Chapter 7
The 3G (Third Generation) of Mobile Communications Technology Standards

EXECUTIVE SUMMARY

Through the 1G and 2G mobile communications technology standardizations, the involved actors became smarter and were able to develop more sophisticated strategies. For the GSM camp, moving the whole GSM market to its favorable technology standard to control and dominate the market for the next generation mobile communications technology was extremely significant. In this situation, what could the actors in the GSM camp do? What could the CDMA camp and other actors who did not belong to either camp (actors in Japan and China) do? This chapter answers all these questions.

1. BACKGROUND OF 3G TECHNOLOGY STANDARDS

Because of the advances in digital technology and system design, all varieties of 2G technologies (GSM, CDMA, and PDC) were able to support high capacity and low cost mobile communications services. Once consumers reckoned the advantages of untethered and always-on communications at fair costs, they subscribed to mobile service en masse. In contrast to the niche role of 1G mobile in communications, 2G mobile unfolded to become a mass market.

Another difference between 1G and 2G configurations should be noted. The industrial configuration of 1G was fragmented – many local service providers providing incompatible mobile services based on a variety of incompatible technologies. In contrast, as discussed in the section of The Unfolding of the Global 2G Mobile Communications Configuration in Chapter 6, the 2G industry may be regarded as a split between just two camps, viz. GSM versus CDMA, with Japan’s PDC being isolated and marginalized.

The third important 3G background fact to note is that 2G was focused on delivering ubiquitous voice communications. (GSM did have simple data delivery via SMS.) Now ubiquitous com-
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Communications had to encompass all media – voice, data, and video – and the enabling technological advances (Internet infrastructure, IP protocol, high performance IC, etc.) were on their way to making that possible.

Thus, these three background facts together dictated that the continuing story of mobile communications was about how the GSM and CDMA camps, and the major actors outside of the two camps, competed to control and benefit from the migration of technology and market to the next generation mass delivery of multi-media mobile services, 3G.

1.1. Migration of Market from the 2G to 2.5G and 3G Arenas

By the late 1990s, as the 2G mobile communications market became more mature and saturated, the competition between companies had become more intense. This fierce competition naturally led to price erosion and loss of revenue. For example, mobile service providers set lower prices to attract customers from their competitors, which increased the costs for recruiting new customers and for maintaining existing customers. As a result, Average Revenue Per User or Unit (ARPU) deteriorated. Thus, both service providers and manufacturers were motivated to look for new sources of revenue.

However, it should be noted that the growth rate of subscribers for the 2G communications differed by region and by nation. Thus, some mobile service providers looked for new source of revenue in mature markets, while others chose to benefit from the growth of subscribers in less mature markets by investing in foreign markets. Likewise, manufacturers’ profits in mature markets were being squeezed while profits in developing markets were growing strong.

Thus, the attitudes of the actors regarding the timing of migration from 2G to 3G differed according to their interpretations of their situations. For example Japan, having failed to benefit from the worldwide 2G explosion, preferred to realize 3G as soon as possible so that it might gain shares in the global mobile market. On the other hand, China, still in the process of growing its huge 2G market, preferred to hold off 3G migration so it might have time to develop its market and its competence to compete.

With the explosive growth of the Internet in the late 1990s, the forward-looking actors in the mobile industry sensed that the future of the industry lied in mobile multimedia services delivered through the Internet. But there were huge obstacles to transforming circuit-switch 2G voice systems to packet-switch 3G multimedia systems. After discussing some of the critical technology issues involved in the section of Migration of Technology from the 2G to 3G, the section of General Background of 3G Technology Standards discusses why influencing the timing, and shaping the path of migration from 2G to 3G, were the focus of the actors’ 3G standards strategies and also the focus of their subsequent business strategies.

1.2. Migration of Technology from the 2G to 3G

Given that the market was to migrate from voice services to broadband multimedia services, the driving questions were:

1. Which technologies were available to sufficiently increase signal transport to deliver broadband over a limited spectrum.

2. How easy or difficult it was, technically speaking, to migrate the existing 2G technology to the chosen 3G technology (rebuilding infrastructure if necessary); and what the migration path would be from here to there.

Given the state of technology knowledge in the late 1990s, there were only three approaches to squeezing capacity out of the limited spectrum: (1) frequency division, (2) time division, and (3) code division. Roughly speaking, since there were