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Investigation of factors affecting the diffusion of mobile telephone services: An empirical analysis for Vietnam

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ABSTRACT

This paper analyzes the diffusion of mobile telecommunications services in Vietnam and examines how telecommunications regulation and potential substitute/complement services affect the growth of the number of mobile telephone subscribers. Using a logistic diffusion model, it is found that fixed telephone services are a complement while data services have a negative relation to mobile telephone services in Vietnam. As for regulation, the policy of introducing competition has been found to be the most effective in influencing the adoption of mobile services. Another important result is that the estimated potential market is roughly 76% of the total population. The findings suggest that suitable regulation that guarantees competition in the mobile telecommunications market in a developing country such as Vietnam is one of the most important factors for a positive diffusion process.

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1. Introduction

Mobile telecommunications services in Vietnam have experienced drastic growth in recent years. In the last 10 years, following the establishment of the global system for mobile communication (GSM) and code division multiple access (CDMA) technologies, the market has grown by approximately 79% per year. Generally, economists believe that the diffusion of mobile telecommunications services is affected by further technological innovation, such as the transition from analog to digital technology, the regulation of spectrum licensing, competition (Gruber & Verboven, 2001), and other factors such as fixed telephone services (Lee & Cho, 2007). However, specifically in Vietnam, the main determinants that brought about this high diffusion speed are still in doubt among policy makers and researchers.

The present research is aimed at finding the best-suited diffusion model for mobile telecommunications services in Vietnam in order to understand the main determinants of the speed of diffusion among government regulations and firm service provisions. By studying Vietnamese mobile telecommunications using diffusion models, it is hoped to create a basis

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for future study. The findings will also be useful for regulators, policy makers, and marketing firms contributing to the further development of the Vietnamese mobile market, especially with respect to the future of 3G.

The structure of this paper is as follows. Section 2 provides brief background information about the Vietnamese mobile telecommunications services market. Section 3 examines the previous literature related to diffusion models as well as some research on the telecommunications market in developing countries. This section also explains the methodology used in this study. The data and empirical analysis are discussed in Section 4. Section 5 concludes with a summary of the results, their implications, and discussion.

2. Vietnam's mobile telecommunications services market and government regulations

Digital mobile telecommunications networks were introduced worldwide during the early 1990s (Gruber, 2001). Vietnam launched its first digital mobile telecommunications service at the end of 1994 with the adoption of GSM technology through a business cooperation contract (BCC) with Comvik, Sweden. Since then, the nationwide mobile telephone communications system has developed extensively in the past 12 years. During this period, the market has demonstrated a considerably high growth rate, even during years affected by the economic slowdown as a result of the Asian financial crisis (1997–1999). During 1995–2003, the mobile telecommunications services sector had only one firm—Vietnam Post and Telecommunications Corporation (VNPT). However, the telecommunications market experienced a small degree of competition between its two subsidiaries: Vinaphone (first provided service in 1999) and Mobiphone (started business at the end of 1994).³ This period also experienced a boom in the GSM prepaid services that were introduced in 1999.

In the early 2000s, the Vietnamese government initiated reform in the mobile telecommunications market by enhancing competition via its ministerial body, namely, the Ministry of Information and Communications (MIC).⁴ Among its policies, the market-opening policy⁵ is the most important: it allows the entry of new firms wishing to provide mobile telephone services. At the end of 2003, the first competitor⁶ entered the market by introducing CDMA technology in the form of a BCC with a Korean partner. One year later, the second entrant⁷ launched another mobile telephone service with a GSM license. Consequently, the diffusion process accelerated rapidly because of fierce competition, especially owing to the second entrant because it had the same technology as the dominant VNPT. In addition to a competitive licensing policy that opened the market, during the period 1999–2003, MIC also set up pricing control regulations⁸ regarding the monopoly, and later revised the measure⁹ of significant market power in order to control the monopoly, as well as dominant operators, in their pricing plans.

3. Methodology description

3.1. Previous studies

The innovation diffusion literature has established that the spread of a successful innovation over time typically follows a sigmoid or S-shape curve (Botelho & Pinto, 2004). Fundamentally, the basic diffusion model can be expressed in a mathematical way, as follows:

$$\frac{dF(t)}{dt} = g(t)(\bar{F} - F(t)) = f(t), \quad (1)$$

with the boundary condition $F(t = t_0) = F_0$, where $dF(t)/dt$ is the rate of diffusion at time t and $g(t)$ is the coefficient of diffusion (Mahajan & Peterson, 1985).

Griliches (1957) uses the logistic model to study the diffusion process of hybrid corn. This pioneering empirical study of the innovation diffusion paradigm in economics reveals that the diffusion of hybrid corn is affected by profitability. Other important research includes the Bass first purchase model (Bass, 1969) and the Mansfield model (Mansfield, 1961). For a distribution with a basic shape close to the logistic model, we have to mention the Gompertz model (Dixon, 1980, as cited in Jaakkola, 1997). Table 1 summarizes the main characteristics of the three models. Among those, the logistic model has an

³ Both Vinaphone and Mobiphone belong to VNPT. At that time, the reason the government issued two GSM licenses for VNPT was to establish a small amount of competition in the market. They competed over quantity but both networks' final pricing and business plans were under the central control of VNPT (DGPT, 1999).

⁴ The first government body to regulate the telecommunications sector was the Department General of Post and Telecommunications (DGPT). In 2003, it was restructured into the Ministry of Post and Telematics. Again in early 2007, it was renamed as the MIC. To avoid confusion, we use the current name MIC when referring to the Vietnamese regulatory body in the telecommunications sector over the entire period studied in this paper.

⁵ This is mentioned in the Post and Telecommunications Ordinance of Vietnam.

⁶ The first competitor was S-phone, which was formed under the BCC between SaiGon Postel, Vietnam, and SLD. Ltd, a South Korean owned company.

⁷ The second entrant was Viettel—the military telecommunications company.

⁸ These regulations are defined in the Prime Minister's Decision No. 99/1998/QD-TTg of May 26, 1998, on the management of post and telecommunications charges.

⁹ The revised measure is the Prime Minister's Decision No. 217/2003/QD-TTg of October 27, 2003, on the management of post and telecommunications charges.

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