By Xiaoni Zhang *and* Victor R. Prybutok

HOW THE MOBILE COMMUNICATION MARKETS DIFFER IN CHINA, THE U.S., AND EUROPE

Market differences include communications standards, price structures, government regulations, customer demographics, usage patterns, business potential, and technology adoption strategies.

Despite the 2001 downturn in the global telecommunications market, the mobile penetration rate in China is increasing due to the elimination or reduction of mobile connection fees. The mobile market worldwide is dynamic in terms of technology development, and competition is aggressive. The potential size and growth rate of the Chinese, U.S., and European mobile markets warrant examination of the state of their wireless development. Here, we explore that growth by examining the differences among the three regions, especially those in mobile consumer demographics, Short Message Service (SMS) usage, and 3G technology.

China. The Chinese market is predominantly voice-centric, but the rapid rise of prepaid subscribers and the continued growth of mobile services within the market's low-end segment continues to push down the average revenue per user. Despite the diverse economic development going on in China today, most Chinese in rural areas cannot afford a cellphone, a satellite dish, or the related communication equipment. Some wireless telephone operators are trying to target rural areas and smaller cities, but because people there make less money than their counterparts in the big and mid-size cities, the value to them from these markets remains to be seen.

Before 1999, Chinese telecom operators encouraged consumers to use telecom services first and pay their bills later. However, this strategy caused the telecom companies to lose millions of dollars in the form of unpaid bills. In some areas, up to 50% of the users did not pay their bills. At that time, China lacked the computer technology needed to track identification numbers, and in most cases, unpaid bills could not be collected. To deal with the increasing problem of unpaid bills, most operators adopted a prepaid strategy. In the second half of 1999, China Unicom notified its agents that it would tolerate a maximum of 15% of its customers not paying their bills, and that those agents who could not meet this target could not represent China Unicom. Within a few months of the company instituting these measures, the situation improved. After 2000, the majority of consumers were moved to prepaid plans for their mobile units, and only a limited number of contract subscribers were maintained. According to BDA (a telecom consulting firm in China), as of 2001, the numbers of prepaid users continued to dominate new subscribers, accounting for over 90% of new users. Although prepaid plans present little risk for the operators, they also result in lost revenue due to the limits imposed by prepayment. With prepayment, consumers are more conscious of their spending and better able to plan how much they actually spend [4].

According to China Mobile in March 2004, the average customer was using 240 minutes of mobile phone time per month. This number has risen as mobile phone usage has become more affordable for Chinese city dwellers. But mobile phones are expensive compared to landlines. It costs Chinese mobile phone users 40 cents per minute for local calls and 80 cents per minute for roaming, whereas landline users pay 10 cents per minute for local calls and 20 cents per minute for long distance. Making or receiving calls with cellphones is comparatively expensive in China. Thus, it is common for cellphone users in China to turn off their phones in order to save money. It is also common for them to use cellphones only for priority calls.

Europe. A growing number of European operators offer customers the ability to access their accounts and get help identifying the most cost-effective plan available. In February 2003, Agcom, the Italian telecom regulatory agency, imposed a tougher pricing structure on mobile termination charges. Specifically, it ordered Italy's mobile operators to slash mobile termination charges levied on fixed-to-mobile phone calls. Other European telecom regulators have since followed suit. Before this regulatory change, controlling the amount spent on calls while traveling was difficult due to pricing discrepancies.

Prices for roaming throughout Europe are heavily criticized by customers, and mobile phone companies have been accused of fixing prices. Vodafone introduced a unique tariff for its customers traveling abroad, though it requires them to select a partner network via mobile phone when in a different country. Users are inconvenienced by having to know how to select other networks, as well as which network provides the best price. Although diverse pricing exists in Europe, Tariff Matching Guarantees were introduced by Orange UK, Vodafone Telecel in Portugal, and other operators. They program competitors' tariffs into their billing systems. Over 60% of active mobile phone customers in Europe use prepaid services [2]. The pool of prepaid mobile users is likely to keep growing as a segment of the mobile market for the next five years. People use the prepaid method in order to control their spending and hence prevent future credit problems.

U.S. Americans use mobile telephones primarily for spoken communication and sometimes for sending brief text messages. Phones are also, though rarely, used to surf the Web; this limited use probably results from U.S. customers' sensitivity to time. Compared to China and Europe, the cost in the U.S. of making a call is relatively low. In North America, most mobile telephone subscribers (approximately 90%) pay their bills after they've incurred charges (known as postpaid service).

The Yankee Group estimates that the number of U.S. mobile phone subscribers will increase by 50% to 200 million by the end of 2006 and has reported that nearly 30% of nonbusiness calling minutes in the U.S. during the third quarter of 2002 were carried on mobile phones (www.yankeegroup.com). As much as 4% of U.S. consumers have discontinued their use of landlines in favor of mobile phones, with an even greater percentage predominantly using cellphones for personal calls [5]. Unlike Europe, there

are few roaming agreements among operators in the U.S., but both the caller and the customer who accepts an incoming mobile call in the U.S. also pays for the call.

Short Message Service

SMS is a way to send text messages (up to 160 characters) to mobile phones using Global System for Mobile (GSM) communications networks. SMS growth is being driven by inexpensive, convenient, interpersonal communication, as well as by applications in shopping, stock trading, business, and games. Most SMS users are in the Asia/Pacific region and in Europe, following the heavy adoption of GSM mobile phones and devices there. SMS is a relatively convenient and cost-effective approach when compared to the cost of airtime charges for voice calls or wireless Web access with short messaging. SMS offers several other advantages: messages can be received while making voice calls; in situations where talking on a cellphone is inappropriate, messages are silent and discreet; most carriers offer SMS alerts (such as stock quotes, sports scores, and news) delivered to the phone at regularly scheduled intervals. SMS has recently begun to gain popularity in the U.S., indicating that the U.S. is beginning to catch up in terms of mobile commerce.

China. Alternative messaging methods using computers and the Internet are relatively expensive because computers in China are expensive, thus limiting computer access. Moreover, people who have computers in China do not use them regularly. For example, even though most university professors have computers with Internet access, few check their email regularly. Chinese users were expected to send 550 billion short text messages in 2004, doubling mobile phone operator revenues to $6.7 billion [6].

U.S. Alternatives to SMS (such as email and paging) are more viable in the U.S., while Europeans send more SMS messages. One key difference is that an SMS message must be typed on the small, awkward keyboards built into mobile telephones and take considerably longer than leaving a voice message. Further complicating U.S. adoption of SMS is that, unlike Europe, mobile operators in the U.S. employ a variety of technologies to provide wireless services. Calling or sending short text messages to friends and relatives in other states may be impossible due to incompatible networks. There's a good chance that SMS technology will be popular in the U.S., possibly as email on mobile phones or voice-activated instant messaging for wireless phones that are as easy to use as regular phones.

Europe. Because SMS in Europe costs less than making a phone call, young people there quickly embraced its advantages. SMS is usually used in addition to voice services. SMS popularity was a pleasant surprise to mobile operators because the cost of sending and delivering messages is low. SMS remains a lucrative revenue stream and does not occupy the same spectrum as voice traffic. Text messages use little bandwidth, and carriers do not have to deliver them in real time, as they do with voice transmission in telephone calls. A recent analysis found that SMS use in Western Europe could continue to grow until 2006, while mobile messaging revenue outside Europe is unlikely to grow until 2007 [7].

3G Technology

The term 3G stands for the third-generation of mobile phones, providing a range of new functionality. Until now, mobile phones were primarily used to carry voice messages, with only some SMS text storage. 3G technology now allows the simultaneous transfer of speech, data, text, pictures, audio, and video. It also provides high-speed Internet access, entertainment, videoconferencing, mobile shopping, and travel information.

Many countries worldwide are preparing to transition from 2G (CDMA, TDMA, or GSM) to 3G technology (CDMA2000, UMTS, or TDSCMA). Depending on a region's current technology, mobile operators could be expected to upgrade to some interim 2.5G technology (GPRS or EDGE) before moving to 3G; in many cases, a move from 2G to 3G would involve steep license costs and be complicated by a lack of demand and available applications.

Chinese administrators are evaluating a number of options, including TD-SCDMA, Qualcomm's CDMA, and the Japanese- and Europe-backed WCDMA standard. In China, mobile operators are largely (70%) state-owned enterprises with close affiliations with the Chinese government. China Mobile operates a GSM network, and Unicom operates both GSM and CDMA communications. China's government recently allocated two 55MHz blocks of the 3G radio frequency spectrum to TD-SCDMA but only one block of 60MHz to each of the other two 3G standards. This may indicate the government favors that homegrown standard. Europe has favored the WCDMA standard, while the U.S. prefers Qualcomm's CDMA2000. China does not want to repeat mistakes made by European telecom regulators with the 3G license bidding process. As a result, the Chinese government has been cautious in 3G licenses and standards because it views 3G technology as not mature enough for a decision on 3G standards.

China's 863 Program includes research and investment intended to go beyond 3G. The country made a strategic decision to involve itself in the early stages of 4G development, enabling participation in the standard-setting process and in global telecommunications competition. Although application of 4G is scheduled for 2010, preparations began in 2000, and in November 2001 the government formally approved the 4G development initiatives.

U.S. The U.S. Congress has directed the Federal Communications Commission (FCC) to auction scarce wireless spectrum resources. While fulfilling these guidelines, the FCC has the opportunity to encourage small businesses to involve themselves in wireless development and services, allocating a large portion of the airwaves for 3G services. The U.S. allows several competing technologies, including CDMA, GSM, and TDMA.

AT&T Wireless upgraded its technology to 3G in July 2004, to become the U.S.'s first 3G voice and data network in San Francisco, Seattle, Phoenix, and Detroit and extended 3G services (in September 2004) in Dallas and San Diego. Verizon Wireless launched high-speed wireless data service on about 20% of its network. However, the U.S. lags Korea, Japan, and Europe in implementing wireless data services. Despite this lag, the U.S.'s largest operators are committed to building 3G networks. The Yankee Group reports that 82% of mobile users do not use wireless Internet services because of the high cost, complications, slow speed, or lack of availability of mobile Internet in their service areas (see www.yankeegroup.com).

Europe. Several European countries have auctioned 3G licensees, prompting mobile telephone operators to bid huge sums [3]. Consulting firm Gartner Group projects that by 2007, WCDMA will account for 11.3% of data revenue [8]. The European Commission has granted antitrust clearance to a set of agreements intended to give manufacturers of 3G mobile equipment better access to patents. Improved access to patents paves the way for introduction of 3G mobile services in Europe. However, operators have been cautious in launching 3G; seamless migration from existing telecommunication platforms to 3G is the key to 3G success [1]. Market information firm Taylor Nelson Sofres reports that 42% of mobile phone customers in Europe are interested in 3G services; approximately 47% of users have expressed interest in downloading music files via their mobile phones, and 40% also want to view video clips (see www.tns-global.com).

Conclusion

The mobile and wireless markets in China, the U.S., and Europe have experienced rapid development, but standardization represents a major challenge. China's government is dealing with competition, policy, and the regulatory consequences of mobile telephony. The Chinese market presents unique characteristics, along with enormous potential. China is destined to be the only country in the world that allows the simultaneous existence of multiple 3G standards. Meanwhile, it is emulating marketing strategies and concepts found in the U.S. and Europe. While it will take time for China to catch up to its Western counterparts in delivering services, such initiatives will certainly increase mobile data adoption [6].

In the U.S., government regulation is often unpopular, and large companies set their own standards. As a result, several different standards are being used concurrently, resulting in incompatible networks. Many users also have to choose from among different providers for long-distance and local telephone calls, as well as from a number of different technical solutions; determining which is best is difficult.

Meanwhile, each country in Europe is a relatively small market unto itself, so most European mobile telecom companies operate in three or four countries. The result is increased interest in participating in standardization procedures, so their products can be used in as many countries as possible. **c**

REFERENCES
1. Dhaliwal, J. Seamless migration is the key to 3G success. *New Media Age* (Nov. 25, 2004), 9–11.
2. Donegan, M. and Lunden, I. G-men crash the mobile payment party. *Total Telecom Mag.* (June 2004), 20–22.
3. Elkington, H. and Naville, M. After the hammer falls. *Telephony 239,* 8 (Aug. 21, 2000), 78–81.
4. Fan, Z. China Unicom fights against delinquent accounts. *Qilu Night* (Apr. 5, 2000).
5. Newman, J. Landlines not needed, some phone users decide. *Wisc. State J.* (Aug. 9, 2003); www.madison.com/wisconsinstatejournal/local/54485.php.
6. Pienaar, I. Mobile and wireless technology: Chinese SMS to top 500bn. *ITWeb* (Aug. 30, 2004); www.itweb.co.za/sections/computing/2004/0408110738.asp?S=Mobile%20and%20Wireless%20Technology&A=MAW&O=FRGN.
7. Shukhevich, R. More than missives, SMS provides variety. *St. Petersburg Times* (Russia) *946* (Feb. 24, 2004).
8. Wieland, K. Vodafone plays its 3G data card. *Telecom. Intern. Ed. 38,* 3 (Mar. 2004), 12; research.analysys.com.

XIAONI ZHANG (zhangx@exchange.nku.edu) is an assistant professor of management information systems in the Department of Information Systems in the College of Business Administration at Northern Kentucky University, Highland Heights, KY.
VICTOR R. PRYBUTOK (prybutok@unt.edu) is a Regents Professor of Decision Sciences in the Information Technology and Decision Sciences Department and Director of the Center for Quality and Productivity in the College of Business Administration at the University of North Texas, Denton, TX.