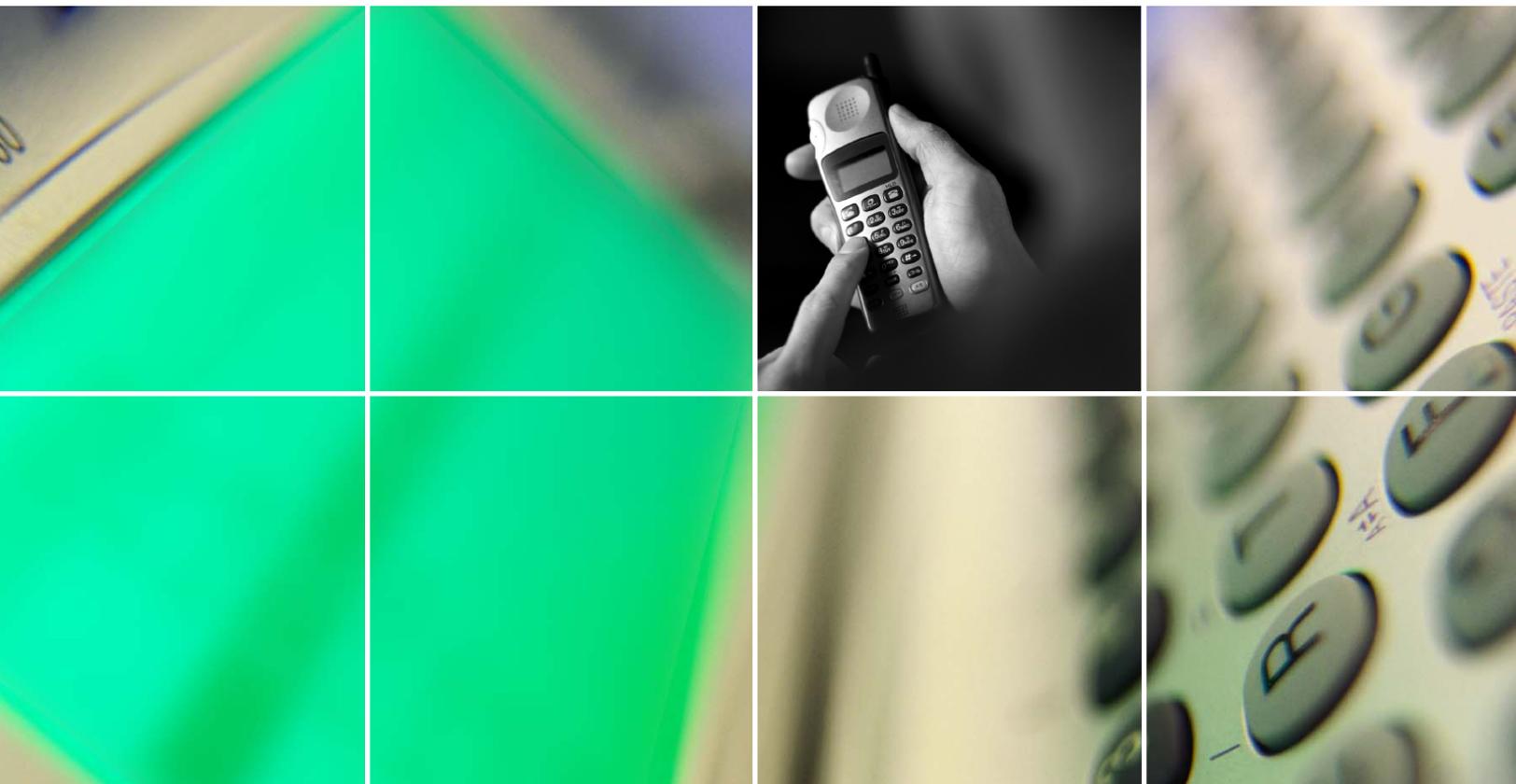


## Wireless enterprise data solutions in China

*Capturing new growth opportunities for China's mobile operators*



*An IBM Institute for Business Value executive brief*

IBM Business Consulting Services, through the IBM Institute for Business Value, develops fact-based strategic insights for senior business executives around critical industry-specific and cross-industry issues. This executive brief is based on an in-depth study by the Institute's research team. It is part of an ongoing commitment by IBM Business Consulting Services to provide analysis and viewpoints that help companies realize business value. You may contact the authors or send an e-mail to [iibv@us.ibm.com](mailto:iibv@us.ibm.com) for more information.

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## Executive summary

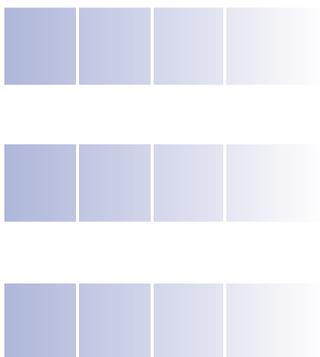
Mobile network operators in China have enjoyed spectacular growth over the past five years. The number of mobile subscribers in China increased from less than 50 million in 1999 to an estimated 329 million in 2004, making China the largest mobile telecommunications market in the world in terms of subscribers,<sup>1</sup> China's two main mobile operators – China Mobile and China Unicom – have been the primary beneficiaries of this growth, with 2003 annual revenues of US\$19.2 billion and US\$8.3 billion, respectively.<sup>2</sup>

There are growing signs, however, that China's dynamic mobile market is now maturing. A combination of price wars, customer churn triggered by the introduction of low-priced Personal Handyphone System (PHS) services, market saturation of high-end mobile customers and a customer base that is 60 percent prepaid has contributed to a nearly 50 percent decline in China's mobile Average Revenue Per Unit (ARPU) over the past three years.<sup>3</sup>

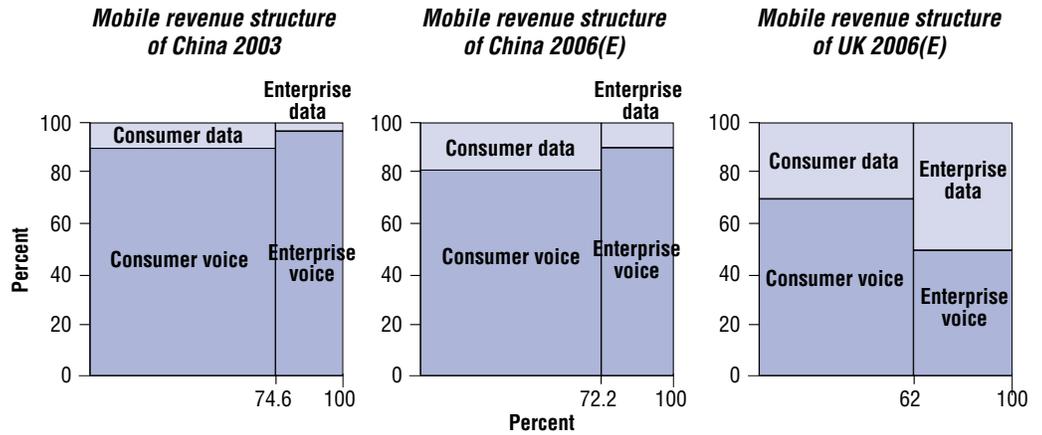
China's annual mobile ARPU is projected to increase moderately from US\$129 in 2004 to US\$142 by 2008.<sup>4</sup> Consumer mobile data services will likely be a key driver of this growth, as demonstrated by the early success of Short Message Service (SMS), ring tone downloads and other consumer-oriented data services. Furthermore, these services remain in their early stages of growth. In 2003, consumer mobile data services (primarily SMS) accounted for 8 percent of China's total mobile revenues.<sup>5</sup> This is a small number compared to developed markets such as the United Kingdom, where mobile data services are expected to contribute up to 30 percent of total consumer revenues by 2006.<sup>6</sup>

The gap between China and foreign markets is even wider for wireless enterprise data solutions: IBM Business Consulting Services estimates that enterprise data accounted for less than 2 percent of China's total wireless data market in 2003 and may at most reach 10 percent by 2006.<sup>7</sup>

On the other hand, in advanced markets such as in the United Kingdom, mobile data revenues from enterprise customers are at least five times greater than in China and may reach 50 percent of total enterprise revenues by 2006 (see Figure 1).<sup>8</sup>



**Figure 1. Mobile revenue structure comparisons: China versus UK.<sup>9</sup>**

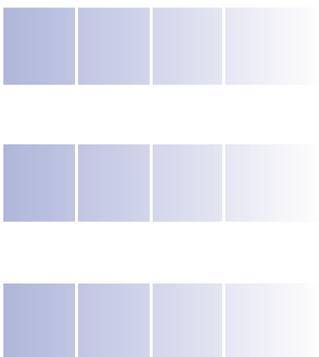


Source: China Mobile and China Unicom annual reports; Lehman Brothers; IBM analysis.

Chinese operators are just beginning to experiment with mobile enterprise solutions, often bundling basic data services with voice as part of promotional strategies to sign up enterprise customers.<sup>10</sup> However, the wireless enterprise data market has the potential to become an important source of high-margin revenues for China’s operators – but only if they have a well-defined strategy, the right partnerships and the internal capabilities required for success in this emerging but rapidly growing market segment.

Globally, convergence (that is, access to any content on any network from any device) is providing new opportunities for operators to enhance their product and service offerings for enterprise customers. A European mobile operator interviewed for this study, for example, believes that the enterprise market is poised for convergence driven by the need for businesses to provide wireless communication services and applications to their suppliers and customers, and the desire for mobile workforces to have seamless access to enterprise applications regardless of the nature of their network access (for example, via mobile, enterprise wireless local area network [WLAN], public wireless local area network [PWLAN] or broadband) or their location – whether at the office, at home or on the road.<sup>11</sup>

In China, the possibilities offered by convergence will clearly benefit fixed-line operators China Telecom and China Netcom. Owing to their significant fixed-line assets, these companies have large enterprise customer bases, and – assuming they receive mobile licenses and leverage their PHS investments – they will be able to offer a full suite of fixed and wireless services tailored to enterprise needs.



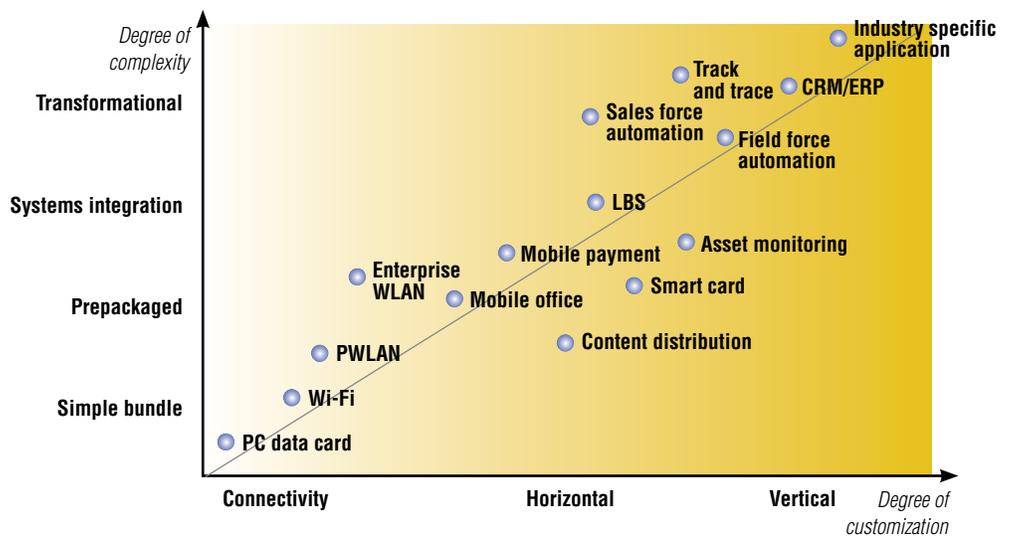
As such, an early mover advantage in the enterprise wireless data market is particularly important for China Mobile and China Unicom. This will allow them to deepen their relationships with enterprise customers by providing value-added data solutions that complement the convergence trend and tend to be much less sensitive to price competition and churn.

### Wireless enterprise data solutions defined

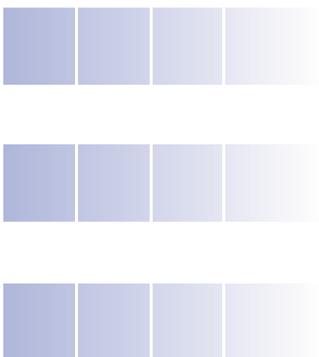
A wireless connection is an obvious prerequisite for employees to gain access to their enterprise applications. Wireless connectivity can be enabled through a wide range of technologies, such as smartphones and PDA's using standard mobile data networks, PC data cards, PWLAN, enterprise wireless LANs and Wi-Fi. Once connected, enterprise employees, customers and suppliers can access the Internet, the company intranet or take advantage of mobile data solutions that may be integrated with their enterprise systems.

While definitions vary by country and operator, horizontal solutions are usually designed for a mass market and enable the automation of relatively simple tasks with little or no industry-specific customization; examples include mobile office, content distribution and smart cards. Conversely, vertical solutions are more complex and often need to be tailored for each industry and integrated with enterprise applications such as CRM or ERP (see Figure 2).

Figure 2. Wireless enterprise data solutions.



Source: IBM Institute for Business Value, 2005.



## ***Global wireless enterprise data solutions market***

The global wireless enterprise data solutions market is a fertile one. To succeed in the enterprise market, progressive mobile operators are making some changes, forming alliances and leveraging partners.

### **Market size and trends**

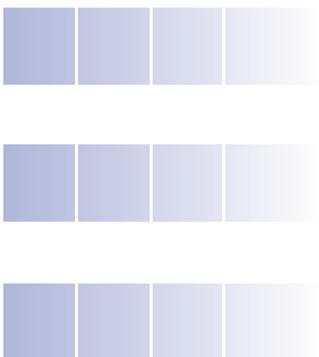
Globally, the area of wireless enterprise data services is a rapidly growing and attractive one for mobile network operators and MVNOs (mobile virtual network operators). According to Gartner Dataquest, enterprise wireless data application revenues in Asia Pacific alone (excluding Japan) are expected to increase from US\$381 million in 2004 to US\$5.5 billion in 2008.<sup>12</sup>

Enterprises are leveraging wireless to increase revenues, lower costs and boost worker productivity. Solutions such as remote Internet access, mobile office, sales force automation (SFA) and field force automation (FFA) are gaining popularity with U.S., European and Japanese companies with large mobile workforces. Other solutions such as location based services (LBS), asset monitoring and mobile payment are emerging as more complex applications that can help drive down costs and improve operating effectiveness in industries such as banking, utilities, transportation and retailing.

Wireless solutions likely to have high initial demand are those that perform a service more cheaply than fixed lines. One example is electric utilities companies in the United States that are replacing antiquated light pole monitoring systems requiring expensive copper wire networks with mobile sensors on light poles to automatically signal field workers when bulbs need replacement.

### **Mobile operators transforming to serve enterprise customers**

Progressive mobile operators are revamping their strategies, business models and internal operations to deliver end-to-end wireless solutions to their enterprise customers. In terms of strategy, wireless operators such as U.K.-based Vodafone and France Telecom's Orange are also forming alliances with fixed-line operators to provide enterprise customers with "one-stop shopping" for bundled wireless and fixed-line solutions. As discussed later in this paper, operators must also transform their organizations, processes and technologies designed for mass markets to meet the unique requirements of enterprise customers.



Mobile operators are also leveraging partners such as systems integrators, application providers and service providers who have the industry-specific relationships, knowledge and expertise necessary to succeed in the enterprise market. A 2002 Yankee Group (a U.S. IT research firm) survey of wireless computing showed that 44 percent of all enterprises surveyed preferred using systems integrators or hardware/systems vendors for their wireless data solutions compared to only 18 percent in 1999. At the same time, the preference to use wireless carriers dropped from 54 percent in 1999 to only 36 percent in 2002.<sup>13</sup>

### ***China wireless enterprise data market and trends***

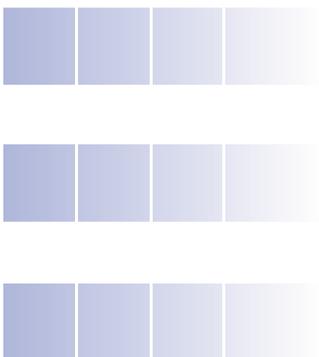
The wireless enterprise market in China is growing fast. Below is a discussion of forecasts, market drivers, the macro environment, demand drivers, government support and supply drivers.

#### **Emerging and rapidly growing market**

China's enterprise wireless solutions market is small but growing rapidly. IBM Business Consulting Services estimates that the market size in 2003 for key wireless enterprise data solutions was over US\$800 million and will reach US\$3.4 billion by 2008.<sup>14</sup> Even so, this represents only a tiny portion of China's US\$32 billion mobile telecommunications market in 2003, estimated to reach US\$62 billion by 2008.<sup>15</sup>

#### **Key wireless solutions and industries**

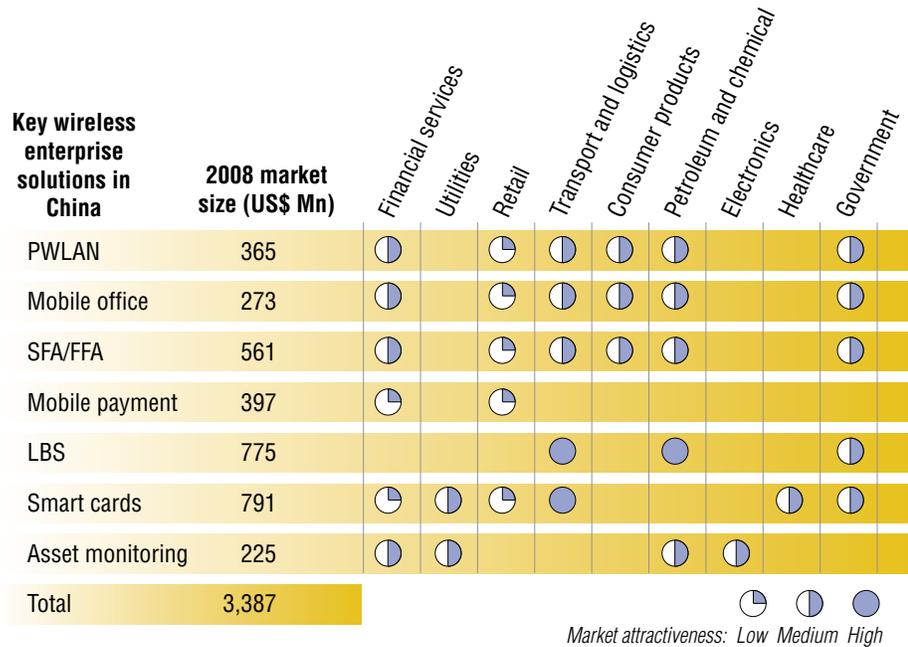
IBM Business Consulting Services has developed macro-level forecasts for key enterprise wireless solutions and analyzed which industries are likely to be early adopters (see Figure 3). Our estimates were developed based on IDC research commissioned by IBM, industry interviews, industry analysis, correlations between wireless and IT spending, and solution adoption trends in foreign markets.



Key findings from our research indicate:

- *Popular mobile solutions* for the China market will include mobile office, LBS, smart cards, SFA, FFA and mobile payment. While we expect relatively simple horizontal applications such as mobile office to naturally take hold first, there are already numerous examples of industry leaders in the consumer products, retail and logistics industries adopting more complex vertical solutions.
- *Key industries* that will likely be early adopters of mobile solutions are the financial services, transport and logistics, petroleum and chemical industries as well as many areas of government.

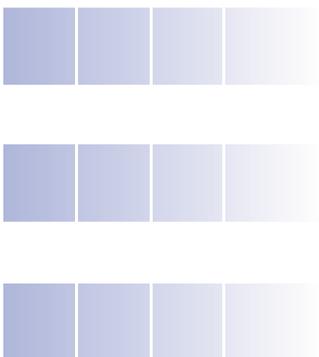
**Figure 3. Wireless enterprise data market forecasts for China.**<sup>16</sup>



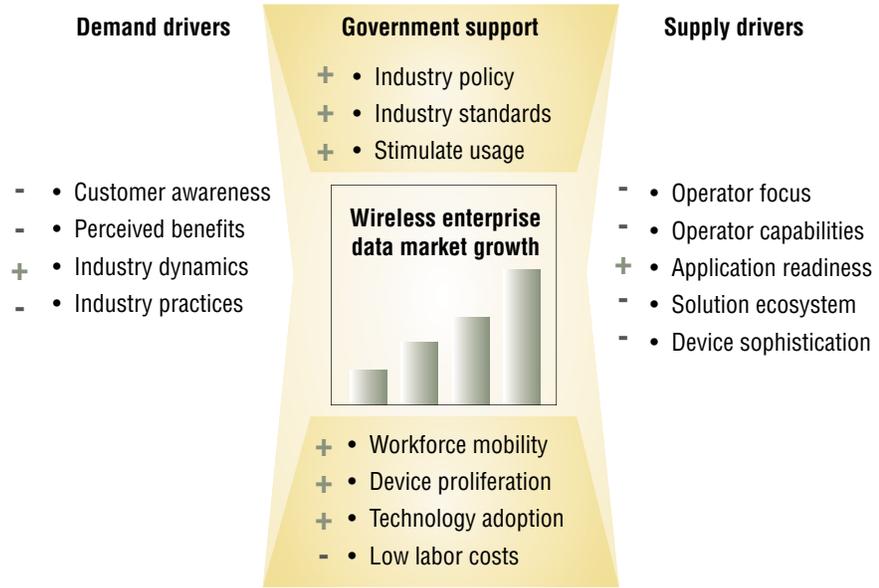
*Note: IBM market estimates include network access fees, IT hardware, software and services. Devices are excluded. Gartner Dataquest estimates mobile operator revenues excluding PWLAN to reach US\$1.2 billion by 2008. Source: IDC; IBM analysis.*

**Market drivers**

There are four key drivers of China’s wireless enterprise market growth: the overall macro environment, market demand, government support and supply forces (see Figure 4).



**Figure 4. Drivers shaping the development of China's wireless enterprise data market.**



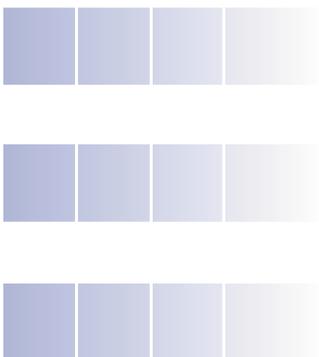
Source: IBM Business Consulting Services analysis.

**Macro environment**

Today's Chinese workforce is increasingly mobile as enterprises expand their operations across China. Today's typical mobile workers, armed with a laptop, PDA and mobile phone, need to stay connected with their offices regardless of location. American Express ranks China – with over US\$10.3 billion in business expenses in 2003 – number one in Asia, accounting for almost 17 percent of total business expenses across the Asia Pacific.<sup>17</sup> Nearly 73.8 million mobile phones and 2.18 million PDAs were sold in China in 2003, and double-digit annual growth is predicted over the next five years.<sup>18</sup> At the same time, Chinese enterprises are making major investments in IT – one indicator of enterprise wireless adoption rates – to improve their overall competitiveness in preparation for the World Trade Organization (WTO). In 2003, China's IT market reached US\$24.46 billion and is projected to grow by 15.3 percent per year for the next five years.<sup>19</sup>

**Demand drivers**

In China, awareness of enterprise wireless solutions is low, making market education an obvious prerequisite before adoption can occur. Based on IDC research commissioned by IBM, 50 percent of all enterprises surveyed had not heard of wireless solutions, and most that were aware of them had difficulty understanding the business benefits.<sup>20</sup> Some industries such as utilities have entrenched industry practices and rely heavily on low-cost labor, which may make wireless adoption



questionable in the near term. On a positive note, companies in high-growth, competitive industries in China such as insurance, transport, logistics and retail are experimenting with wireless solutions to enhance their operating efficiency and financial performance.

China's huge pool of low-cost labor will offset some of the typical benefits that companies gain by adopting wireless solutions to boost labor productivity. Solutions such as sales force automation and field force automation will need to offer benefits other than pure labor cost savings – for example, speed, accuracy, tracking and convenience – to justify adoption by enterprises.

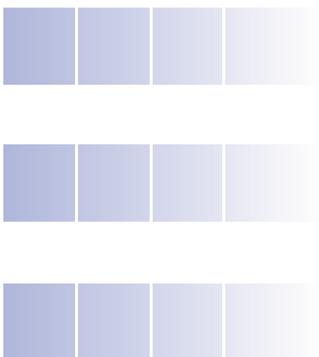
### **Government support**

The Chinese government plays a positive role in the development of the wireless enterprise market. For example, the Standardization Administration of China has issued PWLAN standards and established a working committee for RFID standards. These and other standard-setting initiatives are an important first step to bring players across the value chain together to support interoperability between networks, applications and devices. The government has also been an early adopter of wireless solutions that serve as innovative examples for other industries.

### **Supply drivers**

A key inhibitor to the market's growth is the telecommunications operators themselves who should be the catalyst to form an ecosystem of solution developers, service providers and portable devices. Why aren't mobile operators, who stand to benefit most from rapid growth in the enterprise market, moving more aggressively to capture this opportunity? There are two possible answers: focus and capabilities.

Until recently, mobile operators have focused their efforts on commodity voice services, which remain at the center of their growth strategies. A popular slogan in industry circles exemplifies the passive attitude toward data services overall: "Data service is decoration, voice service is our foundation."<sup>21</sup> Furthermore, some perceive enterprise data solutions as too complex and difficult to replicate, reinforcing the attitude that the solutions should be bundled with voice to maintain profit margins. As an executive interviewed for this study said, "Our sales managers just have no idea about how to promote solutions, they only know air time wholesale and package pricing."<sup>22</sup>



Mobile operators must provide leadership to shape an ecosystem for enterprise data solutions. Similar to the consumer data market, an ecosystem of service providers and user-friendly devices connected together by a common technology platform and universal standards is important to provide seamless solutions to enterprise customers. Most applications can be developed or localized relatively quickly; the challenge is how to bring these applications to market in a way that delivers the promised benefits to customers and is profitable for operators, systems integrators, service providers and other players in the ecosystem.

### *China experiments with wireless enterprise solutions*

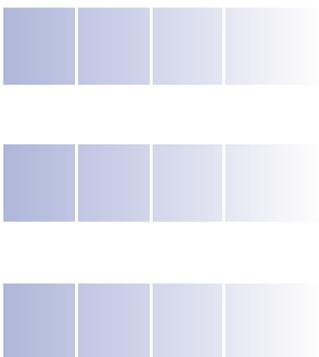
China Mobile and China Unicom are experimenting with enterprise wireless solutions in varying degrees (see Figure 5). The primary focus is on basic access, mobile office and other relatively simple horizontal applications.

Currently, China Telecom and China Netcom are disadvantaged because they do not have mobile licenses. However, they are leveraging their enterprise customer base to offer basic services on their PHS and wireless LAN platforms.

**Figure 5. Experimenting with enterprise mobile solutions.**<sup>23</sup>

Company	China Mobile	China Unicom	China Telecom	China Netcom
<b>Wireless revenues (2003)</b>				
Total	US\$19.2 bn	US\$8.3 bn	US\$1.2 bn (PHS)	US\$0.7 bn (PHS)
Percent mobile data	8%	9%	0.5%	0.5%
Percent mobile enterprise	1-2%	1-2%	N/A	N/A
<b>Wireless platforms</b>	GPRS WLAN WAP	CDMA-1X WLAN WAP/BREW	PWLAN PHS	PWLAN PHS
<b>Key wireless data enterprise initiatives</b>	SMS, MMS, LBS Basic access mobile office	SMS, MMS, LBS Basic access	Basic access SMS	Basic access SMS
<b>Example enterprise customers</b>	Digital China Beijing Public Power Bureau P&G DBT	Sichuan Police Bureau Hebei Police Bureau Shandong Police Bureau Jiangxi Police Bureau	Starbucks Shanghai airport	Starbucks Kerry Center
<b>Strengths</b>	Brand Coverage Customer base	Network Speed	Key account focus Enterprise relationships	Key account focus Enterprise relationships
<b>Challenges</b>	Speed Enterprise focus	Coverage Brand Enterprise focus	No roaming Coverage	No roaming Coverage

Source: IBM; BDA; Company annual reports.



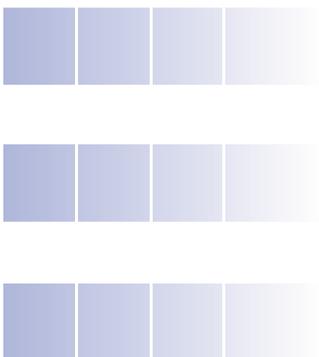
Popular applications being adopted in China include:

- *Basic connectivity.* Enterprises such as People's Insurance Company of China (PICC), the Nanjing Tax Bureau, Nanrui Power and many others are improving worker productivity and customer satisfaction through remote access to realtime enterprise information. Tapping into the growing mobile workforce, China Mobile has introduced a GPRS and WLAN bundled offering so mobile workers can have remote access to their e-mail and corporate systems while traveling across China and also enjoy 11MB high-speed Internet access in commercial areas such as office buildings, airports and hotels. China Unicom is also promoting a similar offering.
- *LBS and information dissemination.* Government agencies, public security and traffic police are using SMS solutions to communicate location-sensitive information and broadcast messages across their organizations in realtime. Often, these solutions are developed by the operators in cooperation with network equipment providers eager to build reference cases in China.
- *Sales force automation.* Enterprises such as Procter & Gamble (P&G), Ping An Insurance and DBTEL are using sales force automation solutions to improve the effectiveness of their field salesforce operations.

#### **Sales force automation**

Procter & Gamble is using SMS as a rudimentary form of sales force automation to communicate sales performance information from its sales terminals across China to regional/head offices to improve overall sales management. Formerly, it took one to two weeks to collect sales information by relying on manual processes; however, in cooperation with Guangdong Mobile and a small ISV named Collaborative Smart Business Engine (CSB), P&G implemented an SMS solution that allowed P&G staff to gather sales data from more than 10,000 terminals nationally and transmit the information electronically to their home offices.<sup>24</sup> Similarly, handset manufacturer DBTEL used to spend weeks manually collecting sales information from over 5000 direct sales shops and 15,000 distribution outlets across China. Information delays and inaccuracies resulted in inventory management difficulties such as inaccurate forecasting, excess inventory levels and out-of-stock positions for popular models. By cooperating with CSB and Guangdong Mobile, DBTEL adopted the "SMS Magic" solution in 2003 to allow for near instantaneous reporting of sales information.<sup>25</sup>

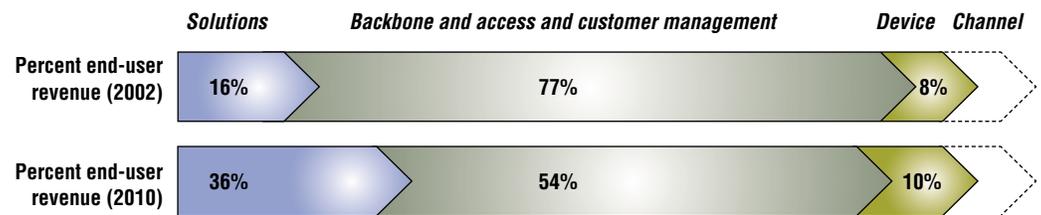
While remote access and horizontal applications will remain popular services, operators are beginning to develop vertical applications to deepen relationships with enterprise customers. For example, in cooperation with IBM, Shanghai Mobile recently built an enterprise solutions demonstration center for a wide range of applications, and Beijing Mobile established a dedicated enterprise service team in April 2004 with plans to launch portals and six industry-specific solutions.<sup>26</sup>



### The role of the operator in the mobile enterprise value chain

To succeed, China's network operators must make bold choices about where and how they will create value across the mobile enterprise value chain. IBM Business Consulting Services research in Europe suggests that network operators that focus only on remote access and customer management will forego much of the value created from the delivery of enterprise wireless solutions to customers. In Europe, solution providers and, to a lesser extent, device manufacturers will capture a growing percentage of the end-user revenues at the expense of the network operators, whose percentage of end-user revenue could decline from 77 percent to 54 percent by 2010 (see Figure 6).<sup>27</sup>

**Figure 6. Projected revenue capture across the mobile enterprise value chain (Europe).**

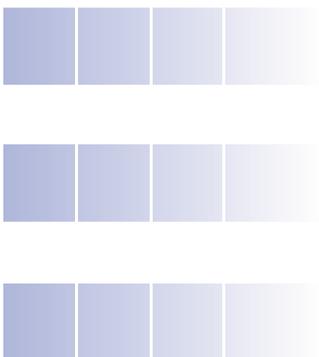


Source: IBM Institute for Business Value.

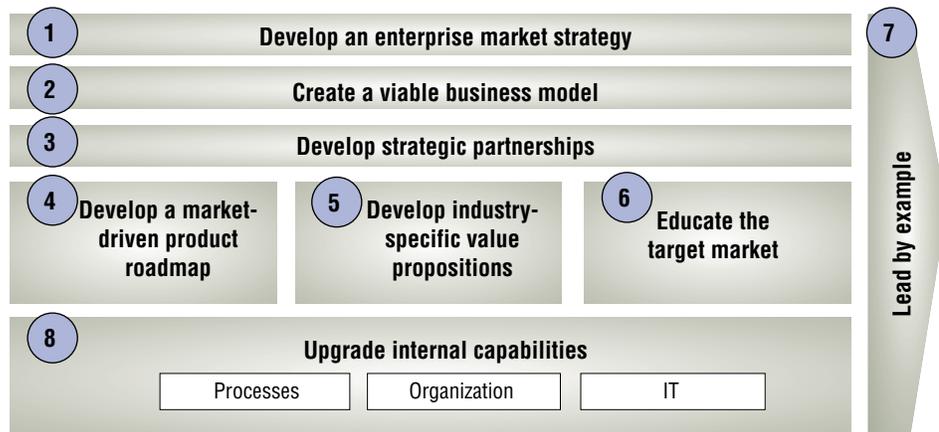
If operators choose to simply act as the "connectivity enabler," revenue growth from the enterprise market is likely to be limited. Increased revenues will come only from leaner business models and teaming up with other players along the value chain who can deliver value-added, higher-margin solutions tailored for enterprise customers. By partnering with solution providers, mobile operators can capture additional revenue by both extending their participation across the value chain and stimulating data traffic over their networks.

### Strategic imperatives to capture the enterprise market

China's mobile operators need a well-defined business strategy to focus investments and capture the wireless enterprise market opportunity. With this strategy in place, execution becomes the key success factor. Based on our work with global operators, IBM Business Consulting Services has identified eight strategic imperatives that Chinese operators must execute successfully to capture the enterprise market opportunity (see Figure 7).



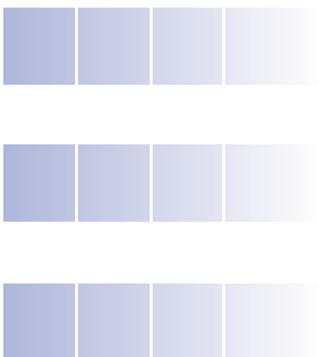
**Figure 7. Eight strategic imperatives to capture the enterprise market.**



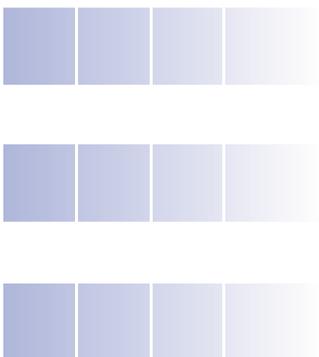
Source: IBM Institute for Business Value.

Mobile operators must:

1. *Develop an enterprise market strategy* that defines the target industries, customer segments, product offerings and overarching partnership strategy for the next three to five years. The strategy should include a high-level vision and roadmap agreed to by executives across the organization to provide a common direction for execution by relevant business units.
2. *Create a viable business model* that clearly defines if, where and how the operator will create value along each key stage of the value chain. Multiple business models will likely be required based on the products, industry, customer segment, degree of systems integration required and sales channels. As part of the business model, operators will often need to play a proactive role in shaping the required ecosystem to stimulate market demand.
3. *Create strategic business partnerships* with content providers, application developers, systems integrators, channel partners and device manufacturers. Operators must team up with partners across the value chain, rather than attempt to build the whole range of required internal capabilities. To achieve this, operators will need a system to identify, evaluate, select and manage partners across the value chain.



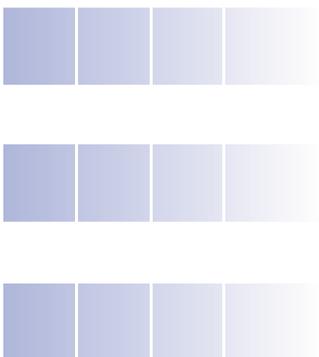
4. *Develop a market-driven product roadmap* to determine what products will be offered, the target industry and customer segments for each offering, and when they should be introduced into the market. The roadmap will likely include two waves: the first wave for horizontal solutions that can be implemented with only minor modifications across multiple industries, and a second wave of vertical solutions tailored for the needs of specific industries. Market research is a critical requirement for successful product development, but it is often not integrated into the product development process due to operators' technology-centric – rather than customer-centric – orientation.
5. *Develop industry-specific value propositions* to convince enterprise customers of the benefits of the solution. The value propositions should be industry-specific and show in quantifiable terms how implementing the solutions can enhance enterprise productivity and effectiveness, and deliver financial benefits.
6. *Educate the target market* on how industries can benefit from enterprise wireless solutions. Basic education includes an introduction to the potential solutions, case studies of how the solution has benefited other companies, and running demos or pilot programs.
7. *Lead by example* because there is no better way to convince potential enterprise customers of wireless solution benefits than by adopting the solutions themselves. This also gives operators the opportunity to increase their internal capabilities and then leverage their experience when marketing to enterprise customers. Mobile office, sales force automation, field force automation and asset monitoring are obvious examples of solutions that operators can implement to enhance their own internal operations and showcase to potential customers.
8. *Upgrade internal capabilities* to confirm that the organizations, processes and technologies are in place to sell to and serve enterprise customers. The business strategy will likely call for development of a dedicated salesforce and channel relationship management capability, design or modification of internal processes, and building or upgrading IT systems.



## ***Meeting the requirements of enterprise customers***

China's mobile operators need to upgrade their internal capabilities to meet the needs of enterprise customers for data services. Based on our experience working with foreign operators, key initiatives will include:

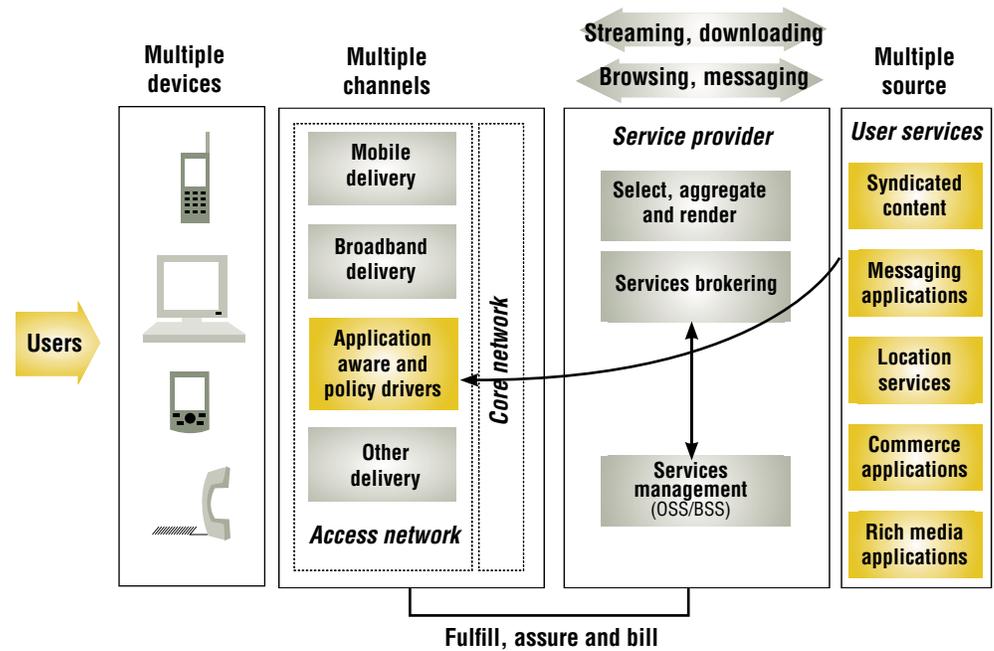
- *Direct salesforce.* A dedicated enterprise salesforce will be required for certain products, customer segments and key accounts. One China operator we interviewed had three different departments to deal with enterprise clients: a Value Added Services department for service design, a Corporate Department for promotion and sales, and a Marketing Department for regulation and internal compliance, which cooperate on an ad hoc basis, depending on the specific needs of the enterprise customer.<sup>28</sup>
- *Service level agreements (SLAs).* Enterprise customers will likely require redundancy, security, speed, network quality and service reliability as basic elements of the service agreement. Current Business Support Systems (BSS) and Operations Support Systems (OSS) are designed primarily for mass market services and will likely require upgrading to satisfy enterprise SLAs.
- *Billing.* Enterprise solutions require flexible and accurate billing. The current billing systems of most operators are far from meeting the potential requirements of enterprise customers. As one interviewee indicated, "Basically, our current billing systems don't support service bundling or flexible price strategies and even treat a customer who uses two services as two independent users." Accuracy is another issue. For example, currently some operators reconcile their billing records with their ISP partners, and any difference within 5 percent is charged to the customer based on the operator's records. In certain cases, up to 50 percent of the operator billing records are different than the ISP's, which clearly is unacceptable for enterprise customers.<sup>29</sup>
- *Customer care.* Enterprise customers require higher levels of customer care than consumers, necessitating offerings such as full-time account managers, 24X7 services, dedicated customer service representatives, and quick turnaround time for inquiries and complaints. In addition, enterprises often would like the ability to manage, authorize, administer and monitor employee usage, often through Web-based, self-service systems that rely on data provided by operators' systems.



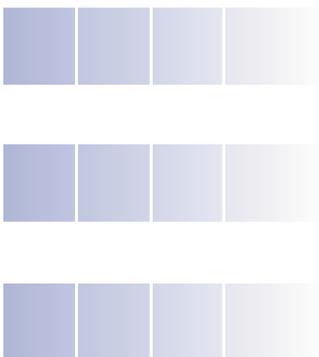
To support these and other needs of enterprise customers, global operators such as Sprint<sup>30</sup> are leveraging IT platforms such as the IBM Service Provider Delivery Environment (SPDE) (see Figure 8). Key benefits of the SPDE platform include:

- Revenue opportunities through service creation and management by third-party service providers and even enterprise customers themselves
- Customer access through multiple devices and Web interfaces
- Reduced cycle time and cost to develop and provision new services
- Ability to modify content, applications and processes to meet customer requirements impacting billing, CRM, provisioning, resource management and service assurance
- Ability to introduce new capabilities and processes rapidly without major modifications to the existing IT environment.

**Figure 8. IBM Service Provider Delivery Environment (SPDE).**



Source: IBM Institute for Business Value.



## **Conclusion**

Wireless enterprise data solutions offer China's operators new opportunities to boost their revenue contribution from enterprise customers in this emerging and rapidly growing market. To realize benefits from these opportunities, mobile operators need to adopt a more proactive approach to stimulate market demand and shape an ecosystem that can bring parties together across the value chain. Leading Chinese operators are already taking steps in this direction, particularly with horizontal solutions that provide basic connectivity and boost the productivity of today's mobile workforce. At the same time, operators must enhance their internal capabilities and forge strategic partnerships to provide their customers with the tailored solutions and service levels that enterprises expect from value-added service providers.

China's remarkable growth over the past two decades has proven time and again that emerging markets often expand rapidly and in unexpected ways. If history is an indicator, progressive operators who seize the wireless enterprise opportunity now will be the key beneficiaries in the future.

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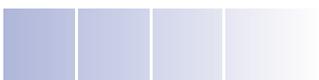
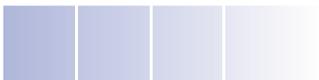


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Note: All numbers will be in US\$ at the exchange rate of US\$1 = RMB 8.28.

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