

Despite hundreds of millions of paying mobile subscribers and enormous potential for many more, the key to prosperity is enticing them to pay for extra services like text messaging and IP telephony.

MOBILE DATA COMMUNICATIONS IN CHINA

By Xu Yan

The Chinese mobile communications market has enjoyed impressive growth in terms of numbers of subscribers over the past six years. As of August 2003, there were 244.12 million of them, meaning China today is the largest mobile communications market in the world. But, unfortunately for the Chinese operators, a subscriber is not necessarily a user. Figure 1 outlines the decline in average revenue per user (ARPU) per month and minutes of usage (MOU) per user per month at China Mobile (HK)—the corporation that owns 21 (of 30) of China Mobile Group's provincial branches. ARPU declined 73.3%, from 431 Yuan (U.S. \$55.26) in 1997 to 115 Yuan (U.S. \$14.74) in 2002. MOU in 2002 was 207 minutes, a decline of 52.8% compared with 1997. The decline in ARPU and MOU, according to China Mobile (HK), was due mainly to the substantial growth in low-use subscribers, particularly those signing up for prepaid services, as shown in the figure.

In order to fully exploit the potential of the mobile network's resources and boost revenue from current subscribers, both China Mobile and China Unicom—the two operators in the duopoly Chinese mobile communications market—have thus sought to introduce a variety of value-added services, including caller number display, voice mail, short message service (SMS), call forwarding, call waiting, conference calls, and long-distance Internet Protocol (IP) telephony. In an effort to keep up with mobile commerce worldwide, both companies launched nationwide Wireless Application Protocol (WAP) services on May 17, 2000, World Telecommunication Day. Services now available through WAP include mobile banking, stock trading, news, weather reports, and email.

ILLUSTRATION BY STEVE ADLER

Subscribers use their mobile handsets as a substitute for PCs for sending and receiving email, or, more precisely, text messages. The only difference is that SMS is limited to a maximum of 160 characters.

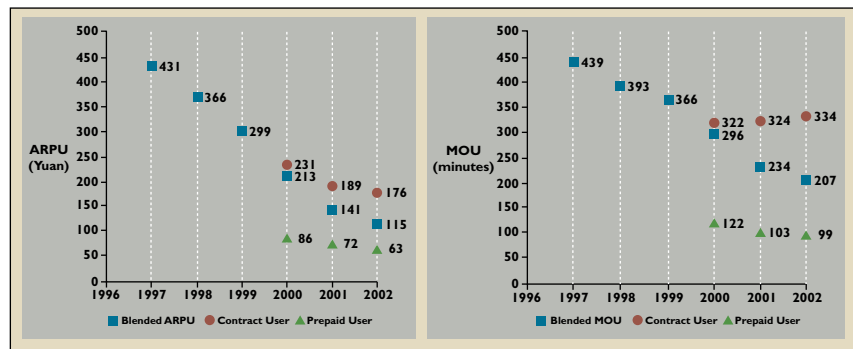
However, these WAP services have not been popular with subscribers. For example, in Beijing, a city of 13.8 million people, China Mobile signed up only 8,000 WAP users in the first five months after launching the service (see www.cci.cn.net). A survey conducted by TNS, a market information firm, from December 2000 to February 2001 found only 2% of Chinese subscribers access mobile Internet via WAP phones, the lowest percentage of the eight Asia-Pacific economies studied (see Figure 2).

In contrast, the number of subscriptions to the popular iMode service from NTT DoCoMo in Japan has increased steadily since that service was launched Feb. 22, 1999. At one point in May 2000, NTT DoCoMo even had to temporarily suspend signing up new subscribers when demand surpassed system capacity. As of August 2003, the total number of iMode subscribers was 39.4 million (see www.nttdocomo.com).

The inconsistent response from the Chinese market might result from inherent differences in the technologies underlying WAP and iMode. For example, WAP uses the Wireless Markup Language for programming content, implying content providers must first learn the language before they can provide content for the operators. As a result of this switching cost, content is limited. In the case of iMode, compact HTML, or CHTML, a subset of HTML 3.0 for

Internet content, is used for programming, practically eliminating the switching cost for content providers wishing to make their services available via iMode.

Because WAP runs over circuit-switched networks with low transmission speeds and per-minute charg-



ARPU = average revenue per user, per month. MOU = minutes of usage, per user, per month.

Figure 1. Changes in average revenue per user per month and minutes of usage per user, per month of China Mobile (HK); source: China Mobile (HK) annual reports.

ing, users are billed according to the time they spend online or occupy the circuit. The packet-switching iMode uses the Packet Data Cellular Protocol to speed transmission; users pay for each packet of data rather than their time online. A single packet of 128B of data is charged at a rate of ¥0.3 (approximately U.S. \$0.003), 80% cheaper than the circuit-switching system for the same volume of content.

For accessing information via WAP, users are obliged to key in a username and password, as well as several numbers. On average, it takes 30 seconds to connect to the network. Packet switching keeps the iMode handset in “always on” mode, meaning it is always ready to receive data, thus providing increased convenience to users.

In addition to these technical strengths, NTT DoCoMo has created a successful business model. It

provides a platform on which third-party content providers supply the content, either for free or for a small premium fee (maximum ¥300 per month). NTT DoCoMo shares traffic revenue related to content with the providers of the content, typically keeping a commission of 9%. This arrangement has been a strong incentive for content providers, and a large amount of Japanese-language content is now available. For example, as of April 2000, 448 application alliance partner companies and 8,023 voluntary iMode Internet Web sites, including 20 search engines, had signed content-provision contracts with NTT DoCoMo. Their content has helped attract more and more subscribers, further enticing more content providers to provide more content [2].

The Monternet

Chinese cellular operators noted NTT DoCoMo's success in Japan. China Mobile's Monternet program (introduced November 2000) allows information service providers to access the operator's mobile network at any place and time to provide nationwide service, also known as the "one-stop shop, China-wide service" arrangement. China Mobile keeps 9% of traffic revenue; information service providers keep the rest. If the arrangement includes coverage for unpaid subscription bills, China Mobile increases its commission to 15%.

Monternet generated an overwhelming response from service providers. For example, by the end of 2000, more than 500 had joined, according to the China Mobile (HK) 2002 Annual Report. Due to the large number of content providers, China Mobile has thus been able to "cherry-pick" the most valuable ones to apportion its own limited capacity. Service providers include Sohu.com, Inc., Sina Corp., and NetEast.com. None had earned a profit through its wireline Internet businesses before cooperating with China Mobile's Monternet, with subscribers paying for each and every message they receive.

These service providers offer several types of ser-

vices, including message-on-demand, message broadcasting, banking, and stock trading. For example, subscribers can visit Sohu's Web site and subscribe to custom-packaged news, including sports and entertainment, via their handsets. As of October 2003, China Mobile charged 0.2 Yuan (U.S. \$0.024) for each news item. For information ordered via handset, China Mobile charged 0.1 Yuan (U.S. \$0.012) for the requesting message and a different rate for terminating the message; see the table here for an overview of charges. In addition to the transmission fee, content providers may also charge a content fee; rates vary depending on service provider. For example, New-Palm delivers daily weather reports to subscribers' handsets for a total monthly fee of 4 Yuan (U.S. \$0.48). China Mobile collects this fee on behalf of the content providers while sharing the transmission fee with them.

In 2000, in order to facilitate Monternet, China Mobile set up a subsidiary called Aspire. Hewlett-Packard Co. invested U.S. \$35 million and today owns 7% of the company. In 2002, Vodafone invested U.S. \$34.97 million and today owns 9.99% of the company. Aspire built the Mobile Information Service Centre (MISC) to serve as the common platform for all of China Mobile's mobile Internet services. It was installed on the basis of the distributed structure of China Mobile's provincial operating subsidiaries. A unified MISC platform provides mobile subscribers with mobile data-roaming capabilities throughout China. MISC also provides a uniform data interface open to third-party service providers, through which standard network information, including billing, is provided. Segregating service platforms from basic mobile communication services ensures that all mobile communications networks developed through the platform migrate smoothly when they are upgraded to 2.5G and 3G networks, making them truly forward-compatible networks, according to the 2001 China Mobile (HK) Annual Report.

Another strategy facilitating Monternet involves upgrading China Mobile's circuit-switching network to a packet-based network. On May 19, 2002, China Mobile formally kicked off its General Packet Radio Service network in 100 Chinese cities. As a result, more advanced mobile value-added services, including short multimedia messages, are now available.

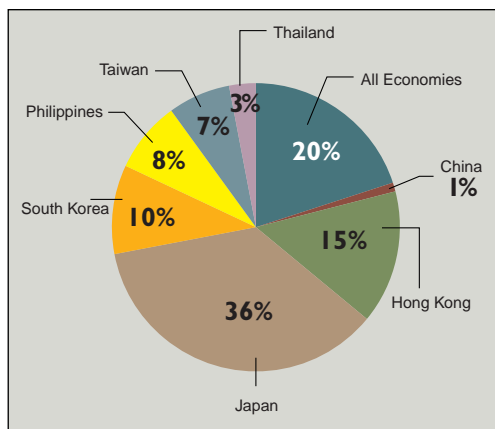


Figure 2. Mobile Internet access using WAP and iMode phones; source: www.tnssofres.com/apmcommerce.

Stock Information	0.20	Train Schedule	0.30
Weather Report	0.10	News	0.20
Flight Schedule	1.00	Dictionary	0.10
Foreign Exchange Rate	0.10		

Termination rate for messages of different content (per item, in Yuan); source: www.c114.net.

The Chinese experience indicates that an advanced but less-than user-friendly technology like WAP is not necessarily more commercially viable than basic but easy-to-use ones like SMS.

Short Message Service

Despite concerted efforts on the part of the operators to upgrade their technology, the promising growth of mobile data services in China depends on the existing SMS (based on the Global System for Mobile Communications standard), one of the most basic of value-added services. For China Mobile (HK), SMS usage volume increased from 126.7 million messages in the first half of 2000 to 40.69 billion messages in the first half of 2003, representing an average compound half-yearly growth rate of 161.6% (see Figure 3a). On Chinese New Year (Feb. 12, 2002), more than 100 million short messages of greeting were delivered over China Mobile's network, representing revenue of about 10 million Yuan, or U.S. \$1.21 million, as shown in the figure.

This phenomenal increase in SMS use is not surprising; market research sponsored by China Mobile in 2000 found that email is the mobile data service most in demand

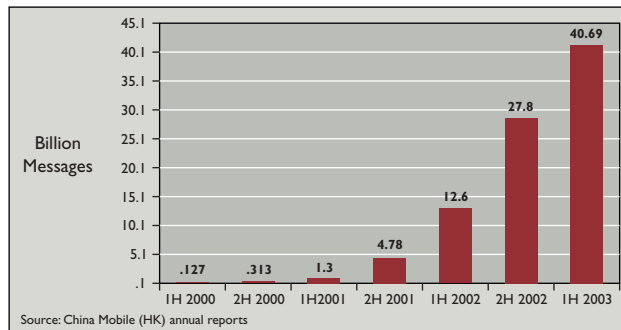


Figure 3a. Short message service usage volume of China Mobile (HK); source: China Mobile (HK) annual reports.

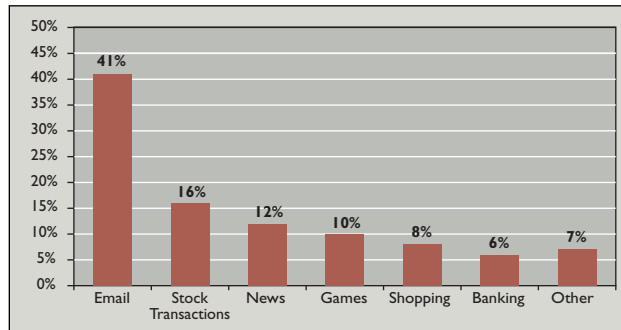


Figure 3b. Demand for mobile data services in China.

(see Figure 3b) [1]. This reflects China's infrastructure. By the end of 2002, there were 206.6 million mobile subscribers but only 49.7 million Internet subscribers, implying that the wireless Internet is more widely accessible than the wireline Inter-

net. Thus, subscribers use their mobile handsets as a substitute for PCs for sending and receiving email, or, more precisely, text messages. The only difference is that SMS is limited to a maximum of 160 characters.

Some wireline Internet portals also allow users to send SMS via their PCs to the handsets of mobile-phone users. SMS thus functions as a bridge between the wireless Internet and the wireline Internet.

According to my own fieldwork in May and September 2001, SMS offers a number of advantages in the context of the Chinese telecommunication market:

An economical way to communicate. The end-user price for sending and receiving an SMS message is 0.10 Yuan (U.S.

\$0.012), whereas a regular one-minute telephone call costs 0.40 Yuan (U.S. \$0.048). The minimum charged unit for mobile telephony in China today is one minute, implying that for simple information, short messaging is more cost effective. And if the two

communicating parties are located in two different cities, the advantage is even more apparent, since the long-distance charge for mobile service is 0.70 Yuan (U.S. \$0.084) per minute, whereas SMS is not distance-dependent.

Useful in special circumstances. When one of the two communicating parties is at a conference or meeting, he or she can still receive and reply to SMS without disturbing other attendees. The wide application of SMS might thus neutralize the urge to talk on the phone at conferences and cinemas, a phenomenon frowned on everywhere.

Better at expressing certain information than verbal media. An example is the large number of messages delivered as greetings on Chinese New Year and Valentine's Day.

More suitable for broadcasting information. Many m-commerce companies now provide solutions for organizations broadcasting internal corporate information. Organizations with dispersed branches and employees, including insurance companies, power suppliers, and police departments, are heavy users of the short message broadcasting service.

Reluctance of Chinese users to leave voice messages. In China, when the called party is not available to answer, the call is usually forwarded to a call center where human operators ask the calling party whether the caller would like to send a message to the called party. If the answer is affirmative, the operator types the message and sends it to the called party in the form of a short text message. China Mobile claims that callers prefer this arrangement, as they rarely leave messages when they have to talk to a machine.

Short messages as a new kind of literature. Political jokes and adult humor are distributed and redistributed among subscribers. One reason millions of them have welcomed this outlet is the Chinese government still exerts strict censorship on these topics in the public media; short messages manage to bypass such control due to the inherent technical difficulty censoring the enormous volume of messages.

These advantages, along with the revenue-sharing business model, have been exploited by mobile operators and content providers alike. In July 2002, Sohu, an Internet portal company established in 1996 and listed on the Nasdaq stock exchange in 2000, reported its first positive quarter (second quarter 2002) in terms of earnings before interest, tax, depreciation, and amortization. Nonadvertising services, mainly SMS, contributed U.S. \$2.76 million, or about 45%, of the total revenue in the quarter. As of September 2003, Sohu's share price had increased more than 40 times. In July 2003, China Mobile (HK) reported it had more than 83.1 million mobile data subscribers,

revenue from its non-voice businesses had increased by 86% over the same period in 2002, and the proportion of its total revenue had increased from 4.9% in 2002 to 8.3% in the first half of 2003, as reported in the China Mobile (HK) Interim Report, 2003.

Conclusion

The growth of SMS-related services over the past several years reflects the enormous potential of the Chinese wireless data communications market. While the Internet is not so popular in this market, the wireless system plays a significant role in meeting the public's demand for point-to-point and point-to-multipoint-content communications. The Chinese experience indicates that an advanced but less-than user-friendly technology like WAP is not necessarily more commercially viable than basic but easy-to-use ones like SMS.

More important, it also shows the value of an effective business model; the mobile data communication system must be an open system attractive to content providers, because, like the Internet itself, the availability of content makes data communications attractive to subscribers. Meanwhile, as more subscribers sign up for mobile data communications, more content providers are likely to be motivated to supply more content—a process of positive feedback.

Moreover, a pricing scheme enabling mobile data communications to function as a cheaper substitute for voice service is also important, at least in low-income economies where subscribers are highly sensitive to price. Consumer behavior must also be considered within a country's cultural and political context. ■

REFERENCES

1. Lu, T. The development of mobile commerce in China. In *Proceedings of the Asia-Pacific Mobile Communications Symposium* (Hong Kong, Sept. 17–18). Hong Kong Institution of Engineers, Hong Kong, 2000, 100–110.
2. Xu, Y. Return of tigers: Asian-Pacific innovation in mobile communications. *Info.* 3, 3 (June 2001), 231–242.

XU YAN (xuyan@ust.hk) is an assistant professor in the Department of Information and Systems Management at the Hong Kong University of Science and Technology, Clearwater Bay, Kowloon, Hong Kong

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.
