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REDACTED—FOR PUBLIC INSPECTION

By ECFS

March 23, 2015

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57

Dear Ms. Dortch,

Pursuant to the *Second Amended Modified Joint Protective Order*[1] in the above-captioned proceeding, COMPTEL submits a public, redacted version of the attached ex parte letter dated March 23, 2015. COMPTEL has denoted with "{{ }}" symbols information that it has deemed Highly Confidential Information pursuant to the *Modified JPO*. A version of the letter containing Highly Confidential Information is being filed simultaneously with the Commission and will be made available pursuant to the terms of the *Modified JPO*.

Please contact me with any questions.

Sincerely,

Markham C. Erickson
Counsel to COMPTEL

[1] Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57, *Second Amended Modified Joint Protective Order*, DA 14-1639 (Nov. 12, 2014) ("*Modified JPO*").

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Re: Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 14-57

Dear Ms. Dortch,

COMPTEL submits this letter to express its continued opposition to the proposed transaction between Comcast Corporation ("Comcast") and Time Warner Cable, Inc. ("TWC"). The transaction, if approved, would severely harm the market for competitive set-top boxes ("STBs"), ultimately stifling innovation and the development of new consumer-friendly technologies. Such a result not only would have a detrimental impact on consumers *outside* of Comcast's and TWC's combined footprint, it would thwart future competition within their combined footprint. For these reasons, as well as the numerous others raised in this proceeding, the Commission should act to protect the public interest and deny Comcast's bid to acquire TWC.

I. THE COMMISSION AND CONGRESS HAVE RECOGNIZED THE IMPORTANCE OF DEVICE-LEVEL COMPETITION

The importance of consumers' ability to choose their own devices has been a central part of the Commission's policy for nearly fifty years, at least since its landmark decision in *Carterfone*.[1] That decision, which first recognized the right of consumers to attach non-harmful customer equipment to a telephone network, revolutionized telephony (not just the telephone) and led

[1] *See* Use of the Carterfone Device in Message Toll Telephone Service, *Decision*, 13 F.C.C. 2d 420 (1968).

directly to the massive innovation that followed.[2] By allowing third-parties to innovate, the Commission "cleared the way for the rapid deployment of the modem."[3] As residential modem use spread, so did the use of the public Internet. In fact, "it is likely that the Internet would have been unable to develop"[4] without *Carterfone* and the principles it embodies.

Seeing the massive consumer benefits that flowed from *Carterfone*, Congress adopted an open access policy for navigation devices used to access multichannel video services in Section 629 of the Telecommunications Act of 1996.[5] As the House Committee explained, "competition in network navigation devices and other [CPE] is an important national goal" that it believed would lead to "innovation, lower prices and higher quality" services for consumers.[6] In adopting implementing regulations, the Commission echoed this sentiment, noting that the "competitive market for consumer equipment in the telephone context provides the model of a market we have sought to emulate."[7] This policy is intuitive. The device ecosystem benefits from both competition and innovation, and consumer welfare is best achieved by creating the potential for choice, rather than relying on a single firm.

Unfortunately, despite actions by Congress and the FCC, a competitive market for navigation devices has not developed.[8]

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[2] *See, e.g.*, Matthew Lasar, *Any Lawful Device: 40 Years After the Carterfone Decision*, Ars Technica (June 26, 2008), http://arstechnica.com/tech-policy/2008/06/carterfone-40-years/.

[3] Jason Oxman, *The FCC and the Unregulation of the Internet* 14 (Office of Plans and Policy, FCC, OPP Working Paper No. 31, 1999), *available at* http://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf.

[4] *Id.*

[5] Telecommunications Act of 1996, Pub. L. No. 104–104, § 629, 110 Stat 56, 125 (codified at 47 U.S.C. § 549).

[6] H.R. Rep. No. 104-204(I), at 112 (1995), *reprinted in* 1996 U.S.C.C.A.N. 10, 79-80.

[7] Implementation of Section 304 of the Telecommunications Act of 1996, *Report and Order*, 13 FCC Rcd. 14775, 14780 ¶ 11 (1998).

[8] Congress recently rescinded a ban on directly integrating security features into STBs. *See* STELA Reauthorization Act of 2014, Pub. L. No. 113-200, § 106, 128 Stat 2059, 2063 (codified in scattered sections throughout Title 47). In the same Act, Congress also called for the FCC to create a working group to explore a "software-based downloadable security system" for navigation devices, but not require the FCC to take any further action in furtherance of Section 629. *Id.*

The market for streaming devices,[9] which are not directly reliant on cable companies like Comcast, is far more competitive and innovative. Comcast controls, however, whether such a device can integrate linear cable programming and other cable-related features such as on-demand video with Internet-based applications and other content available online. Thus, Comcast controls whether such a device can replace an STB on its systems. Merely replacing the STB should not be the goal. Rather, with the help of TWC, truly innovative devices have begun to go far beyond providing single sources of content by aggregating them into a single location and even in a single user interface. As with *Carterfone*, these devices may revolutionize the video industry itself, by allowing side-by-side competition for a vast array of video services.

Fanhattan, which was forced to sell itself to Rovi after the Comcast-TWC deal was announced, was a prime example of an innovator in the video services industry, with a product that could revolutionize video consumers' experiences. Fanhattan's Fan TV not only allows customers to watch live and streaming video content on a single device, it transforms how subscribers discover and follow content—all in a cohesive and user-friendly manner.[10] By amalgamating traditional cable and new online video distributor ("OVD") services within a single, simple, innovative device, Fan TV has been lauded by critics as "very seriously revolutioniz[ing] the way that pay TV subscribers interact with their TV programming."[11]

II. COMCAST IS SEEKING WAYS TO THWART FUTURE OVD EXPANSION

Aside from stifling the growth of competitive STBs, Comcast also has an incentive to slow the growth of OVDs generally. Highly Confidential documents show that Comcast perceives OVDs as {{

}}.[12] As that

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[9] Streaming devices are generally limited to over-the-top, best-efforts video services. Set-top boxes, on the other hand, generally give the viewer access to linear and video on demand ("VOD") content, whether provided over IP-cable or traditional QAM technology.

[10] *See* Richard Schmalensee, Economic Case Study of the Impact of the Comcast/Time Warner Cable Transaction on Fan TV, MB Docket No. 14-57, ¶¶ 4-5 (Mar. 20, 2015) ("Schmalensee Declaration") (attached here as Exhibit 1).

[11] *Id.* ¶ 6 (citing Ryan Lawler, *Fan TV Is A Next-Generation Set-Top Box For Live TV, DVR, VOD, And Streaming Services Like Netflix*, TechCrunch (May 30, 2013), http://techcrunch.com/2013/05/30/fan-tv/).

[12] {{

document explains, {{ }}[13] This, in turn, could make it difficult for Comcast {{ }}[14]

Comcast documents also show that the company is seeking ways to limit the growth, expansion, and ultimate success of OVDs. For example, a Comcast {{ }}[15] As a result, the document urged the need to {{ }}.[16]

Comcast documents show concern on the part of NBCU that {{ }}.[17] One internal NBCU {{ }}[18]

Comcast has even gone so far as to {{

}}

13 {{ }}

14 {{ }}

15 {{ }}

16 {{ }}

17 {{ }}

18 {{ }}

}}[19] At the same time, Comcast has speculated that, {{ }}[20] Put differently, Comcast appears to believe that {{ }} will eliminate any competitive threat against its video products.

Comcast documents do recognize that {{ }} service competition within a streaming device like that developed by Fan TV.[21] But those same documents condemn taking steps to increase consumer choice as {{ }}[22]—even going so far as to call it {{ }}.[23] In essence, Comcast worries that, {{ }}[24] As a result, Comcast has a natural, pervasive, and perverse incentive to stave off any threat of direct competition from OVDs.

III. THE PROPOSED MERGER THREATENS THE AVAILABILITY OF COMPETITIVE STBS FOR SMALL- AND MEDIUM-SIZE COMPETITIVE PROVIDERS

Given the lack of a competitive retail market for STBs, most consumers continue to obtain their STBs from their local MVPD. But access to future STB innovations by small- and medium-size competitors to the merged entity though the wholesale market would be of significant concern. Comcast already is pushing to unify the cable platforms used by the large cable systems by selling wholesale access to its proprietary and closed X1 platform. Without the two largest cable

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[19] *See* {{ }}

[20] {{ }}

[21] {{ }}

[22] {{ }}

[23] {{ }}

[24] {{ }}

systems to drive STB improvements and innovations from existing device manufacturers, it is likely that little innovation or development will occur.

Lack of competition in the STB market is particularly problematic for cable providers that compete directly with Comcast. Competitive carriers cannot match Comcast's scale, and without the two largest cable operators to push third-party STBs to innovate, those carriers would need to rely on outdated STBs that are already available on the market. Post-transaction, competitors in Comcast's footprint would be placed in the awkward position of either attempting to negotiate with Comcast (which has no incentives to make discussions run smoothly or offer reasonable terms) to use the X1 platform or relying on inferior STBs. A flourishing wholesale or retail STB marketplace would remove one of the many barriers that insulates Comcast from competition and prevents other providers from deploying or attracting new customers in the Comcast footprint.

Development of traditional STBs is a function of scale and generally controlled in the United States by Arris and Cisco. For historical reasons, most terrestrial multichannel video providers in the United States adopted one of two conditional access standards provided by these companies (or their predecessors). Unlike with the open DVB standard and interoperable conditional access schemes used in Europe,[25] once a cable operator has adopted, for instance, the Arris standard, that multichannel video provider can only use STBs that incorporate Arris's proprietary technology. More problematic, the conditional access standards used by Arris and Cisco integrate not only proprietary encryption standards but also other network information critical for designing a competitive STB, such as access to programming guide information and the consumer's channel profile. Because Arris and Cisco are loath to license their proprietary encryption schemes to third parties, STB manufacturers must work very closely with large operators that have significant bargaining power in developing their products.[26]

Transitioning from one conditional access scheme to another is generally out of the question. Doing so would require MVPDs using Arris or Cisco to replace a significant amount of cable-

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[25] *See* History of DVB, Adoption and Use of DVB Systems, https://www.dvb.org/about/history#Adoption-and-Use-of-DVB-Systems (last visited Mar. 23, 2015).

[26] The now defunct CableCARD regime has largely failed to create a competitive retail or wholesale STB market for any variety of reasons, and failed to attract any interest from the international device manufacturers specifically. Implementation of Section 304 of the Telecommunications Act of 1996, *Third Report and Order and Order on Reconsideration*, 25 FCC Rcd. 14657, 14660-61, ¶¶ 4-6 (2010). The merged entity would have every incentive to ensure that any future standard is equally ineffective at creating a vibrant market for such devices.

plant equipment as well as all of the STBs across its entire footprint. In practice, an MVPD would need to operate two different video systems at the same time for many years while it switched out consumer equipment. One system would need to use its existing encryption (e.g., Arris) and another would use the new standard (e.g., DVB or an IP cable standard). This is an extremely expensive and time-consuming endeavor. But because of the limited QAM channels available, this would likely also require the multichannel video operator to make serious changes to its service (such as cutting a number of video channels, eliminating VOD, or narrowing its broadband pipe) that would be detrimental to consumers and its competitive position. It is precisely because of these concerns that developers of competitive STBs need the ability to utilize the existing conditional access schemes.

As a result, recent STB innovations generally have developed due to pressure from large cable operators with sufficient buying power to force Arris or Cisco to make accommodations. Their small- and medium-size competitors lack the buying power to demand changes, such as to the user interface or for additional DVR functionality. Their hands are tied until the large cable systems move Cisco and Arris to action, after which they can begin to negotiate with Cisco and Arris for access to the improvements.

Large cable operators like Comcast also enjoy an enviable and sizable relative advantage on the costs of the STBs themselves over their small- and medium-size counterparts. In the current marketplace, however, the major developers of STBs do not compete directly with these small- and medium-sized operators. The Comcast-TWC merger, however, will change that.

Comcast has spent roughly $2 billion developing its closed, proprietary X1 platform.[27] While Comcast has publicly played down its ambitions for wholesale of its X1 platform to other cable operators, internal Comcast documents reveal that {{ }}.[28] The proposed merger would immediately expand the reach of Comcast's proprietary X1 platform to TWC, but Comcast's internal documents reveal that it is actively seeking to {{

[27] *See* Liana B. Barker, *Comcast in Talks to License Technology to Cox – Sources*, Reuters (Jan. 28, 2014), http://www.reuters.com/article/2014/01/28/comcast-cox-idUSL2N0L11YV20140128.

[28] {{ }}

}}.[29]

Without availability of the two largest cable partners, there will not be enough remaining scale in the United States for existing and potential STB manufacturers to develop innovative devices outside of Comcast's X1 platform. Dr. Schmalensee raised this concern at the roundtable,[30] and Comcast's economists did not deny that it would seek to dominate the U.S. market with its proprietary X1 platform. Instead, Comcast's economist offered the view that the international market for STBs could provide sufficient scale for new competitors.[31]

This response is wrong. As noted above, differences between the technologies used in the United States and the rest of the world, as well as difficulties in transitioning to a new conditional access standard, mean that a device developed abroad cannot be used here without incurring substantial and potentially fatal financial and business risks both for the STB developer and the cable operator. Moreover, as Dr. Schmalensee explains, there is no evidence that the non-U.S. market for STBs is robust enough to provide the kind of scale necessary to push STB technology forward. Fanhattan, for example, does not appear to have believed that foreign markets were an option for its Fan TV product, and we have not seen an influx of STBs designed for foreign markets entering the United States.[32]

In addition to the significant constraints placed on STB development by Cisco's and Arris's control over the two main conditional access regimes in the United States, consumers here are unique in the amount of money they spend on entertainment.[33] As Dr. Schmalensee notes, "[d]ata for Europe as a whole indicates that the ARPU is about $22 per month, as compared to about {{ }} per month for Comcast."[34] As a consequence:

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[29] {{ }}

[30] *See* Transcript of Economic Analysis Workshop, Federal Communications Commission, Proposed Comcast-Time Warner Cable-Charter Transaction, MB Docket No. 14-57, at 157:11-18 (Jan. 30, 2015).

[31] *See id.* at 161:16-18 ("[T]he boxes are a worldwide market. This is not something that is just U.S.").

[32] Schmalensee Declaration ¶¶ 24-26.

[33] *Id.* ¶¶ 30-31.

[34] *Id.* ¶ 28.

> In the majority of countries where ARPU is very low, available content is correspondingly limited, and there is no incentive for cable systems to invest in providing sophisticated set-top boxes to subscribers. After all, consumers paying less than $20 a month for television are unlikely to be interested in paying an additional $10 or more a month to lease a sophisticated set-top box (or pay hundreds of dollars upfront to buy the box). It is implausible that a firm looking to innovate in set-top boxes will find relevant scale in such countries.[35]

In any event, Comcast provides no evidence that global manufacturers are developing STBs (for example, for European or Asian markets), which they are, or would be, able to modify and sell into the U.S. market generally, let alone to its small- and medium-size competitors. Given the lack of evidence of a robust trade in STBs across the Atlantic and Pacific, Comcast's reference to a global market provides no comfort.

IV. THE TRANSACTION ALSO THREATENS INNOVATION FOR STBS AND STREAMING DEVICES

Today, devices used to provide access only to OVD services are no substitute for STBs for small- and medium-size multichannel video operators seeking to provide a robust video service that integrates multichannel video offerings with online content. If the technology is allowed to develop, these devices could provide a choice for individual consumers, fostering direct competition among traditional cable video and OVDs. However, the devices still lack the ability to integrate features and content of a consumer's multichannel video service with content available online. As discussed in COMPTEL's Reply, customers prefer bundled video and broadband services, so "overbuilding cable and telephone company systems must be able to compete in video services and any impediment to their ability to profitably offer video necessarily harms their ability" to compete in broadband services as well."[36]

A truly competitive, robust, and open video content market requires consumers to have the freedom to choose not only their content and their provider. Consumers also must have the freedom to choose the device and user interface that best meets their needs.[37] And this

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[35] *Id.* ¶ 29.

[36] COMPTEL, Reply to Comcast's Opposition to Petition to Deny, MB Docket No. 14-57, at 24 (Dec. 23, 2014).

[37] *See* Telecommunications Act of 1996, Pub. L. No. 104–104, § 629, 110 Stat 56, 125 (codified at 47 U.S.C. § 549).

competition among cable video and OVD services is best fostered by integrating these two services into a single device. In this regard, Comcast and TWC could not be more different.

This competition is unlikely to be fostered by Comcast, whose corporate goal has long been to maintain control of its subscribers at every level, and its development of the X1 platform as a closed system is emblematic of that corporate culture. Comcast has spent billions developing its X1 platform.[38] The decision to make such a large investment makes sense only if Comcast intended to foreclose competing devices and services, and that is precisely what the company has done. Comcast has funneled its services exclusively through its proprietary platform, while excluding competitive services and competing devices.

Internal documents suggest that Comcast has no interest in allowing other cable operators to control whether third-party devices or services are allowed to commingle with the X1 platform.[39] Instead, Comcast will require those who license the X1 to {{ }}[40] In other words, Comcast's proposed expansion of the X1 to the rest of the cable industry will extend its control not only across TWC's footprint, but effectively across the nation.

At the same time, Comcast has been actively working to prevent third-party programming carried on Comcast's video services from being authenticated on third-party devices that connect to the television. As COMPTEL explained in its Reply, Comcast had refused to authenticate HBO Go on popular devices such as the Roku and Playstation 3 until very recently, and continues to refuse to authenticate HBO Go on the Playstation 4. These actions were apparently taken to prevent streaming devices from offering programming already offered by Comcast.

{{

[38] *See* Liana B. Barker, *Comcast in Talks to License Technology to Cox – Sources*, Reuters (Jan. 28, 2014), http://www.reuters.com/article/2014/01/28/comcast-cox-idUSL2N0L11YV20140128 (estimating Comcast had invested $2 billion in X1 platform).

[39] {{ }}

[40] {{ }}

}}[41] So, according to [another Comcast executive], {{ }}[42] {{ }}[43] {{ }}:

{{ }}[44]

These actions are not one-off strategies, but the apparent implementation of a long-term strategy to inhibit the development of a device market that would provide consumers with choices in video services. {{ }}[45]

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41 {{ }}

42 {{ }}

43 {{ }}

44 {{ }}

45 {{ }}

TWC, by contrast, has been moving toward an open platform that enables consumer choice and third-party development of competing user interfaces and customer experiences. TWC has effectively freed its customers to purchase devices of *the customer's* liking, including those that integrate third-party OVD content alongside TWC's MVPD content, provide differing capabilities, and allow for innovative hardware and user interface designs. Internal TWC documents reveal a sincere commitment to {{

}}[46]

Indeed, TWC has already deployed its IPTV service on Roku, Xbox 360, and Fan TV devices.[47] But TWC appeared to be moving far beyond even those steps prior to the proposed merger. For example, TWC appears to have been in serious negotiations with {{

}}.[48] As TWC's CEO explained: {{

}}[49]

The merger would eliminate TWC as the maverick innovator and close off a significant avenue for third-party collaboration toward the kind of open platforms mandated by Section 629.[50]

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[46] {{ }}

[47] *See* Tom Cheredar, *Fan TV Will Now Let Time Warner Subscribers Ditch Their Crappy Cable Boxes*, VentureBeat (Apr. 22, 2014), http://venturebeat.com/2014/04/22/fan-tv-will-now-let-time-warner-subscribers-ditch-their-crappy-cable-boxes/; Steve Shannon, *TWC TV on Roku Now Offering Live and On-Demand Entertainment*, Roku Blog (Dec. 18, 2013), http://blog.roku.com/blog/ 2013/12/18/twc-tv-on-roku-now-offering-live-and-on-demand-entertainment/; Michael Gorman, *Time Warner Cable TV App Brings Live TV to Xbox 360*, Engadget (Aug. 27, 2013), http://www.engadget.com/2013/08/27/twc-tv-app-xbox-360-live-tv/.

[48] {{

}}

[49] {{

}}

[50] See Roku, Inc., Comments, MB Docket No. 14-57, at 3 (Aug. 25, 2014) ("[C]onsolidation among MVPDs threatens to harm consumers by eliminating the incentive for Time-Warner to

As Dr. Schmalensee explains in the attached case study, Comcast's antipathy toward competing devices and its proposed merger with TWC already has caused the downfall of Fanhattan, a truly innovative start-up STB developer.[51] Fanhattan may prove to be the "canary in the coal mine" for the marketplace for current and future video device manufacturers. Fanhattan's Fan TV was a truly innovative product, heralded by critics as revolutionary.[52] With widely favorable reviews for Fan TV in the technical press, Fanhattan was able to raise {{ }} million from investors.[53] TWC {{ }}, and perhaps more importantly, became a marquee partner by agreeing to sell Fan TVs to TWC customers, who would be able to use the devices to access linear and on-demand content from TWC.[54] The TWC partnership provided domestic scale, and reflected TWC's more open and flexible attitude toward competitive device innovation.[55] After the proposed merger was announced, however, it became clear that Fan TV would not find a willing partner in Comcast, and Fanhattan sold itself to Rovi for less than {{ }} of the {{ }} million it had raised from investors.[56] In other words, the proposed merger directly contributed to the collapse of an otherwise exciting and innovative product.

* * *

As this evidence shows, the proposed merger of Comcast and TWC would harm the public interest by impairing competition and innovation. At the very least, the proposed merger would harm the market for competitive STBs and delay the development and deployment of new technologies. Because of the potential for significant harm to the public interest—as identified here and elsewhere—COMPTEL urges the Commission to deny the proposed transaction.

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continue to act as a disruptive maverick with respect to Internet streaming platforms."). Even after Roku reached a deal with Comcast on authentication of the HBO Go and Showtime Anytime apps, it still expressed concern that the merger could "eliminate Time-Warner Cable as a disruptive supporter of independent internet streaming platforms." Letter from Jonathan Kanter, Counsel to Roku, to Marlene Dortch, FCC, MB Docket No. 14-57, at 2 (Mar. 16, 2015).

[51] *See generally* Schmalensee Declaration.

[52] Schmalensee Declaration ¶¶ 4-7.

[53] *Id*. ¶¶ 6, 20.

[54] *Id*. ¶¶ 10-15.

[55] *Id*. ¶¶ 10-11, 22-31.

[56] *Id*. ¶¶ 16-21.

Sincerely,

Markham C. Erickson
Counsel for COMPTEL

EXHIBIT 1:

DECLARATION OF

DR. RICHARD SCHMALENSEE

ECONOMIC CASE STUDY OF THE IMPACT OF THE COMCAST/TIME WARNER CABLE TRANSACTION ON FAN TV

Richard Schmalensee

March 20, 2015

I. Introduction

1. My name is Richard Schmalensee. I am the Howard W. Johnson Professor of Economics and Management Emeritus at the Massachusetts Institute of Technology (MIT). My other qualifications are set forth in my prior declaration in this proceeding.[1]

2. As I explained in my prior declaration, the Transaction may restrict the access of third-party set-top box providers to Comcast and Time Warner Cable's customers and thereby reduce competition in set-top boxes, resulting in decreased innovation in set-top boxes. Further review of the documents produced by the parties confirms that there is already evidence of the impact of the merger announcement on set-top box competition.

3. Fan TV was one of the examples I mentioned in my prior declaration of competition facilitated by Time Warner Cable's approach of encouraging development of third-party set-top boxes. The documents I have since reviewed indicate that Fan TV presents a concrete and convincing case study that illustrates the concerns I had expressed in my declaration.

II. Impact of Comcast/Time Warner Cable Transaction on Fan TV

A. Background

4. Fan TV is a set-top box that was developed by Fanhattan. Fanhattan started in 2011 by offering an entertainment discovery product.[2] That software product, which was called Fanhattan, allowed consumers to browse for television programs and movies using a central interface. Rather than looking for video content on individual sites, consumers could use

[1] Richard Schmalensee, "Economic Analysis of the Impact of the Comcast/Time Warner Cable Transaction on Set-Top Box Competition and Video Programming Costs," December 23, 2014 ("Schmalensee Declaration").

[2] BusinessWire, "Introducing Fanhattan, A New Digital Entertainment Discovery Service," December 16, 2010, available at http://www.businesswire.com/news/home/20101216005358/en/Introducing-Fanhattan-Digital-Entertainment-Discovery-Service#.VQeWZ47F9Og.

Fanhattan to identify content of interest from a single aggregated source. Fanhattan offered an iOS app and a web interface. It was well-received in the technical press:

> Enter Fanhattan, a beautiful, versatile new iPad app that aims to be a navigator on this sea of movie and TV services. It doesn't just help you find a show or movie you might like, or tell you which app offers it. Fanhattan actually will launch the app where the content resides and take you right to the page inside that app from which you can stream, rent or buy the particular video you want. For instance, it can take you directly to a specific episode from a specific season of a TV show, on whichever service you prefer.[3]
>
> There's no shortage of streaming TV and movie services available, but launching separate apps for each one quickly gets cumbersome. The free Fanhattan app acts like a slick launchpad to other popular streaming apps, letting you find and watch what you want with minimal fuss.[4]

5. In May 2013, Fanhattan announced its set-top box, Fan TV.[5] Fanhattan believed Fan TV offered solutions to at least three significant problems with existing devices.[6] First, Fan TV was designed to provide a single source for live and streaming video content, saving consumers from having to search and switch among their various devices. Second, it offered the types of entertainment discovery tools that Fanhattan had offered through its apps, allowing consumers to easily find content they wanted to watch.[7] And third, it offered innovation in hardware

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[3] Walt Mossberg, "A Launchpad for Watching TV, Movies on the iPad," *Wall Street Journal*, June 8, 2011, available at http://allthingsd.com/20110608/a-launchpad-for-watching-tv-movies-on-the-ipad/.

[4] Doug Aamoth, "50 Must-Have iPad Apps," *Time*, April 12, 2013, available at http://techland.time.com/2013/04/15/50-must-have-ipad-apps/slide/fanhattan/.

[5] See http://blog.fan.tv/2013/05/29/meet-fan-tv/. The entertainment discovery app and web interface were also rebranded as Fan TV. I use Fan TV to refer to the set-top box.

[6] See http://blog.fan.tv/2013/05/29/meet-fan-tv/.

[7] In the FCC economic workshop, Dr. Rosston stated that "Finally -- X1 is a -- X1 works on a number of different set-top boxes. It doesn't work only on Comcast set-top boxes; it's not just Comcast manufactured set-top boxes. It's an operating system on the top, so to get this problem for set-top box manufacturers and to have a real competition issue on set-top boxes and forestalling things requires a whole bunch of different steps that don't seem to be evident." See Federal Communications Commission, Proposed Comcast-Time Warner Cable Transaction—Economic Analysis Workshop Transcript, January 30, 2015 ("Economic Workshop Transcript"), pp. 161-162. To the extent that he is arguing that the software used on set-top boxes is relevant I would agree. In my prior declaration, I noted the importance of software and stated that "I use "set-top box" here to include the entirety of the set-top box including the software user interface." See Schmalensee Declaration, ¶ 8 and n. 12.

design, notably in the form of a touch-driven remote that was a dramatic change from existing remotes.

6. Fan TV again was favorably reviewed in the technical press:

> With the Fan TV set-top box, the company is bringing that same discovery experience to the TV. But it's also combining access to various streaming services with the ability to watch live, pre-recorded, and video-on-demand titles from your local cable or satellite TV providers…. The most impressive thing about the Fan TV isn't just the way it seamlessly combines content from multiple services and makes it simple to browse and discover shows and movies. The most impressive thing about Fan TV is a new trackpad-like remote control that does away with all the ugly buttons and complexities of today's current options…. The Fan TV has the opportunity to provide a better user experience for users who already subscribe to TV, making it easier to search for, watch and record their favorite TV shows. If it becomes widely available, the device could very seriously revolutionize the way that pay TV subscribers interact with their TV programming.[8]

> If you've ever used the Fanhattan website or app, you know that its true power lies in its ability to let you find things you want to watch, regardless of whether they're on TV, streamed from Netflix or purchasable from iTunes. Imagine the same interface, but on your TV and all controlled with a simple yet fancy touchscreen remote.[9]

> The last thing the world needs is another second-screen service for TV shows — and yet the TV viewing audience desperately needs Fanhattan. Earlier this year, the company pivoted to become a hardware startup determined to revolutionize crappy cable set-top boxes with its own product, Fan TV. The device, which integrates Fanhattan's second screen service, provides access to a universal "queue," or watchlist, of programming from all services, such as Netflix and Hulu — then sends you to those services to watch the content you want. It is far

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The fact that Comcast's X1 platform can run on a number of different hardware set-top boxes hardly means that the loss of set-top box software development from firms such as Fan TV is not relevant.

[8] Ryan Lawler, "Fan TV Is A Next-Generation Set-Top Box For Live TV, DVR, VOD, And Streaming Services Like Netflix," *TechCrunch*, May 30, 2013, available at http://techcrunch.com/2013/05/30/fan-tv/

[9] Doug Aamoth, "With Fan TV, Fanhattan Thinks It Has the Home Entertainment God Box," *Time*, May 30, 2013, available at http://techland.time.com/2013/05/30/with-fan-tv-fanhattan-thinks-it-has-the-home-entertainment-god-box/.

> closer to Steve Jobs' vision for a revolutionary TV product than Apple's own Apple TV.[10]
>
> The idea is compelling. Imagine using just one remote, controlling a simple interface to find your favorite programs, and watching them whenever you'd like. Who wouldn't want that?[11]

7. Thus, Fan TV was seen by many industry observers as a promising example of innovation in set-top boxes.

B. Role of Cable Providers

8. While Fan TV was viewed as an innovative product, commentators also noted that technology alone would not be determinative. It was well understood that partnerships with major cable providers would be critical to the success of the product:

> To make this work, cable and satellite TV companies must cooperate, because [Fanhattan CEO] BianRosa says this device won't be for those who don't have such services — at least not at first. In other words, it's not for "cord cutters," those who use services such as Netflix and Hulu and reject cable TV or satellite TV subscriptions…. Until Fan TV has confirmed that cable giants such as Comcast and Time Warner have signed on the dotted line, this promising hardware and software combination will remain a dream.[12]
>
> There's a catch, though — and it's a big one. If you subscribe to a cable or satellite service, Fanhattan is going to have to convince your service provider to let the Fan TV box act as your cable or satellite box as well. As [a commentator] notes, "Fanhattan's big challenge may not be getting consumers onboard but the cable providers. [Fanhattan CEO] BianRosa said they are working with paid TV providers to bring Fan TV to market together."[13]

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[10] Dylan Tweney, "26 amazing startups you need to watch in 2014," *VentureBeat*, December 31, 2013, available at "http://venturebeat.com/2013/12/31/26-amazing-startups-you-need-to-watch-in-2014/

[11] Charlie White, "Fan TV Set-Top Box Might Be the Easiest Way to Watch TV," Mashable, May 30, 2013, available at http://mashable.com/2013/05/30/fan-tv/.

[12] Charlie White, "Fan TV Set-Top Box Might Be the Easiest Way to Watch TV," Mashable, May 30, 2013, available at http://mashable.com/2013/05/30/fan-tv/.

[13] Doug Aamoth, "With Fan TV, Fanhattan Thinks It Has the Home Entertainment God Box," *Time*, May 30, 2013, available at http://techland.time.com/2013/05/30/with-fan-tv-fanhattan-thinks-it-has-the-home-entertainment-god-box/.

9. This demonstrates the gatekeeper role the large cable providers play in controlling set-top box innovation. Without the permission of the cable provider to access its content, a set-top box manufacturer cannot offer the type of integrated product that Fan TV was seeking to provide.[14] Fan TV was well aware of the need for a deal with one or more large cable providers.

C. Time Warner Cable Agreement

10. As I discussed in my prior declaration, Time Warner Cable has been more interested in consumer owned and managed ("COAM") devices as a matter of company strategy than Comcast has been. A Time Warner Cable {{

}} noted that:

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> }}[15]

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[14] It is technically possible for a set-top box manufactured by a third party to access a cable provider's linear content without reaching a commercial agreement with the cable provider by using CableCARD, but CableCARD does not provide access to the cable provider's video on demand content. Moreover, CableCARD can be cumbersome to install. See, e.g., Rich Jaroslovsky, "Tech review: New TiVo is slick but cable hassles a drawback," *The Seattle Times*, September 13, 2013 available at http://www.seattletimes.com/business/tech-review-new-tivo-is-slick-but-cable-hassles-a-drawback/. The article stated: "So what's not to like? Start with the setup process. The Roamio requires a CableCARD, a special plug-in device that costs an extra $1.50 a month from Comcast and in my case, required three trips to its nearest office. (The first card didn't work; Comcast then gave me two cards in hopes that at least one of them would work; I then had to return the one I didn't need.) It also requires at least one phone conversation, and maybe more, with your cable company so the TiVo can be paired with your service. Comcast kept bouncing me around from department to department as it tried to diagnose why the two wouldn't play well together. Dealing with a cable company's support department is not a pleasure."

[15] Time Warner Cable, Inc., Responses to the Commission's Information and Data Request, MB Docket No. 14-57 (Oct. 14, 2014) ("Time Warner Cable Responses to Commission") {{

11. And as I also discussed in my prior declaration, given Comcast's significant investment in its X1 platform, Comcast would be expected to encourage its subscribers to engage with the X1 platform rather than third-party STBs. {{ }}[16]

12. Fanhattan's need to sign up a major partner for Fan TV was obvious. Given the differing positions of Time Warner Cable and Comcast toward third-party set-top boxes, it was not surprising that Time Warner Cable, rather than Comcast, became Fan TV's marquee partner. Around {{ }}, Time Warner Cable and Fanhattan negotiated the scope and terms of Time Warner Cable's involvement in Fan TV.[17] Time Warner Cable agreed {{ }} and to reach an operational agreement to offer Fan TV to its subscribers.[18] The operational agreement provided for Fanhattan to sell Fan TVs to Time Warner Cable subscribers, who would be able to use the devices to access linear and video on demand content from Time Warner Cable and streaming

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[16] Time Warner Cable Responses to Commission, {{ }}

[17] {{ }}

[18] {{ }}

video from other providers.[19] {{

}}[20]

13. Time Warner Cable promoted the agreement enthusiastically:

> "The Fan TV experience is a leap forward for the cable industry," said Mike Angus, Senior Vice President and General Manager, Video for Time Warner Cable. "Fan TV is the perfect marriage of the compelling content we at Time Warner Cable bring to customers with the complementary services available to consumers, delivering both in a rich experience for seamless entertainment. The service leans into the multiple ways that consumers are increasingly watching their entertainment across live TV, VOD and streaming, and pulls them together in an intuitive product."[21]

14. This public support was consistent with Time Warner Cable's internal views of Fan TV. In describing a document prepared by Fanhattan's CEO, Time Warner Cable's Senior Vice President and General Manager of Video stated in an email to Time Warner Cable's CEO:

> {{
>
> }}[22]

15. Industry observers were also enthusiastic about the promise of Fan TV on Time Warner Cable:

> We have experienced the future of TV – it works so well, it reminded of us of the first time we touched an iPhone. Intuitive, rich-graphical, touched-based interface and navigation with no buttons or grids. The experience is so fluid and

[19] Time Warner Cable press release, "Fan TV Coming to Time Warner Cable Subscribers Nationwide," available at http://www.timewarnercable.com/en/about-us/press/fan-tv-coming-to-twc-subscribers-nationwide.html.

[20] {{

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[21] Time Warner Cable press release, "Fan TV Coming to Time Warner Cable Subscribers Nationwide," available at http://www.timewarnercable.com/en/about-us/press/fan-tv-coming-to-twc-subscribers-nationwide.html.

[22] {{

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> effortless, browsing actually becomes fun – much like when you navigate through Netflix on an iPad – you just glide through an endless array of content. You actually forget that you are navigating through a cable operator provided experience, which historically is frustrating, heavily text-based, and the farthest thing from intuitive. Plus no more switching HDMI ports to get to different IPTV apps – everything is blended together into a single interface.[23]

D. Impact of Comcast-Time Warner Cable Merger

16. While Fan TV's introduction with Time Warner Cable seemed promising, the fact of the announced Comcast-Time Warner Cable merger was casting a shadow on the future of the Fan TV's deal with Time Warner Cable and of the future of Fan TV itself. Industry commentators were explicitly questioning the viability of the product given the announced merger:

> We do wonder what will happen to the partnership when/if that TWC-Comcast merger is completed, particularly since Comcast has an internet-integrated platform of its own with X1.[24]

> There's also the question of what happens when and if Comcast's acquisition of Time Warner Cable is approved and goes through. Assuming it does, and that at some point Time Warner Cable's broadband and TV service becomes Xfinity broadband and TV service, it's not clear whether or not the new company will continue to support the device.[25]

> The other big caveat is that Time Warner Cable is in the process of merging with Comcast. If approved, Fan TV may find itself confronted with Comcast's much more controlling approach towards TV experiences and devices. Comcast has invested a lot of money into the development of its X1 and X2 platforms,

[23] Rich Greenfield, "Watch Our FanTV Experience: What Apple TV Should Be – How Soon Till We Hear: Drop Satellite for Cable," *BTIG Research*, July 28, 2014 available at http://www.btigresearch.com/2014/07/28/watch-our-fantv-experience-what-apple-tv-should-be-how-soon-till-we-hear-drop-satellite-for-cable/.

[24] Richard Lawler, "Time Warner Cable will sell a $99 Fan TV box that streams cable TV and internet video," *engadget*, April 22, 2014, available at http://www.engadget.com/2014/04/22/time-warner-cable-fan-tv/.

[25] Ryan Lawler, "Fan TV's Streaming Set-Top Box Will Soon Be Available To Time Warner Cable Subscribers," *TechCrunch*, April 22, 2014, available at http://techcrunch.com/2014/04/22/fan-tv-twc/.

> and the company wants to own the relationship with the customer through those platforms.[26]
>
> Then there's the matter of Time Warner's planned merger with Comcast. Even Gilles BianRosa, Fan TV's CEO, says he doesn't know how long Fan TV will still be supported by Time Warner if the merger goes through. "You'll have to ask Comcast," he says. It's unlikely that service would be shut down immediately, but it might still give some buyers pause.[27]

17. Time Warner Cable did not do much to allay these concerns. In an FAQ for Fan TV, the answer it provided— and is still providing—to the question of "Will the service end for TWC customers after the merger closes?" was a far from assuring statement that "It is too early to comment on that."[28] It is likely that consumers considering Fan TV would have significant concerns about making an upfront investment in buying the device given this statement.

18. In light of these widespread concerns, it should not be surprising that Fan TV was significantly affected by the announced Comcast merger with Time Warner Cable. As a startup that had not reached profitability, Fan TV was in the position of needing to fund its ongoing development. This proved to be difficult specifically because of the announced Comcast-Time Warner Cable merger. In a {{ }}, Gilles BianRosa, Fanhattan's CEO, stated that:

> {{

[26] Janko Roettgers, "BYOD goes TV: Fan TV starts selling its streaming box to Time Warner Cable customers ," *GIGAOM*, April 22, 2014, available at https://gigaom.com/2014/04/22/byod-goes-tv-fan-tv-starts-selling-its-streaming-box-to-time-warner-cable-customers/.

[27] Casey Newton, "Fan TV's new set-top box will connect with Time Warner Cable," *The Verge*, April 22, 2014, available at http://www.theverge.com/2014/4/22/5639826/fan-tvs-new-set-top-box-will-connect-with-time-warner-cable.

[28] Time Warner Cable, "FAQ," available at http://www.timewarnercable.com/en/support/faqs/faqs-tv/fantv/will-the-service-end-when-the-merger-closes.html.

}}[29]

19. The concerns about Comcast's willingness to support Fan TV after its acquisition of Time Warner Cable appear to have been well-founded, as Comcast has stated its intention to deploy its X1 platform in the Time Warner Cable footprint.[30] Fanhattan was ultimately unable to complete its financing.[31] As one commentator concluded:

> The partnership with the 11 million household cable TV operator was arguably a big win for Fan TV, but it lived on borrowed time. Time Warner Cable is looking to merge with Comcast, a company that has invested a lot of money and resources into developing its own next-generation set-top box, and that is unlikely to cede control over the experience to any third party.[32]

20. Giving Fan TV's diminishing prospects, Fanhattan sold itself to Rovi, a provider of set-top box user interface software to cable providers, in November 2014. The sale price of $12 million was {{ }} that Fanhattan had raised in the past.[33] While

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[29] {{ }}

[30] Recent reports indicate that Apple had similar concerns that the merger with Comcast affected Time Warner Cable's interest in cooperating with Apple on set-top boxes and that "Apple came to believe that Comcast was stringing it along while the cable giant focused on its own X1 Web-enabled set-top box." See Keach Hagey, Shalini Ramachandran, and Daisuke Wakabayashi, "Apple Plans Web TV Service in Fall," March 16, 2015, available at http://www.wsj.com/articles/apple-in-talks-to-launch-online-tv-service-1426555611.

[31] Janko Roettgers, "Fan TV sells to Rovi after finding that it's hard to revolutionize the cable box," *GIGAOM*, November 3, 2014, available at https://gigaom.com/2014/11/03/fan-tv-sells-to-rovi-after-finding-that-its-hard-to-revolutionize-the-cable-box/.

[32] Janko Roettgers, "Fan TV sells to Rovi after finding that it's hard to revolutionize the cable box," *GIGAOM*, November 3, 2014, available at https://gigaom.com/2014/11/03/fan-tv-sells-to-rovi-after-finding-that-its-hard-to-revolutionize-the-cable-box/.

[33] {{ }}; Rovi Corporation 10Q for quarter ending September 30, 2014, p. 23, available at http://www.sec.gov/Archives/edgar/data/1424454/000142445414000065/rovi9301410q.htm.

Rovi will try to use Fan TV's technology in its own products, the sale was seen as the failure of the Fan TV model.[34]

21. The experience of Fan TV illustrates the contrasting positions of Time Warner Cable and of Comcast toward third-party set-top boxes. Time Warner Cable enthusiastically supported Fan TV. Whether or not Fan TV would have ultimately succeeded is of course uncertain, but it would have had a markedly better chance with support from Time Warner Cable as a standalone company than it did with Time Warner Cable given the anticipated merger with Comcast.

E. Importance of Scale

22. The importance of the loss of Time Warner Cable as a partner for third-party set-top box providers comes from its scale. As I discussed in my prior declaration:

> Comcast and Time Warner Cable are, by far, the two leading cable MVPDs, with approximately 40 percent and 21 percent respectively of all U.S. cable MVPD subscribers. They are two available anchor tenants for a set-top box platform. The remaining cable MVPDs account for about 39 percent, with the next largest system at about 8 percent. Given the significant fixed costs involved, the incentives for a third-party firm to invest in developing and enhancing set-top boxes are greater if they expect to have access to the subscribers of one or both of the merging parties.[35]

[34] Peter Kafka, "Fan TV, Which Wanted to Replace Your Cable Box and Your Apple TV, Heads for the Exits ," re/code, November 2, 2014, ("the logical conclusion will be that Fan failed at a tough task: Selling a stylish, affordable box that integrated Web video and pay-TV programming, without a big push from pay-TV providers or deep-pocketed consumer tech companies.") available at http://recode.net/2014/11/02/fan-tv-which-wanted-to-replace-your-cable-box-and-your-apple-tv-heads-for-the-exits/; Janko Roettgers, "Fan TV sells to Rovi after finding that it's hard to revolutionize the cable box," *GIGAOM*, November 3, 2014, ("So what does all of that mean for Fan TV? In all likelihood, Rovi will eventually decide to take parts of the Fan TV experience, and license them white-labeled to operators and consumer electronics manufacturers. Some may decide that they just want the guide, others may license the entire platform to build their own hardware, and ship it to consumers under their own branding, running their own set of services. But Fan TV as a device that consumers buy and hook up to their TV to replace their cable box is likely going to remain a niche — which makes you wonder how long Rovi is really going to keep it around in this form.") available at https://gigaom.com/2014/11/03/fan-tv-sells-to-rovi-after-finding-that-its-hard-to-revolutionize-the-cable-box/.

[35] Schmalensee Declaration, ¶ 12.

23. The Fan TV case study is convincing evidence of the importance of scale and the importance of the loss of Time Warner Cable as a marquee partner for third party set-top box providers. At the FCC economic workshop, economists for Comcast alleged the existence of a worldwide set-top box market,[36] suggesting there would be scale available outside the United States, so that the loss of Time Warner Cable may be unimportant in such a worldwide market. Their claim is flawed.

24. First, the empirical evidence from Fan TV is that scale from foreign cable providers did not play a factor. From what I have seen, Fan TV was widely viewed as a technologically innovative product that offered advances beyond existing set-top boxes, and I have seen no evidence that anyone thought they could become viable by selling to foreign cable providers. The challenge for Fan TV was obtaining distribution among U.S. cable providers.

25. {{

}}[37] The financial projections of device sales, users, and profitability were {{ }}[38]

26. Given the importance of gaining traction with cable providers, I would expect that, if there had been promising partnerships with foreign cable providers, Fanhattan would have turned to those providers. Had the availability of scale from foreign cable providers been an important opportunity, then I would also expect that Fan TV would have not been as affected

[36] Dr. Rosston and Dr. Israel made these claims. See Economic Workshop Transcript, pp. 161, 164.

[37] {{ }}

[38] {{

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by the Comcast-Time Warner Cable merger as it was. There is no shortage of capital for promising technology firms, let alone ones with a working and well-received product.

27. In fact, Fanhattan was right to focus on the United States. With the exception of a handful of countries, the non-U.S. cable subscriber base is of no relevance to a firm developing an innovative set-top box. The average revenue per user ("ARPU") for cable video is substantially higher in the United States and Canada than almost all other countries. My understanding is that compared to the United States the ARPU is lower in the United Kingdom, lower still in most other industrialized countries and yet lower in the rest of the world. This is confirmed by publicly available data on the ARPU in other countries.

28. In the United Kingdom, the ARPU for Virgin Media at the end of 2013 was only about $32 per month.[39] By contrast, Comcast reports a video-only ARPU of {{ }} per month.[40] For Germany, data are available for Kabel Deutschland, the largest cable provider in Germany. For Kabel Deutschland, only about 30 percent of video subscribers subscribe to anything beyond a basic package of video that consists of only over-the-air television channels.[41] Kabel

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[39] Virgin Media reported television revenues of £248.1 million in the fourth quarter of 2013 from 3,749,600 television subscribers. See Virgin Media, *2013 Selected Operating and Financial Results*, pp. 2, 4, 9. The resulting monthly ARPU is £22.05, or $32.42 using an exchange rate of 1.47 $/£ (from http://www.x-rates.com) as of December 31, 2013. There may be some modest differences in the methodology underlying the ARPU figures I report in this section (such as how one-time installation revenues are treated) but the differences in ARPU between the United States and other countries is so substantial that it is implausible they result from any such methodological differences.

[40] See {{ }}

[41] Kabel Deutschland Annual Report for Fiscal Year Ended March 31, 2014, p. 23.Kabel Deutschland's description of its basic cable product is as follows: "Our Basic Cable products consist of analog as well as digital TV and radio services. Our analog cable services currently offer up to 32 free-to-air television and up to 35 radio channels, respectively. Our digital cable services offer more than 100 digital TV (Free-TV) channels and up to 70 digital radio channels." See Kabel Deutschland Annual Report for Fiscal Year Ended March 31, 2014, p. 15.

Deutschland's ARPU across all video customers is only about US$15.[42] Data for Europe as a whole indicates that the ARPU is about $22 per month, as compared to about {{ }} per month for Comcast.[43]

29. In the majority of countries where ARPU is very low, available content is correspondingly limited, and there is no incentive for cable systems to invest in providing sophisticated set-top boxes to subscribers. After all, consumers paying less than $20 a month for television are unlikely to be interested in paying an additional $10 or more a month to lease a sophisticated set-top box (or pay hundreds of dollars upfront to buy the box). It is implausible that a firm looking to innovate in set-top boxes will find relevant scale in such countries. Even in the United Kingdom, we observe that Virgin Media used set-top boxes from TiVo, a U.S. company. My understanding is that essentially all innovation in set-top boxes has taken place in the United States.

30. There are also significant differences between the United States and other countries in the technology used in set-top boxes that use cable providers' existing (QAM) cable streams (as opposed to set-top boxes such as Fan TV that use IP streams). My understanding is that most of the rest of the world uses the Digital Video Broadcasting (DVB) standard (or DVB-C for the cable version of the DVB standard, which also encompasses terrestrial and satellite

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[42] Kabel Deutschland reported 7.114 million direct basic cable subscribers and 0.69 million indirect basic cable subscribers as of December 31, 2014 and television revenues of €880.706 million for the nine months ended December 31, 2014. See Kabel Deutschland, *Quarterly Financial Report, for the Quarter and the Nine Months Ended December 31, 2014*, pp. 6, 8. The resulting monthly ARPU is €12.54, or $15.17 using an exchange rate of 1.21$/€ (from http://www.x-rates.com) as of December 31, 2014.

[43] Cable Europe, *Cable Facts & Figures*, 2013, pp. 2, 5, available at http://cable-europe.eu.apache11.hostbasket.com/content/uploads/2014/08/140805_FF-YE2013_FINAL.pdf. The report indicates that total cable television revenue was €11 billion and the number of cable TV customers was 56.75 million. The resulting monthly ARPU is $22.29 using an exchange rate of 1.38$/€ (from http://www.x-rates.com) as of December 31, 2013.

transmissions), which institutes common standards for transmission, encryption, and conditional access across devices. For historical reasons, cable operators across the United States have generally deployed cable systems that rely on one of two proprietary, non-interchangeable technologies—DigiCipher owned by Arris and PowerKey owned by Cisco—to provide this functionality. This means that a cable set-top box adhering to the DVB-C standard could not be used in the United States. To function on U.S. cable systems, the manufacturer would need to use a different processor and different parts for tuners, demodulators and other components for transmission.

31. A further and significant hurdle for a foreign manufacturer of a DVB-C set-top box attempting to produce a U.S. set-top box accessing existing cable streams is that it would need a license to the two main encryption technologies in use in the United States. Without such licenses, the set-top box could not decrypt the video streams on U.S. cable systems. Given that Arris and Cisco are both set-top box manufacturers themselves, their incentives to license these technologies, which would increase competition with their respective set-top boxes, are at best weak. My understanding is that because of the difficulty of obtaining licenses to DigiCipher and PowerKey, it is rare for large non-U.S. manufacturers of set-top boxes to sell set-top boxes in the U.S. market.

III. Conclusions

32. None of the foregoing should be taken as suggesting that Comcast does not innovate or, in particular, that it has not made significant investments in its X1 set-top box. But society generally benefits when there is competition in innovation as well as in production. In the old days of the Bell System, AT&T invested significantly in innovation, but it was the unchallenged sole supplier of telephones. When that monopoly was broken and there was

competition in innovation in phones, a wide variety of innovative phones appeared at what seemed like amazingly low prices.

33. Similarly, in the early days of PCs, Apple designed all the hardware that worked with its operating systems, while Microsoft encouraged innovation by many hardware providers. Consumers generally found the Microsoft model preferable, and Apple was relegated to niche status. The same storyline is being followed in smartphones: Apple manufactures all the phones that use its operating systems, while Google encourages many phone manufacturers to innovate using its Android operating systems. Globally, Android-based phones currently outsell iPhones by about four to one.[44]

34. Competition in innovation benefits consumers, particularly in industries in which technology is advancing. Conversely, allowing an industry's innovation to depend entirely on the creativity of a single, unchallenged firm, be it the old AT&T, Apple, or Comcast is unlikely to serve consumers well.

[44] IDC, Smartphone OS Market Share, Q4 2014, available at http://www.idc.com/prodserv/smartphone-os-market-share.jsp. The share for Android was 76.6 percent compared with 19.7 percent for iOS. I do not mean to suggest that Apple is not an innovative smartphone provider—it plainly is. But competition among smartphone makers using the Android operating system has also clearly been beneficial for consumers.

* * *

The foregoing declaration has been prepared using facts of which I have personal knowledge or based upon information provided to me. I declare under penalty of perjury that the foregoing is true and correct to the best of my information, knowledge, and belief.

Executed on March 20, 2015.

Richard Schmalensee
Director
Global Economics Group