Fixed and Mobile Broadband, Bundling, and the Future of the Broadband Industry

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INTRODUCTION

Broadband access and usage have increased dramatically over the past decade. There are two types of broadband service, fixed and mobile. Much of the industry growth has occurred in the mobile sector. The penetration rate for fixed broadband within OECD nations has risen from 8.17% in 2004 to 26.97 percent in 2013. The penetration rate for wireless broadband within OECD nations has grown from 32.87 percent in 2009 to 72.37 percent in 2013 (OECD, 2014). Within the OECD, more internet users now access the internet through mobile devices than through PC's or other fixed wire devices. The International Telecommunications Union, which collects data from over 200 economies worldwide, estimates the number of mobile broadband subscriptions globally at 1 billion for 2010 and at 2.3 billion at the end of 2014. The explosion in mobile broadband access has expanded broadband access to consumers in developing countries without fixed broadband, often because these countries do not have robust legacy telephony infrastructures.

The relationship between fixed and mobile broadband is an interesting and dynamic one, constantly evolving with advances in technology. For some consumers, and especially those without access to fixed broadband, mobile broadband may be a substitute for fixed broadband. Consumers with access to both types of broadband may consider the two forms to be complementary or substitutable. A consumer's attitude toward fixed and mobile broadband as substitutes or complements may be influenced by the availability of bundled services. Bundling is defined as packaging or combining two or more communication services for a single price, such as combining fixed broadband with WiFi access, mobile broadband or fixed line voice service.

We first describe the various types of broadband connections. Substitution, complementarity and bundling are then discussed. Since fixed broadband is available predominantly in developed countries, the discussion of complementarity between fixed and mobile broadband focuses on developed countries. The chapter concludes with a summary and concluding remarks.

TYPES OF FIXED AND MOBILE BROADBAND

The term "broadband" refers to internet access via a variety of high-speed networks, including cable, DSL, FiOS, Wi-Fi, WiMAX, 3G, 4G and satellite. Most high-speed internet connections are asymmetric. In the United States, the minimum speed threshold for broadband is download speed of 4 Mbps and upload speed of 1 Mbps (Federal Communications Commission, 2010). The Federal Communications Commission is currently reviewing the possibility of increasing these thresholds to accommodate current demands.

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The European Commission, through its Digital Agenda for Europe (DAE) program, required all Member States to devise and make operational by 2012, national broadband plans which would enable the EU to meet the broadband targets for Europe by 2020. Those targets included basic broadband (512Kbps to 4Mbps) to all by 2013 (Mastrangelo, 2012). In 2014, the Telecom Regulatory Authority of India set the minimum download speed for broadband at 512 Kbps. ARCEP, the telecom regulator in France, has also set a minimum speed of 512 Kbps. In Korea and Japan, broadband plans start from a minimum of 2 Mbps. IDA (Infocomm Development Authority) of Singapore requires broadband services to deliver a speed of from 400 to 1000 Kbps, as of 2014, whereas in 2011, IDA required a broadband speed of only 256 Kbps.

Fixed Broadband

Initially broadband service had been provided through wireline (fixed wire) connectivity. Types of fixed-line broadband service include DSL (Digital Subscriber Line)/ADSL (Asymmetric Digital Subscriber Line), FTTH (fiber to the home), and Cable/HFC (hybrid fiber-coaxial) (Atkinson, 2011).

Within some OECD nations, DSL or FTTH is the predominant fixed broadband technology, while in other nations, cable broadband is more prevalent. Across the European Union, ADSL/XDSL or similar services are the most common type of internet connection (59%) followed by cable (19%). About one in twenty (6%) have fiber optic broadband, 3 percent have satellite broadband and 1 percent have broadband via power lines. One in twenty with at home internet access use a dial-up connections. (Special Eurobarometer 414, 2014).

Specifically, the Netherlands experienced early broadband rollout from both cable and DSL providers (Correa and Crocioni, 2012). In Korea (Broadband Policy Development in the Republic of Korea, 2009) and Ireland, cable television providers first introduced broadband, although voice telephony providers then entered the broadband market with DSL access. In many Western European nations, telephony providers offering DSL tend to dominate the broadband industry. FTTH is more prevalent in Central and Eastern Europe, and Scandinavia, where the copper infrastructures are less robust and unable to meet data demands (Storaasli, 2012).

In the United States, legacy telephone companies provide DSL and/or fiberoptic service, while cable companies have installed hybrid fiber-coaxial networks; cable companies are the major provider of fixed broadband service in the United States.

With FTTH, an information path can be assigned to one single customer, and therefore actual speed is not negatively impacted by number of users. Cable broadband generally uses a hybrid fiber-coaxial architecture. Fiber optic lines bring cable services to a neighborhood node at which point connections are made to coaxial cables that bring service to customers' homes. Unlike telephone companies' FTTH, clusters of cable users share the capacity of each node so that actual speeds vary depending upon the simultaneous use of others sharing the node.

DSL and ADSL use the existing copper telephone wires that connect homes and businesses to the local telephone exchange. Using a piece of equipment called a DSLAM increases the bandwidth that the pair of copper wires can provide. DSL and ADSL have the disadvantage that the speed decreases with the distance from the telephone exchange. Telephone companies have also been steadily converting pure DSL services to hybrid FTTN-DSL by pushing fiber closer to customers' premises as well as by deploying additional FTTH. Even DSL, using slightly improved telephone networks, can reach in newer versions over 20 Mbps. (Noam, 2011) and averages 10 Mbps. The most advanced ADSL, known as ADSL2+, typically has a speed of about 10 Mbps.