



Mobile network evolution toward IMT-2000 in Korea: a techno-economic analysis

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Abstract

This paper develops a techno-economic model for evaluating mobile network evolution strategies and demonstrates its real-world applicability, using a Korean case study. A number of mobile network evolution strategies toward IMT-2000 are generated and evaluated with this model. The overall market performance is evaluated and its sensitivity to the key strategic variables such as technology choice, time to market and service coverage is analyzed. Given the regulatory condition that W-CDMA network should be deployed no later than 2004, it is found that direct evolution from cdma2000 1x to W-CDMA is more profitable than evolving via 1xEV-DO. Also, direct evolution from cdma2000 1x to 1xEV-DV appears to be a comparable choice, but with a higher supplier market risk. Finally, strategic implications of the empirical findings obtained in this study are discussed along with some further research issues.

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1. Introduction

Worldwide mobile telecommunications markets are so drastically changeable that predicting what will emerge in even three or four years is not an easy task. Following the second-generation (2G) mobile technologies, many interim solutions have been offered in the market and considered as an effective bridge to the third-generation (3G) broadband mobile technologies such as W-CDMA and cdma2000 3x. Typical examples are GPRS and EDGE in the GSM world and cdma2000 1x, 1xEV-DO and 1xEV-DV in the CDMA world. As new technologies are introduced and deployed in telecommunications markets, a number of questions arise about the optimal technology deployment strategy and the most effective network evolution path to ensure future profitability. Technology choice, deployment timing and coverage expansion plan are critical to a company's future profitability.

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As one of the leading CDMA markets in the world, the Korean market is now eager to find out what target and which evolution path toward that target are most profitable, with consideration of the market risk and the technological risk involved in each network evolution scenario. The purpose of this paper is to demonstrate how this strategic decision problem can be effectively dealt with by using a carefully designed techno-economic model.

Following this introductory section, Section 2 briefly reviews the status of the Korean mobile telecom market and explains the background to the problem. Section 3 shows the structure of the techno-economic model along with some underlying key assumptions. Section 4 describes the key model components and formulas. Section 5 evaluates typical network evolution scenarios in the Korean mobile telecom market and discusses the strategic implications of the results. Finally, some promising future research topics are discussed in Section 6 with concluding remarks.

2. The Korean Mobile Telecommunications market

In Korea, the first cellular mobile telephone service was launched by Korean Mobile Telecommunications (KMT),¹ a subsidiary of Korea Telecom, in early 1984. However, it was not until 1996 when Shinsegi Telecom, the second cellular service provider, entered the market that the number of subscribers really exploded. As the market became competitive, prices fell significantly, attracting a huge number of potential subscribers.

In 1995, the Ministry of Information and Communications (MIC) announced a new policy to make the Korean mobile telecommunications market more competitive. As a result, three PCS providers (KTF, LGT and Hansol PCS) entered the mobile service market in 1997, competing against two incumbent cellular operators, SK Telecom and Shinsegi Telecom. This policy led to excessive competition among the players for the next several years. The intense competition during this period degraded market profitability significantly, resulting in subsequent market restructuring. In December 1999, SK Telecom acquired Shinsegi Telecom, and KTF acquired Hansol M.com² in May 2001. This market shakeup reduced the number of mobile market players from five to three.³

In 1999, MIC announced that IMT-2000 licenses would be given to three qualified consortia. Among the three consortia applied, KTF consortium (KT-ICOM) and SK Telecom consortium were qualified, and two W-CDMA licenses were allocated to them. After a subsequent industry-wide dispute over the Korean IMT-2000 standard, a third IMT-2000 license was allocated to LGT in 2001 under the condition that the service should be based on cdma2000. After this licensing process was completed, the market expectation was that they would invest aggressively in 3G network in the near future.

However, the players in the Korean mobile market have behaved somewhat differently from market expectations. Rather than investing in IMT-2000 on a large scale, SK Telecom and KTF have apparently been more interested in deploying some interim solutions like cdma2000 1x and

¹KMT was acquired later by the SK group to become SK Telecom.

²Hansol M.com is a new name of Hansol PCS.

³For the details of the Korean mobile market restructuring during the late 1990s, refer to Choi, Lee, and Chung (2001) and Song and Kim (2001).

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