, Danish consumers lose because they are deprived of further next generation networks and the value generated by the resultant technological competition. The winner in this scuttled affair is, of course, the incumbent TDC. With its competitors weakened, TDC can continue to enjoy its market position. Regulatory intervention, frequently asserted to protect consumers, can unwittingly serve incumbents.

¹⁴¹ "Statement by Commissioner Vestager on Announcement by Telenor and TeliaSonera to Withdraw from Proposed Merger."

¹⁴² Thomas Breinstrup, "Nu Stiger Mobilpriserne I Danmark," *Berlingske Business*, October 20, 2015, <http://www.business.dk/content/item/390308>; Kim Stensdal, "Efter Mange Års Priskrig: Derfor Stiger Prisen for et Mobilabonnement I Danmark," *Computerworld*, January 11, 2016, <http://www.computerworld.dk/art/235976/prisen/>; Madanmark Finans, "TDC Skruer Op for Mobilprisen—Det Vil Vække Glæde," *Finans*, March 15, 2016, <http://finans.dk/live/erhverv/ECE8512119/tdc-skrue-op-for-mobilprisen-det-vil-vaekke-glaede/>.

It is not always DG Comp's approach to scuttle mergers or insist on severe remedies, but the basis of approval appears to be either arbitrary or extremely political. For example, the British Telecom–EE merger was approved by British authorities without remedies,¹⁴³ but DG Comp disallowed the Hutchinson–O2 deal.¹⁴⁴ As of the publication of this paper, the UK has three network operators serving 60 million users. If counting competitors is the name of the game, then it is not logical for the UK to have three network operators serving 60 million users while Denmark must have four operators for a mere 5.7 million users. Similarly, Mexico has three mobile network operators (after a consolidation from five network operators) and 125 million users.

The European Parliament and Council established a policy with an arbitrary preference for allowing “cross-border” mergers rather than “in-country” mergers.¹⁴⁵ From a financial perspective, there are few, if any, synergies in cross-border mergers. The spectrum regime, regulations, taxation, and other conditions do not necessarily cohere across borders, but within any given country, they are better harmonized. Among mobile operators within single European countries, there is up to 75 percent cost redundancy.¹⁴⁶ This story is indicative of the larger challenges in the European Union, which faces about a €100 billion gap in investment for needed next generation networks.¹⁴⁷ It seems untenable for the European Parliament and Council to

¹⁴³ “BT Group/EE Merger Inquiry,” *Gov.uk*, January 15, 2016, <https://www.gov.uk/cma-cases/bt-ee-merger-inquiry>.

¹⁴⁴ “CK Hutchison/Telefonica Europe (O2 UK) Merger,” *Gov.uk*, December 4, 2015, <https://www.gov.uk/cma-cases/ck-hutchison-holdings-ltd-ckhh-telefonica-europe-plc-o2-uk-merger>.

¹⁴⁵ “Opinion of the European Economic and Social Committee on the ‘Proposal for a Directive of the European Parliament and of the Council on cross-border mergers of companies with share capital,’” *Official Journal of the European Union*, April 30, 2004, online at *EUR-Lex*, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52004AE0664>.

¹⁴⁶ Wolfgang Bock, Björn Röber, and Péter Soos, “Reforming Europe’s Telecom Regulation,” *bcgperspectives.com*, July 19, 2013, https://www.bcgperspectives.com/content/articles/telecommunications_public_sector_reforming_europes_telecom_regulation/.

¹⁴⁷ *Ibid.*

oppose mergers simply for the sake of upholding some magic number of mobile operators in each European country.¹⁴⁸

This article has not focused on spectrum, but suffice it to say that suboptimal spectrum allocation and refarming are challenges for Danish operators. Indeed, all operators and countries face these issues, and they are being addressed in an EU-wide reform process.¹⁴⁹

Companies in the digital IT sector compete largely through innovation, not price.¹⁵⁰ But many competition authorities still analyze mergers by counting competitors rather than by performing a dynamic competition analysis, which would consider that firms in converged digital markets compete not necessarily on price but on the ability to create new services, enter new markets, and leverage technologies to deliver existing services at lower costs.

Having four mobile network operators is not only increasingly unsustainable in many countries, but it is also not empirically associated with lower prices, more choice, or more innovation. Moreover, there may be more effective ways to support lower prices, increased choice, and more innovation than by artificially creating a fourth operator where market actors see no incentive to do so. Lower mobile prices are largely the result of technological competition and substitutes. It is over-the-top voice and SMS providers that have provided the most price pressure.

¹⁴⁸ For further discussion of the European Commission and its challenges with telecom policy, see Roslyn Layton, “The European Union’s Broadband Challenge,” American Enterprise Institute, February 19, 2014, <https://www.aei.org/publication/the-european-unions-broadband-challenge/>.

¹⁴⁹ “Improving Access to Radio Spectrum through Market Mechanisms,” *European Commission*, last modified March 16, 2016, <https://ec.europa.eu/digital-single-market/en/improving-access-radio-spectrum-through-market-mechanisms>; and “Auktioner Og Udbud for Frekvenser,” *Energistyrelsen*, Danish Energy Agency, May 30, 2016, <https://ens.dk/ansvarsomraader/frekvenser/auktioner-og-udbud-frekvenser>.

¹⁵⁰ Eisenach and Soria, “New Regulatory Framework,” 10.

Pan-Nordic Cooperation to Facilitate Modernized Telecom Policy: 2015

In response to the European Commission's Digital Single Market initiative, the telecom authorities of the Nordic countries conducted a dialogue about further improvements for telecom policy.¹⁵¹ Katrine Winding, deputy director general of the telecom section within the Danish Business Authority, wrote a series of position papers for the group. The regulators observe that telecom regulation needs to be updated to reflect the competition from over-the-top technologies (OTT), the substitutability of OTT for traditional telecom services, the need to level the playing field, and the need to roll back sector-specific regulation. A submission to the European Commission in 2015 explains,

The playing field for all actors in the digital economy needs to be levelled out. To promote innovation and new solutions in the European digital economy, the Nordic regulators agree that the starting point should be reducing the regulatory burden where possible, rather than extending the present sector-specific regulation.¹⁵²

The position was further updated in 2016 to recognize that telecom operators are not “bottlenecks” to OTT providers (“edge providers” in American parlance):

The OTT development has been intensive over the last couple of years. When the open Internet is used as a distribution platform, the delivery of telecommunication and media services becomes global, and consumers are no longer forced to buy these services together with the network service. This leads to a more competitive market situation at the local level.

Previously, the aggregator or distributor role was linked to network ownership, giving these companies a unique position as owners of a bottleneck resource. Today, we see a development, where the link between the aggregator and network ownership is disintegrating. This development removes the high entry barriers on delivery of content services as an aggregator, and it allows many companies to position themselves in the role of both aggregator and content service provider. So far, it is the experience in the

¹⁵¹ “The Digital Single Market Strategy: The Nordic NRAs’ Viewpoints” (position paper by communications regulatory agencies of five Nordic countries, published online by the Swedish Post and Telecom Authority, August 25, 2015).

¹⁵² *Ibid.*, 11.

Nordic countries that the reduced vertical integration has a positive effect on market dynamics, innovation, and investment.¹⁵³

This view sharply contrasts with the FCC position that ISPs have the ability and incentive to harm openness. While the FCC recognizes that there has been an explosion of Internet content, services, and applications from third party “edge providers,” its response is to add regulation to “preserve” and “protect” rather than to allow the ostensible free competition to continue.¹⁵⁴

What the United States Can Learn from Denmark

These developments in Denmark illustrate some important lessons for the United States. For one, there is no particular political party that has the magic formula for telecom policy. In fact, the Danish model shows that cooperation across parties produces good and sustainable outcomes. This is not a foreign concept even for the United States—there was noted bipartisanship on telecom policy from 1996 to 2008. While some stereotypes are proffered about Republicans favoring deregulation, some of the most noted reformers and deregulators have been Democrats. The chief exponent is the “father of airline deregulation” himself, Alfred E. Kahn, a Democrat whom President Jimmy Carter appointed to head the Civil Aeronautics Board and who then dismantled it.

President Bill Clinton, a Democrat, signed the 1996 Telecommunications Act promising to keep the Internet “free and unfettered from state and federal regulation.” Indeed, his FCC appointee Chairman Bill Kennard offered a proposal to reform the agency¹⁵⁵—a proposal that

¹⁵³ “The EU Telecommunications Legislation for the Digital Single Market: The Nordic NRAs’ Viewpoints” (position paper by communications regulatory agencies of five Nordic countries, published online by the Swedish Post and Telecom Authority, July 4, 2016), 4.

¹⁵⁴ “FCC Adopts Strong, Sustainable Rules to Protect the Open Internet,” Federal Communications Commission, February 26, 2015.

¹⁵⁵ Federal Communications Commission, “Chairman Kennard Delivers to Congress Draft Strategic Plan For 21st Century: Sees Need for New Structure in Era of Converging Technologies; Calls for Faster, Flatter and More Functional Agency,” news release, August 12, 1999.

was abandoned because of pushback from the Washington, DC, bar association, which feared a potential loss to its billings.

This point underscores a fact overlooked: deregulated markets are still subject to competition law and in fact could come under closer scrutiny depending on the quality of economic analysis. Consumer protection standards at the Federal Trade Commission (FTC) are tougher than the vague public-interest standard employed by the FCC today. Moreover, the FTC can actually recover damages for consumers, whereas the fines collected by the FCC do not go back to those abused.

In any event, the FCC, with 587 lawyers and only 59 economists, is not optimally equipped to make determinations about consumer protection, let alone other economic issues. Establishing respective Bureaus of Economics, Competition, and Consumer Protection at the FCC, mirroring the FTC, would likely be a good place to start.

Unlike other federal agencies, the FCC is not required to conduct benefit-cost analysis or include economic analysis in its activities. The situation in which the agency's economists are not consulted or included in rulemaking was highlighted in the Open Internet proceeding.¹⁵⁶ This raises a number of concerns about the quality of the agency's decisions.¹⁵⁷

Compared to other federal agencies, the FCC suffers from a high rate of litigation against its decisions. While this reflects that it regulates parties with the capacity to sue (and the barriers to sue are relatively low in United States), it demonstrates that many FCC decisions are partisan, push the boundaries of its authority, and are therefore challenged in court. As of the publication

¹⁵⁶ Tim Brennan, "Is the Open Internet Order an 'Economics-Free Zone'?", *Perspectives from FSF Scholars* 11, no. 22 (Free State Foundation, June 28, 2016).

¹⁵⁷ Gerald R. Faulhaber and Hal J. Singer, "The Curious Absence of Economic Analysis at the Federal Communications Commission: An Agency in Search of a Mission" (working paper, CALinnovates, San Francisco, CA, July 10, 2016).

of this paper, the DC Circuit has yet to rule on the request of an en banc rehearing of the nine lawsuits against the FCC Open Internet Order. Such litigation is not costless. A leading financial analyst suggests that telecom investment is 10–15 percent lower because of the risk premium imposed by Title II reclassification.¹⁵⁸ Adding another \$10 billion to infrastructure investment, particularly to rural areas, would surely make a positive difference in the United States.

The Danish model proves that a specialized telecom regulator is unnecessary to deliver telecom laws. Laws can be delivered across a range of institutions and, indeed, reducing regulatory capture improves outcomes for consumers and competition. In any case, congressional review of telecommunications laws and the FCC is long overdue.

Conclusion

While Denmark has been praised as a broadband utopia and the world’s happiest nation,¹⁵⁹ this paper has attempted to look deeper to understand the concrete elements and decisions that helped create Danish telecom policy and produce a competitive market outcome with high adoption.

While it is not correct to say that there is a pure free market for telecommunications in Denmark, the government has opted not to allow regulators to micromanage the industry.

At the same time, Danish regulators have followed the tenets of classic regulation more closely than a number of other countries. This means that there is a conscious effort to achieve full competition and remove regulation. Moreover, regulatory professionals have exhibited humility and flexibility; they see their roles objectively and are willing to contribute to other areas of public service when needed.

¹⁵⁸ Frank Louthan, “Raymond James, Title II Late; The Damage Assessment for Telecom Begins,” February 27, 2015.

¹⁵⁹ John Helliwell, Richard Layard, and Jeffrey Sachs, *World Happiness Report 2016, Update* (New York: Sustainable Development Solutions Network, 2016).

The Danish government sees its role as a facilitator for telecommunications, not a regulator. Therefore it has created a framework for a digital society with assets and systems to reduce friction and lower transaction costs. In addition, it has designed telecom policy with a multi-party agreement to a long-term vision of a market-led, technology-neutral framework that delivers high quality and competitively priced services for Danes. American telecommunications policymakers can look to the Danish model for guidance in developing a more cooperative and ultimately more effective telecom policy to serve consumers and competition, not special interests or specific companies.