Chapter 10
Innovations in Mobile Broadband in Japan and its Implications to Developing Countries

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ABSTRACT

Japan has experienced two developmental stages in the mobile telephony innovation since 1979 when the first mobile phone was commercially launched. The stages can be identified as traditional mobile phone with only voice function and mobile phone with IP (Internet Protocol). This paper discusses how mobile phone with IP function offers diversified services, influences people's daily lives by changing their ways of communication, and interaction by adopting mobile broadband. The paper examines key economic, technology and policy factors based on monthly datasets from 2000-2007 in the provision of both second (2G) and third generation (3G) mobile phones adoption. Particularly, the study uses a linear regression model and presents extended and reduced models using the Pearson correlation method. The results of the empirical study examine how innovations in services contribute to the mobile broadband deployment in Japan. Main findings of this study suggest policy and strategy implications for developing countries which are adopting IP functionality in mobile phones. The paper also presents brief recommendations for India's 3G mobile phone adoptions in terms of opportunities, challenges, and policies which drive on growth.

INTRODUCTION

Mobile broadband innovation bear witness of dramatic changes in telecommunication technology and services, especially in 3G mobile phones. In Japan, the total number of mobile subscribers reached to 112.71 million (2.79 million 2G; 109.91 million 3G) as of April, 2010 (TCA, 2010). Theoretically, the 3G services allow a broadband wireless access to the Internet and the difference between 2G and 3G technology resembles more a radical technology change than a smooth tech-

DOI: 10.4018/978-1-4666-2934-9.ch010

nology evolution (Shapiro & Varian, 1999). This requires a fresh approach to analyze the migration from one technology to the next.

Empirical studies on the diffusion of technological innovation have frequently utilized epidemic models (Geroski, 2000). In the context of mobile phone, several studies have addressed on market entry and cross-country diffusion (Gruber & Verboven, 2001; Dekimpe et al., 1998; Koski & Kretschmer, 2005) or substitution of mobile with fixed networks (Vogelsang, 2010). Moreover, some researches focus on survey data (Katz & Aspden, 1998) or choice-behavior models (Jun & Park, 1999; Jun et al., 2002) to forecast demand, while others have investigated collusive market conduct (Parker & Roller, 1997).

Moreover, many of the early researches on the diffusion process focused on describing observed diffusion patterns in terms of pre-specified trend or distribution functions (Mahajan & Peterson, 1985). For example, cumulative normal, Gompertz, and logistic distribution functions have all been used for modeling diffusion processes because each gives rise to an S-shaped curve. Some researches focus on the dynamics of mobile telecommunications market from two perspectives, either as technology innovation or as service adoption. Likewise, focus on standardization of 2G services from a social construction point of view is analyzed by Funk and Methe (2001), and Haung (2002).

In Japan, mobile phone growth has identified into two shapes: mobile with IP and without IP. While mobile without IP started in 1979 via only voice functionality, IP in mobile phone started in 1999 via voice and data services. Therefore, it is possible to illustrate two growth curves at a time. In order to analyze the upheaval pattern of the diffusion curve in terms of the diffusion theory, several factors are needed to explain the shift from a downward to an upward slop comprises to government policies and technological innovations. While government policies such as deregulations and privatization increase market competition, technological innovations include both the interaction between government and firms' initiative toward the development. However, it is often not possible to empirically determine what are several competing trends or distribution functions best describes a given diffusion curve. Besides, diffusion of new technologies is nonlinear as observed by Kim et al. (2003) and Cava-Ferreuela and Alabau-Munoz (2006) for broadband adoption and policy measurements. While for mobile broadband adoptions in Japan, it is not actually new technologies rather than smooth shift from 2G to 3G (Shoji, 2008) and almost all functionality are possible to access via 2G mobile phones. Thus, attempts have been made to develop theory-based diffusion models for analyzing and modeling the spread of an innovation over time. Since the cumulative normal curve, the Gompertz model, and the logistic distribution function have been used in the diffusion theory, in this study, a regression analysis is used comprised with monthly dataset from 2000-2007. The effect of IP in mobile phone is absolutely visible, irrespective of generational shift like 2G or 3G.

Therefore, first key aspects of the Japanese mobile phone developments are explained, with a focus on diversified services. This represents a fresh look for the developments of contents both for 2G and 3G services and the effect of government policy, that is, mobile number portability (MNP) launched in October, 2006. At the same time, the paper focuses on Indian 3G mobile phones as an example of developing countries perspective where market potentiality is high in relation to Japan's mobile broadband experiences. Like other developing countries, leapfrogging in mobile phone is observed in India while 3G is not a smooth shift rather than radical change that is illustrated in Section 6. Moreover, the paper presents a policy options for countries those who are thinking to adopt IP in mobile telephony or already have adopted.

The empirical analysis is thus based on an extensive literatures survey, numerous data sets collected from individual operators, Ministry of Internal Affairs and Communications (MIC,