

Chapter 125

Wireless Technologies: Shifting into the Next Gear?

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ABSTRACT

Mobile Operators (MOs) in several countries are constantly challenged with the urge to further enhance the quality of their existing wireless networks, often dictated by the need to meet the newest technological standards as progress in wireless technologies is made. While the pressure to upgrade wireless networks is constantly felt by MOs in this market, it is not uncommon to observe some MOs upgrading their networks earlier than others. This article provides a theoretical explanation for this apparent paradox of why some MOs postpone the upgrading while others do not. It is shown that in the presence of different types of users - conservative versus quality-seeking - MOs may find it more profitable to adopt asymmetric upgrading strategies. Furthermore, it is argued that the incentives by some MOs not to upgrade are the largest when the share of conservative users in the market is sufficiently high, relative to the additional cost that upgrading entails. In such a case the MOs that do not upgrade their networks enjoy higher profits than the ones that do so.

INTRODUCTION AND BACKGROUND

Motivation

It is not uncommon nowadays to be confronted with various and continuous forms of advertising by MOs trying to persuade (prospective) customers of Mobile Internet services that their respective network

is the fastest, the one with the broader coverage, or the one with the overall best performance, and so on. One such example is that of Telecom NZ with its only very recently proposed slogan to current and prospective customers of broadband Internet services: “*Testdrive, Faster in more places*”.¹ Why would only some MOs engage in the upgrading of their networks? The answer to this question is far from obvious and the aim of this article is to

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fully characterize under which conditions such a behavior is perfectly rational.

The results of the analysis offer a way to reconcile the apparent contradiction of postponing the upgrading of their networks by some operators, but not others. By means of a theoretical model, the article first provides an explanation for the decision of MOs to engage in the upgrading of their networks. It is shown that those incentives to upgrade are the strongest, the tougher the competition between MOs for market shares, and the more alike the users with respect to their willingness to pay for the enhanced services. Further, it is analyzed and discussed that those incentives for MOs to all upgrade their networks change when the willingness to pay for enhanced services may vary considerably across potential users. In this case, it becomes relatively less attractive for MOs to align their networks to the highest technological standards, when others do so, and this could paradoxically guarantee the MOs that do not upgrade their network's higher profits than the ones of MOs that decided to do so.

These findings may provide a rationale for why MOs such as, for example, Telecom NZ, are at times more aggressive players than others in their upgrading decisions. For Telecom NZ, that decided to start upgrading its network before its rivals, there is at stake the prospect of being the provider capturing the share of the market formed by the New Zealanders seduced by the enhanced speed of accessing mobile broadband services.² Similar cases can be found, in which MOs have alternatively behaved as the leaders (pioneers), or the followers, in the adoption of several and subsequent standards.³ A related example, is the case of Telecom NZ that itself took years before adopting the same 3G standards used by its rivals, such as Vodafone NZ, preventing over these years the possibility of international roaming for its subscribers. It is only recent the passage to the same standards as the ones used by its rivals, after Australian operators switched to this alternative standard.

Description of the Main Features of the Model and Related Literature

A theoretical model is built to capture the main features needed to characterize the upgrading decision MOs make with respect to their respective networks' quality, as well as to allow for both scenarios in which (A) all users would equally value high quality services; and (B) users all value low quality services the same, however differ in their willingness to pay for the highest quality services; a distinction is made between *quality-seeking* and *conservative* users.

The model used is well suited to analyze at the same time different qualities of services offered in the market by MOs (e.g. different speeds of Internet access), as well as different varieties of services offered by MOs (e.g. that may depend on MOs' images, or their proposed bundles of services, etc.). The differences in quality are referred to in the economic literature as forms of vertical differentiation, while differences in varieties fall under the category of horizontal differentiation.

Many contributions in the economic literature have considered horizontal and vertical differentiation together, e.g. Economides (1989), or Neven and Thisse (1990). These rather classical studies have analyzed the way competing producers may select their offered *quality* and *variety* of services. In this article, the quality is endogenously determined by the upgrading decisions of horizontally differentiated MOs competing over prices. The novelty here is to allow for those decisions to be taken under alternative scenarios: the traditional one (scenario A) where users are considered to all have the same preferences for services of comparable quality; and the additional one (scenario B) where users might differ in the extent of their appreciation of high quality of services.

Users' mobility is often recognized as being a crucial feature of wireless Internet. To capture this important feature, in this article the upgrading decision of MOs is considered to be made

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