



# Cost allocation of WCDMA and wholesale pricing for mVoIP and data services



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## ARTICLE INFO

Available online 20 December 2012

### Keywords:

Cost-plus  
Ecosystem  
mVoIP  
MVNO  
Network neutrality  
Prepaid  
Retail-minus  
Smartphone  
WCDMA

## ABSTRACT

This study estimates cost-based prices for wholesale voice and data services provided to 3G (WCDMA) MVNOs according to their distinct types. For estimation, 3G MVNOs are classified into different types, and the overall cost of WCDMA facilities are separated into voice and data components based on their subscriber rates, actual traffic rates, as well as efficiency consideration of traffic rates. The study then calculates cost-based wholesale prices of voice and data services for each of the 3G MVNO types. The result of this study shows that a cost-plus pricing scheme can help achieve the policy goals of the regulator, namely, lowering telecommunications tariffs and facilitating the introduction of new convergent-type services, far more effectively than the current retail-minus pricing scheme. The findings of this study may assist firms in developing business models based on 3G networks and telecom regulators in designing policies related to interconnection, mVoIP, prepaid calls, wholesale services, and network neutrality.

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## 1. Introduction

Since 1999, Mobile Virtual Network Operators (MVNOs) have been introduced in major countries throughout the world under arrangements that are adapted to their respective telecommunications market environment. The market entry of MVNOs has been made possible either by setting new spectrum licensing conditions (e.g., Germany), through a broad interpretation of telecom resale law (e.g., US) (FCC, 1996), or its amendment (e.g., Japan). The Korea Communications Commission (KCC) newly enacted article 38 (Wholesale provisioning of telecommunication service, also known as the MVNO Act) of the Telecommunications Business Act (hereafter referred to as the Act), and announced its enforcement ordinance in September of 2010 (registration requirements for special category telecommunications business) and public notice number 2010-42 in November of 2010 (obligatory wholesale provision service targets the obligatory wholesale provisioning service provider, and conditions, procedures, methods, and pricing of wholesale provisioning). The notice by the KCC designates 2G and 3G (WCDMA) mobile services (voice, Short Message Service (SMS) and data) by SK Telecom (the largest operator) as the mandatory wholesale services and prescribes retail-minus pricing for setting wholesale prices charged to MVNOs (Korea Communications Commission (KCC), 2010a, 2010c, 2010d). However, this retail-minus pricing scheme has a restrictive effect on the price lowering effect of MVNOs, connection to Wideband Code-Division Multiple Access (WCDMA) networks (Koo, Kim, & Kwon, 2010; Lee, Lee, & Jung, 2010), corporate utilization of mobile services, and

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the emergence of diverse and innovative business models based on converged media services and Machine to Machine (MtoM) services. To remedy this situation, the KCC is currently working on a method of breaking down 3G network costs into voice and data service components and is considering an alternative cost-based approach to setting the wholesale prices of MVNO's voice and data services.<sup>1</sup>

In this study, 3G MVNOs are divided into three segments according to their types and break down the cost of WCDMA facilities into voice and data costs based on actual traffic rates, subscriber rates, and efficiency traffic rates. Cost-based wholesale prices of voice and data services for each of the 3G MVNO segments are estimated, then describing the cost-plus pricing approach that the KCC is considering, instead of the retail-minus pricing scheme currently applied to 3G voice and data services, pursuant to article 38 of the Telecommunications Business Act (wholesale provisioning of telecom services), can effectively contribute to its policy goals of lowering telecom tariffs and facilitating the introduction of new converged-type services. Finally, by determining retail prices relative to corresponding cost-based wholesale prices pursuant to article 38 of the same act and the amount of retail discounts, this study provides information useful in designing a wholesale pricing policy when the current retail discount rule diminishes three years from now.<sup>2</sup>

## 2. Policy purpose of MVNO and related literature

### 2.1. Policy purpose of MVNO

In Korea, in a mobile market environment in which competition based on factors such as price competitiveness and service innovation is delayed, its Mobile Network Operators (MNOs) have been competing for the market share, instead, through handset subsidy programs and other such marketing-oriented means. It was against this backdrop that the KCC introduced MVNOs, and the goals of this move were to promote competition in the mobile communications market and induce the lowering of telecom tariffs. MVNOs are resellers of telecom services which do not have their own spectrum or network facilities. Provided services along with facilities used to provide these services to customers are either wholly or partially supplied by an MNO at a wholesale rate. Through the introduction of MVNOs, the KCC expects a more diversified pool of suppliers to enter the market and new business models to emerge in order to stimulate competition in mobile services, thereby increasing the greater welfare of users.

In a mobile market without MVNOs, Multiple System Operators (MSOs) do not have the means to provide mobile services as they are unable to compete viably with telecom operators offering Quad Play Services (QPS), which typically include IPTV. Meanwhile, telecom resellers lack independence from MNOs both in terms of price and marketing strategy. On the other hand, under a rational MVNO scheme, MSOs and resellers can purchase mobile services needed at wholesale prices and design their own service bundles, independent rate schedules, and marketing strategies, and thereby become more competitive.

In a MVNO scheme, in which the provision of service is dependent on network facilities of MNOs, the level of practiced wholesale prices is highly important for the regulator to be able to achieve its policy goals. Reasonable wholesale prices promote efficient market entry of MVNOs, as well as raise the level of competition in the retail market to a healthy level. On the other hand, if wholesale prices are too low, it can result in inefficient MVNOs entering the market and reducing MNOs' incentive to invest in facilities and network upgrades. Finally, unreasonably-high wholesale prices will lower the profit of MVNOs to the point of canceling out the purpose of the MVNO scheme.

MVNOs can resell voice services, data services, or both to their customers. In order for MVNOs to be able to access services and facilities required, wholesale prices must first be set for the services (voice, data). Setting appropriate wholesale prices for data services is of extreme importance, especially during these times when an Information and Communications Technology (ICT) ecosystem has just begun to develop, and data traffic is continuously rising at a sharp rate, both for maintaining and expanding the ICT ecosystem. If wholesale prices are regulated only for voice services, MNOs can always raise the prices of Short Message Service (SMS) and data services to an unreasonably high level to obstruct the market entry of MVNOs, or otherwise take advantage of it by bending the rules. Therefore, to guarantee the regulatory effectiveness of wholesale price-setting, prices must be regulated comprehensively, concerning all services, including voice and data, as well as SMS. Accordingly, wholesale price-setting research must also include in addition to voice services, data services.

<sup>1</sup> The Japanese Ministry of Internal Affairs and Communications (MIAC) (2007) adopted a cost-based method for setting prices of wholesale services provided to MNOs with type 2 telecommunication facilities. In this new pricing method, the wholesale price must not exceed reasonable costs under efficient management, plus an appropriate level of profit. In 2009, the Japanese regulator released the process of calculating cost-plus wholesale prices for MVNOs accessing WCDMA networks (hereafter 3G networks; MIAC, 2009). Japan Communications (data MVNO) currently provides wireless data services using NTT docomo's network facilities, at a cost-plus price negotiated with the latter, and is also planning to offer mVoIP services in the near future. Hong Kong's Ofta (2001a, 2001b), while it allows 3G MNOs and MVNOs to freely determine interconnection charges through negotiations, requires the use of a cost-plus method, if the negotiations between them fail. Cost-plus pricing schemes are in use also in countries including Norway (1998), Finland (1998), Denmark (2000), and Sweden (2004) (Zoller, Matthews, Van Housen, O'loughlin, & Davison, 2001; Post & Telestyrelsen, 2006).

<sup>2</sup> The MVNO notice pursuant to paragraphs 2 and 4 of articles 38 of the Act, and article 39-3 of the enforcement ordinance to the same Act is effective until September 22, 2012 (KCC, 2010a), in accordance with the relevant provision of the "regulations regarding issuing and managing government orders and administrative rules, etc." (Presidential directive No. 248).

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