

Mobile Communications Business Model in the United States

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1 Overview

The worldwide mobile communications industry is at a crossroads. The voice market has been rapidly maturing. The 3G technology is unproven, and has experienced technical difficulties and delays; its cost is higher than the previous 2G system, and moreover, spectrum is insufficient and expensive. This chapter will review the issues facing the industry and their implications for a mass media content strategy. We discuss the United States, including its particularities, but the main dynamics apply to other developed countries, too. The chapter is divided into five sections. This section provides a brief overview of the industry. The next two sections discuss the major problems and issues confronting the U.S. cellular industry: spectrum cost and allocations, standards, and pricing strategies for voice services.¹ The fourth section summarizes the business model practiced by the wireless carriers. The last section reviews the industry and concludes.

1.1 Growth/Revenue

The growth of the U.S. wireless telecommunications industry has been remarkable, similarly to other countries with average rates of more than 25% per annum since 1993. As seen in Figure 1, the number of subscribers is more than 170 million, and has reached more than 60% of U.S. households.² Although revenues have grown with this increase in penetration to more than \$90 billion, until recently the average revenue per customer (ARPU) has actually declined. The proliferation of service providers undermined the high prices and limited service of the previous duopoly and increased price competition.³ The recent ARPU increase appears to be the result of data service revenues (Standard & Poor's, 2004, p. 8). Roaming revenues—the subscriber's

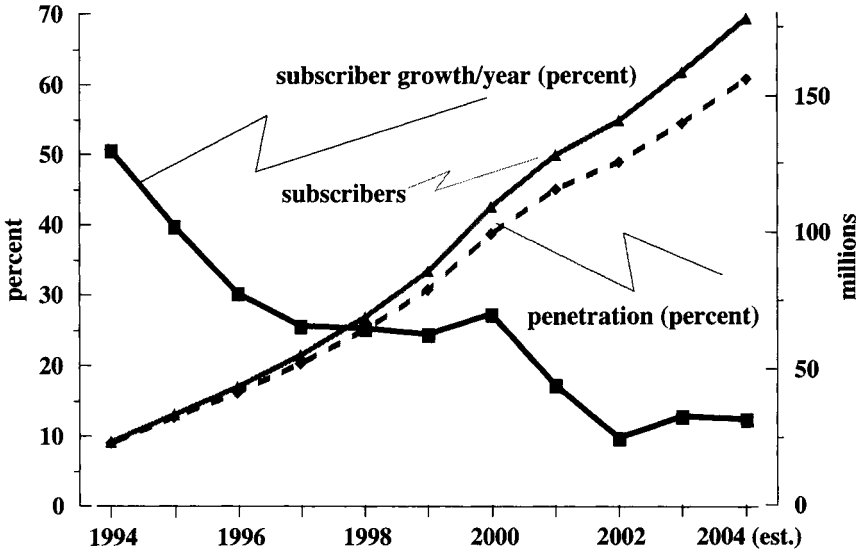


Figure 1: Subscribers, subscriber growth, and penetration
 Source: [S&P, 2001 & 2002]

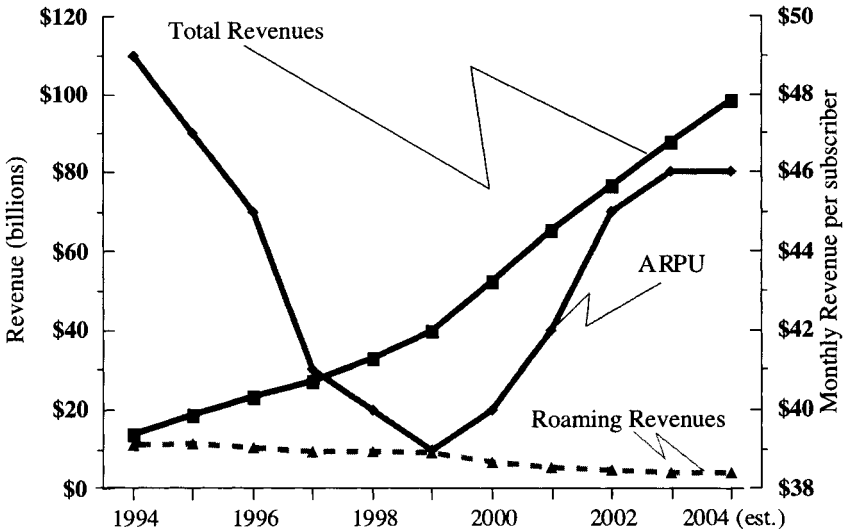


Figure 2: Total revenue, average revenue per subscribers, and roaming revenue
 Source: [S&P, 2001 & 2002]

charge for calls initiated or received from outside the designated service area—declined (see Figure 2), and are being eliminated as a competitive response. With lower revenues per customer it becomes harder to subsidize handsets. These issues will be addressed below.

1.2 Market Players (USA)⁴

The three major wireless voice providers: Cingular (including AT&T Wireless since 2004), Verizon Wireless, and Sprint (including Nextel since 2005), control nearly 80% of the market; Alltel (which acquired Western Wireless in 2005), US Cellular and T-Mobile USA hold the balance (Belson, 2004, 2005). Figure 3 summarizes the carriers' market share.

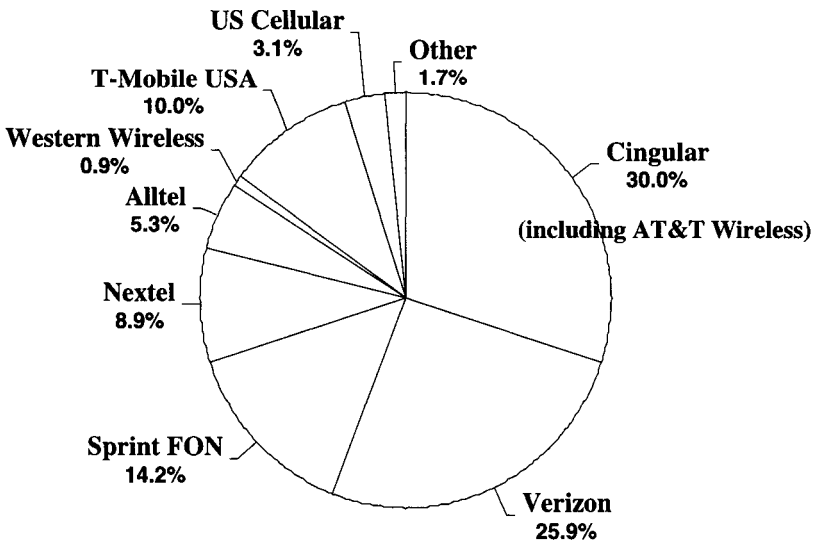


Figure 3: United States Wireless Market Share (Q2 2004)
 Source: Standard & Poor's Industrial Survey: Telecommunications Wireless
 November 4, 2004, p. 8

2 What are the Issues?

Spectrum allocations, geography, technologies, and price policies are issues that distinguish the United States from the European environment. We will address each of these in turn.

2.1 Spectrum Issues⁵

Inadequacy

The United States wireless industry believes that the allocation of electromagnetic spectrum is inadequate for its needs. Whereas Europe has allocated 155 MHz of spectrum for 3G components (NTIA, 2002), the U.S. has only allocated 90MHz (FCC, 2002b). There are plans to auction more spectrum from the UHF TV band, but the television industry has resisted.⁶

Regulatory Delays

United States wireless had additional barriers. The pre-divestiture Bell System experienced significant regulatory delays which allowed the rest of the world to jump ahead on mobile communications (Hausman, 2001; Noam, 2001). All this cost the United States' consumer an estimated \$20 billion in welfare loss (Crandall, 2000). The wireless service went to the regional Bell Operating Companies.⁷ In the FCC's desire to perfect the auction system for second generation mobile, it delayed the introduction of digital service, allowing Japan and Europe to move ahead (Noam, 2002).

Thus, the US has had a lower penetration of wireless than some other countries. In addition to the delay, the US has a geographic vastness that other countries do not have, inexpensive landlines, and multiple standards.

2.2 Multiple standards⁸

Europe, and much of the rest of the world, adapted the Global System Mobile Communications (GSM) standard, which allows for inter-country roaming and economies of scale in the production of handsets; in contrast, multiple standards exist for mobile service in the United States. This locks the subscriber into the service provider, since the handset cannot be used with a new provider who uses a different standard.⁹ Because the handsets are heavily sub-

sized, lock-in has benefited the wireless providers, although it is a loss to customers. Customers also must agree to a one-year contract when they initiate service. In addition to locking-in the customer, this ensures that at least a portion of the handset subsidy is covered by customers' monthly recurring charges.

Multiple standards have the advantages of competition among technologies, and barriers to some oligopolistic consolidations. If companies wish to consolidate their networks or share facilities, it is more difficult to do so with different standards. It also limits the ability of any US company to be a global player on two levels. First, it would need different technical skills and capabilities if it wished to enter different markets outside of the US. Second, it limits international roaming revenues.¹⁰

3 Pricing Strategies

In 1998 AT&T Wireless introduced its "one-rate" calling plan. It changed the pricing dynamics of the industry. The one-rate plan allowed AT&T wireless subscribers to use their minutes anywhere in the United State—without roaming charges or distance charges. Since AT&T's footprint was nationwide, it represented a significant threat to the regional carriers. This led to consolidations, sharing and joint ventures to develop nationwide coverage and combat loss of market share to AT&T. The carriers began to offer plans with a large number of "free" minutes. Moreover, the average price per minute continues its historical decline—13% between 2000 and 2001 and 9% between 2001 and 2002 (Standard & Poor's, 2004, p. 9). The pricing plans are similar. The game is to get the customers, and to lock them in with a contract and a handset that cannot be used with other carriers.

When one examines the tariffs of the major carriers, then, price differences do not appear all that significant. However, the myriad of options that are offered to customers confuses them. Massive amounts of "free" weekend minutes and "free" minute allowances with different monthly charges make the plans difficult to compare with one another. It allows the carriers to compete on a basis other than price. Brand name and reputation play a predominant role.

Moreover, the choice of a provider is not easy for the consumers. With the different pricing options, the consumer is forced to estimate minutes, something that is difficult to do (Alleman, 1984; Paverini, 1979). If consumers had perfect information, these self-selecting rates could be welfare enhancing (Willig, 1978); however, this is not the case. On average, customers over-esti-

mate their usage; thus, they pay more than they would if they had correctly estimated their minutes. It is particularly hard to estimate the impact of the tariff under receiving party pays, since, in addition to estimating her own traffic, the customer has to estimate the number of incoming calls. Thus, these self-selecting tariffs are revenue enhancing for the carriers.

3.1 Pricing and Marketing War

What is the incentive for the carriers to price so aggressively? First, the cost structure supports it. The industry has a high fixed, and mostly sunk cost with much lower variable costs. This means that they can drive their cost close to the incremental cost, because it will at least cover some of the fixed cost. Once the carrier captures a customer there is less need to price so low. But, in order to acquire the customer a carrier needs to offer enticements. If a carrier fails to capture the potential customer, it will be difficult to entice her away from a competitor because of the lock-in. As a result of price competition, wireless prices, per minute of usage, are much lower than in Europe and Japan, and usage minutes per subscriber much higher. But is this pricing strategy sustainable? Two factors are undercut it. First, number portability became available in 2003. Second, the move to 3G will only have two standards, at most: WCDMA and CDMA2000. Thus, the ability to maintain lock-in with the handset should be diminished.¹¹

4 Is there any hope? Data? 3G?

Data

The main hope for the carriers is a boom in data services. European providers have had success with short messaging services. DoCoMo, in Japan, has had even greater success with its i-Mode Internet data service. I-Mode is a “2.5” G service. It features an always-on connection much like a cable modem or DSL connection in the wired world. Also, the service is priced by the bits transferred, not air minutes. This can make a significant difference in the total cost to the consumer. As a result, it has captured 60% of the market based on this technology and is the second largest Internet Service Provider in the world. It should be noted that the demand for 3G in Japan has been below expectations (Belson, 2002). This does not bode well for the US carriers, or the European carriers for that matter.

In the United States the adoption of data services delivered over the mobile phone has been slower. With the exception of teenagers, consumers have not readily accepted the early data services offered on their handset. The technology is still awkward to use, and close substitutes are readily available. Moreover, in the carriers' closed systems, they control the available content. Thus, it has only been a small percentage of the carriers' revenue. In 2000 it was \$211 million—negligible; in 2001 it was \$545 million less than one percent of total revenue. However, the market has grown much larger with new offerings such as ringtone downloads, picture-mail, and particularly text messaging or Short Messaging Service (SMS). Data revenues for 2004 are estimated at \$4.3 billion (Yankee Group, 2004; Global Insight, 2005). Nevertheless, the level of revenues from these services remains a small portion—on the order of 4%—of total carrier revenues.

WiFi, a wireless service targeted mainly to laptop computers, has spread in the urban areas. This allows people to sit in coffee shops, airport lounges, or other “hot spots” to access their e-mail and web services at high-speed data rates. This service is competitive to wireless data services on mobile phones.¹² Blackberry, a wireless service that allows users to send and receive e-mail while on the go, is another competitor to voice-mobile data services with 800,000 dedicated higher-value customers. T-Mobile has introduced a service in 2003 which combines BlackBerry and voice features to mitigate this threat. In addition it has pursued a strategy to sell WiFi service in Starbucks and other locations as part of its service offering. Other mobile providers are expected to follow a similar path (Standard & Poor's, 2004, p. 14). Given the current lack of demand for data, close substitutes, and no “killer” application on the horizon, it is problematic whether the wireless voice industry can be saved with data services.

Next Generation 3G

The industry, worldwide, has touted 3G as the great leap forward (and portends a similar result to its Chinese namesake). It has better quality of service; it can handle data better—via packet switching. It handles spectrum more efficiently. However, at least two major problems are associated with 3G. The first is the transition of current subscribers from 2G to 3G. The handset, spectrum, and system are all more expensive than the current system. This means that the subscribers' cost will be higher. New mobile customers are unlikely; most probably the customers will come from their existing subscriber base. What can carriers do to migrate their customers to the next generation, if they are happy with their service, and are not enthusiastic to pay more for

a service, which does not offer much perceived improvement? Not much, it would seem. But, for argument's sake, assume that the carriers are successful in migrating their customers. Then the existing 2G-business collapses. It is a lose-lose situation. If the firm successfully migrates subscribers, it loses the revenue from the older service without an offsetting cost savings. On the other hand, if they fail to move customers from 2G, their investment in the 3G service is lost.

But in a market where all carriers will be going after the same customers, a price and marketing war is likely to continue with even greater intensity than before.

5 Outlook and Conclusions

While the indications are that mobile cellular is a maturing industry, much uncertainty remains. In the past the wireless carriers have been able to implement a lock-in strategy. To lock the subscriber in the carrier must first obtain the customer. The marginal cost of service for each additional customer is low, particularly compared with the large sunk cost of the network, but the acquisition cost is high, thus the drive to obtain the customer is intense. And when 3G services begin, the drive to capture customers will become ever more intense. Carriers will attempt to poach each other's markets. Price wars and intense marketing campaigns will ensue. With the introduction of 3G, it is an industry in which competition has worked to the benefit of the consumer, but to the detriment of the carriers.

This will lead to bankruptcies and consolidation of the industry. Indeed, consolidation may be one of the only strategies that the wireless carriers can implement and win by reducing price competition. The mergers of Cingular/ AT&T, Sprint/Nextel, and Alltel/Western Wireless, all in rapid succession, are past of these scenarios of consolidation. Given that the top three firms now account for 80% of the market, the consolidation strategy is reaching its limits. The second major strategy for wireless carriers is to increase their for individualized and mass media type content. With voice minutes and subscriptions approaching saturation, this seems to be the main avenue of growth, in America and worldwide.

Endnotes

- ¹ Unless otherwise stated, all of the references are to the United States voice-mobile market.
- ² Seventy percent penetration has been estimated as the point at which growth will be virtually satiated, although this may be high for the United States (Shere, 2001).
- ³ The Federal Communications Commission (FCC), at the time, seemed to think that a duopoly would have impact associated with the economic concept of competition, that is, prices at or near marginal cost; no monopoly rents, *et cetera*. This was far from the case. The regulatory authorities in the United Kingdom and elsewhere made similar errors. See Swann (2002).
- ⁴ As indicated earlier, we will not address the wireless data market except as it is integral to the voice providers' offering or if it is in competition to wireless voice.
- ⁵ Although not addressed here, auctions have a perverse effect on the allocations. The rationale for auctions is to allocate the resource to its best use. However, government, at least in the recent past, has assumed that proceeds of the auctions accrue to the government. This has led to inefficient behavior in setting up the auction and does not account for the adverse tax effects (Noam, 2002; Alleman, 2002).
- ⁶ For a detailed discussion of the 3G spectrum issues, see NTIA (2002).
- ⁷ AT&T was not reluctant to give this up, since an internal report done for it by McKinsey in 1981 indicated that the demand for mobile service would not exceed 900,000 by 2001, far below the current 170 million mobile subscribers in the United States today.
- ⁸ For a brief history of wireless development, see Liew (1999).
- ⁹ It is not simply that the standard locks in the customer. In the US the service provider has a veto over the handset used. It adds its own requirements to the handset used, in contrast to Europe where the handsets are interchangeable among carriers. Noam (2002) noted that this type of vertical integration is greater than in any other industry. As he puts it "The subscriber is 'owned' by the carrier." In the data arena, the carriers control the content available to customers.
- ¹⁰ T-Mobile was the only exception; it provides a dual-mode handset that is capable of operating in countries that have the GSM standard. Subsequently, Cingular (including AT&T Wireless) offer GSM platforms (Standard & Poor's, 2004).
- ¹¹ Dominant wireless providers can impose constraints and codes in the handset to make them incompatible with similar technologies, but regulatory control over these actions can eliminate these anti-competitive acts. See Noam (2002) for an analysis of vertical control in the industry and means of alleviating it.
- ¹² Antenna technology has been developed to extend the range of 802.11b signals to up to four miles. If this is successful, it has serious negative implications of the data space for the wireless voice service providers.

References

- Alleman, J. (2002). *A Note on the Inefficiency of Spectrum Auctions*. Working paper (available from the author).
- Alleman, J. & Schmidt, L. W. (1984). Telecommunications in a Fickle Regulatory Environment. In P. C. Mann & H. M. Trebing (Eds.), *Changing Patterns in Regulation, Markets, and Technology: The Effect on Public Utility Pricing*, Michigan State University, East Lansing, Michigan.
- Belson, K. (April 22, 2002). Japan Slow To Accept New Phones. *New York Times*, p. C-4.
- Belson, K. (December 16, 2004). Latest Merger Would Recast Cellular's Face Once Again. *New York Times*, p. C-1.
- Belson, K. (January 11, 2005). Alltel to Buy Western Wireless in \$6 Billion Deal. *New York Times*, p. C-1.
- Cellular Telecommunications & Internet Association (CTIA). (2002). Retrieved from the World Wide Web: <http://www.wow-com.com/>.
- Crandall, R. W. & Hazlett, T. W. (2000). *Telecommunications Policy Reform in the United States and Canada*, AEI-Brookings Joint Center For Regulatory Studies, December.
- De Aenlle, C. (June 2, 2002). Beyond the Big Loss of Vodafone. *The New York Times*.
- Federal Communications Commission (FCC 2002a). *Broadband PCS*. May 23.
- Federal Communications Commission. (FCC 2002b). *Spectrum Policy Task Force Presents Recommendations for Spectrum Policy Reform*. November 7.
- Federal Communications Commission (FCC 2002c). Retrieved November 5 from the World Wide Web: <http://wireless.fcc.gov/services/broadbandpcs/operations>.
- Global Insight. (2005). Unpublished forecast of Telecom/IT Group.
- Hausman, J. (2002). Wireless From 2G to 3G: Competition for Internet-Related Services. January 22.
- Liew, J, *et al.* (2002). Wireless Voice To Data: The Impact on the Consumer. Retrieved from the World Wide Web: <http://www.ksg.harvard.edu/project6/>.
- Noam, E. (forthcoming). Opening the 'Walled Airwave, in this volume.
- Noam, E. (2005). *Ownership and Concentration in the US Communications Industry*. New York: Oxford University Press (forthcoming).
- National Telecommunications and Information Administration (NTIA). (2002). An Assessment of the Viability of Accommodation Advance Mobile Wireless (3G) Spectrum in the 1710-1770 MHz and the 2110-2170 MHz Bands, July 22. Retrieved from the World Wide Web: <http://www.fcc.gov/3G/3Gva072202.pdf>
- Pavarini, C. (1979). The Effect of Flat-to-Measured Rate Conversions on Local Telephone Usage. In J.T. Wenders (Ed.), *Pricing in Regulated Industries II*. Denver, CO: Mountain States Telephone Co.
- Schiesel, S. (January 13, 2005). For Wireless, the Beginnings of a Breakout. *New York Times*.
- Shere, C. K. (2002). Telecommunications: Wireline. *Standard & Poor's Industry Surveys*, May 30.
- Standard & Poor's. (2004). Standard & Poor's Industry Survey—Telecommunications: Wireless, November 4.

- Swann, C. (2002). Presentation at Global Insight's World Outlook Conference, New York, NY, October 30.
- Tachkawa, K. (2002). NTT DoCoMo and the New Global Communications Community, Presentation Columbia Business School, New York, NY, November 13.
- Willig, R. (1978). Pareto Superior Non-linear Outlay Schedules. *Bell Journal of Economics*, 55-69.
- Yankee Group. (2004). Market for wireless data services remains untapped. *Silicon Valley/San Jose Business Journal*, December 27. from the World Wide Web: <http://www.bizjournals.com/sanjose/stories/2004/12/27/daily7.html>.