



# Wireless Unbound

The Surprising Economic Value and  
Untapped Potential of the Mobile Phone

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## Contents

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3	Introduction
3	Big, yes – but how big?
6	Behind the figures
10	What operators and regulators can do

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## Introduction

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To the average mobile-phone user, the benefits of wireless are obvious. Consider the numbers: Worldwide, about a billion people will purchase new handsets in 2006. In Afghanistan, the wireless population has grown from 20,000 users five years ago to 1.3 million today, *The Economist* reports. And in China, many of the nearly 100 million rural migrant workers rely on a mobile phone not only for their work, but to stay connected with the families they have left behind. The explosive growth of wireless subscribers – 1.2 million new users added daily in emerging economies around the globe – is changing society. Users are captivated by the freedom, security, and enhanced productivity that mobile phones make possible.

Attaching figures to the value of these benefits is difficult, however, as is identifying exactly how society gains from all those handsets in pockets and purses. On balance, a healthy wireless industry is clearly a boon to any economy. But there is little hard data available to quantify its current impact on the economy and productivity – and even less information on the public policies and industry actions needed for its potential value to be achieved.

With assistance from the GSM Association (GSMA), McKinsey has undertaken research to assess the economic impact of the wireless sector and determine how government policies and opera-

tor initiatives influence the economic value created. The research focuses on the differing state of the mobile-phone industry in three developing countries in Asia: China, India, and the Philippines.

The broad conclusion: Estimates frequently understate the overall economic impact of wireless by at least 75%. Wireless adds value to society in a number of ways, many of them overlooked. Taken together, the total impact of its benefits can approach 8% of a nation's GDP.

To help realize the vast economic potential of wireless – and ensure that even the poorest members of society can attain its benefits – governments and operators must perform two kinds of work together: lower the cost of ownership, making mobile phones affordable to all; and extend coverage beyond cities to rural areas, where many millions of potential users await. This is not as straightforward as it might appear. The most commonly proposed solutions to these challenges – lowering prices and allowing more operators to enter the market – are not always helpful, and may even hurt. Instead, operators and regulators should pursue a number of less obvious steps.

## Big, yes – but how big?

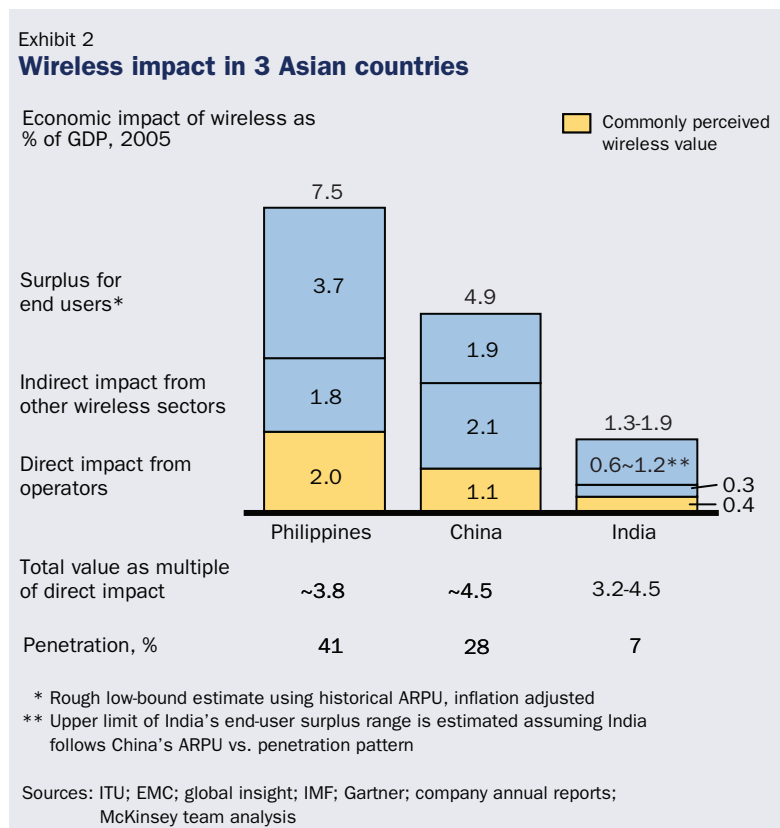
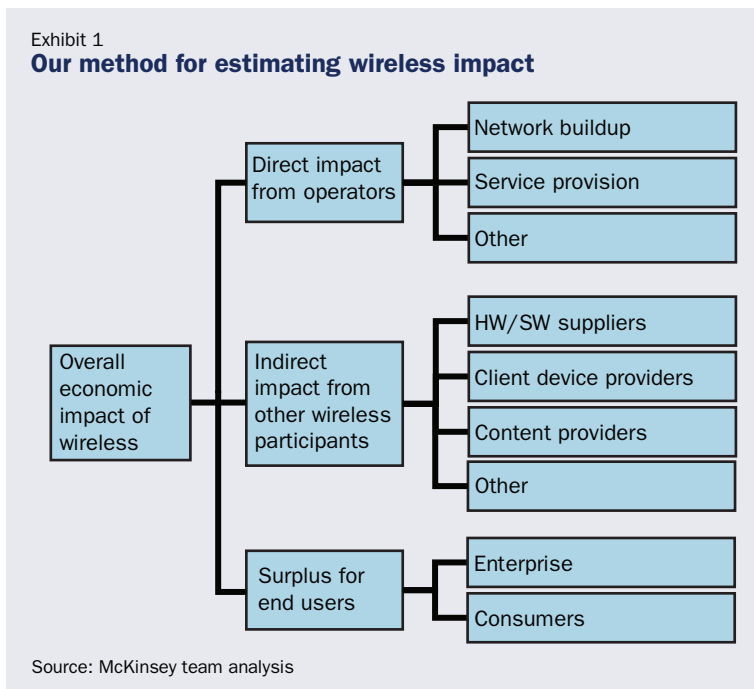
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Most estimates of wireless impact consider only the contribution of mobile operators to GDP – the direct impact. Our research has concluded that in fact, the indirect impact of wireless is at least three times as great (and often much more).

We define the total economic impact of wireless as the sum of three elements: the direct impact from mobile operators, the indirect impact from other companies in the wireless business system (hardware and software vendors, handset vendors, and so on), and a second form of indirect impact: the surplus enjoyed by end users. This surplus includes improved productivity for mobile workers and the less tangible but nonetheless valuable benefits of access to family, improved security, peace of mind,

and other virtues enjoyed by both enterprise workers and consumers (*Exhibit 1*).

The total impact of wireless in the three countries we studied far exceeded expectations (*Exhibit 2*). In China, the total economic impact in 2005 was \$108 billion, or the equivalent of about 5% of GDP – much higher than the observed 3% contribution from the telecom sector (wireless and wireline combined). Of the total impact, moreover, only \$24 billion was direct. Indirect impact amounted to \$84 billion: a \$47 billion contribution to GDP from other wireless businesses, such as equipment and handset makers, and at least \$37 billion from end-user surplus.



**CALCULATING INDIRECT IMPACT**

Indirect impact begins with the contribution companies other than operators active in the wireless business system make to GDP (i.e., the value they add, usually a small percentage of sales). These companies include software and hardware vendors, handset vendors, contractors, and others.

But the indirect impact of wireless doesn't stop there. Consider the case of Mr. He, a 43-year-old Beijing taxi driver who shares his cab with another driver in alternating 12-hour shifts. Buying a cell phone improved Mr. He's productivity by 5%. He receives six or seven calls per month from regular passengers, which saves him from spending about four hours a week trawling for business. He uses his mobile phone to contact other taxi drivers if, say, he needs to ask direc-

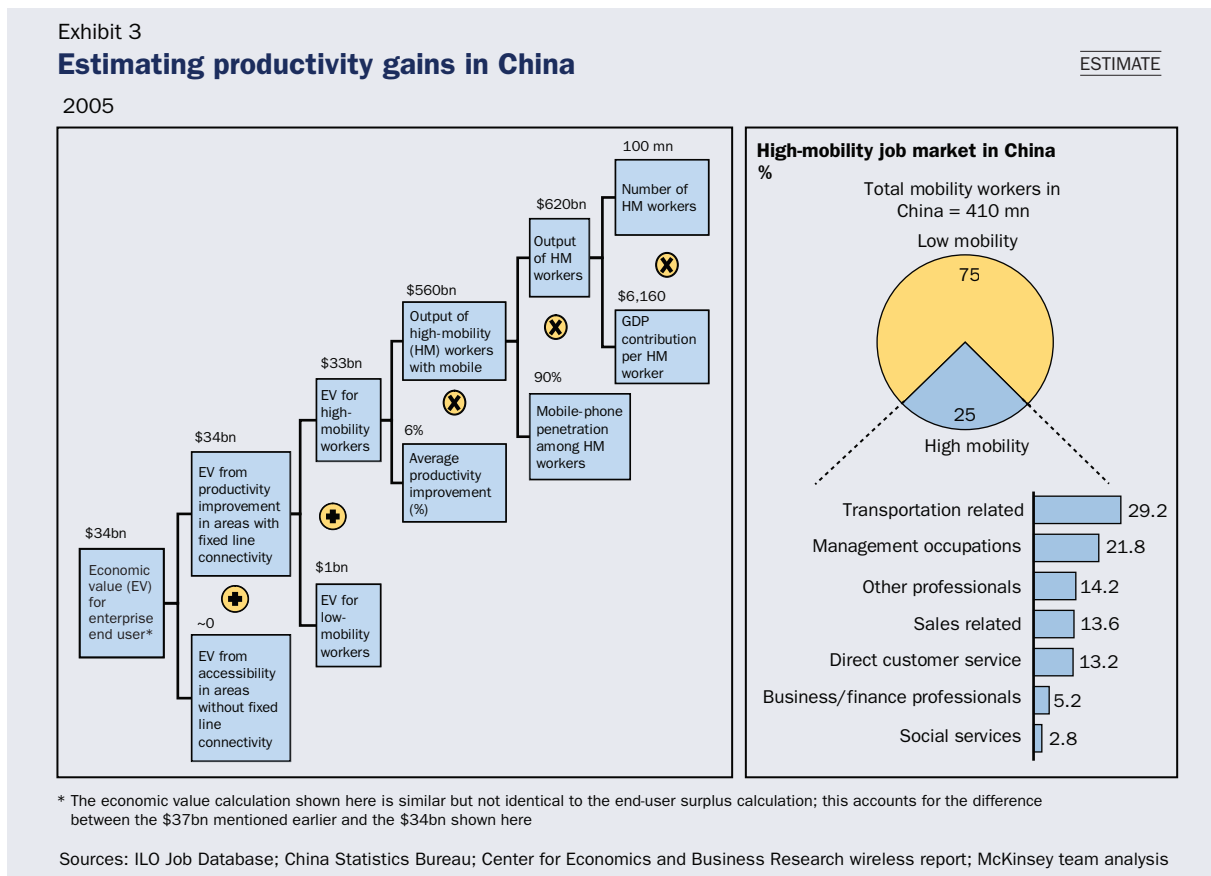
tions to unfamiliar destinations in the fast-changing neighborhoods of Beijing. Having a mobile also saves him time when his car breaks down and in bad weather. And as anyone who has taken his taxi lately can attest, Mr. He uses his phone to stay in touch with his family and friends. His employer also benefits: The company now provides an instant lost-and-found service to passengers.

For Mr. He, the benefits of wireless take two forms, which together we call “end-user surplus.” The first, of course, is greater productivity (*Exhibit 3*). In our calculations, we begin by distinguishing productivity improvement in areas served by fixed-line telecoms, where mobile is used as an alternative, from that in areas without fixed-line connectivity, where mobile’s impact is even higher. In some countries, this difference can be substantial; in China, however, it is negligible, as government has ensured that nearly 99% of the country is covered by fixed-line service.

To calculate productivity improvement in China, we conducted extensive market research, including 608 interviews with consumers in 14 cities of all sizes. We found that on average, the productivity improvement is roughly 6% (*Exhibit 4, overleaf*). The cross-section of workers we interviewed was consistent with the composition of the Chinese job market.

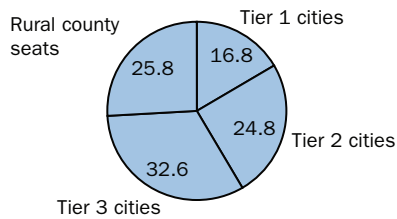
We also discovered that wireless provides a much greater productivity improvement for high-mobility workers than for low-mobility workers. Although low-mobility workers account for a significant percentage of the workforce (about 75% in China), their economic value was only about \$1 billion in 2005, much less than the \$33 billion economic value of their high-mobility counterparts.

To estimate the second and less tangible form of benefit, as when Mr. He rings his family and friends, we used historical average revenue per user (ARPU) as an indicator of users’ willingness to pay.

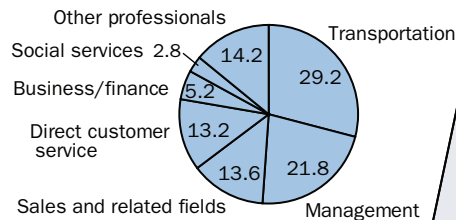


## Exhibit 4 The 6% solution

608 interviews with high-mobility workers  
in 14 cities and 9 rural county seats

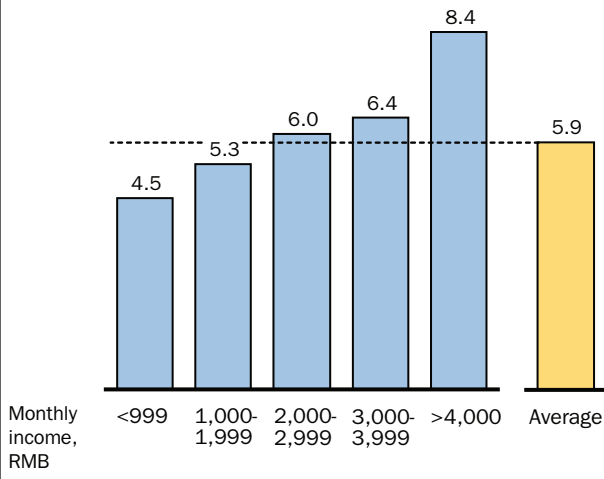


Over a wide range of high-mobility occupations\*



Average productivity improvement is ~6%

Worktime saved  
%



\*These percentages are ILO estimates. They are not the actual percentages sampled.  
Sources: Wireless benefit surveys; McKinsey team analysis

This consumer portion of end-user surplus is equal to ARPU at the time of subscription to wireless services minus ARPU today, and assumes the user's willingness to pay does not change over time. Thus, a Mumbai subscriber who bought service in 2000 for 300 rupees a month but now pays only 250 rupees a month (because of competition and other factors) can be said to have gained a surplus of 50 rupees a month.

Admittedly, any estimate of intangible benefits is rough, but this one at least relies on actual data – the amount customers have demonstrated that they are willing to pay. In fact, we consider our estimate to be conservative, since many users would pay higher rates if necessary. Moreover, as technology, network

coverage, and network quality improve over time, this form of surplus should increase.

## Behind the figures

Because this is a simple numbers game, the total impact of mobile telephony is driven primarily by its level of penetration in a given nation – that is, the number of wireless subscribers as a percentage of total population. Using our method, we can see that increasing penetration by 10% in China and India would produce tremendous end-user value of at least \$10 billion, equivalent to an incremental 0.38%-to-0.61% contribution to GDP. This is con-

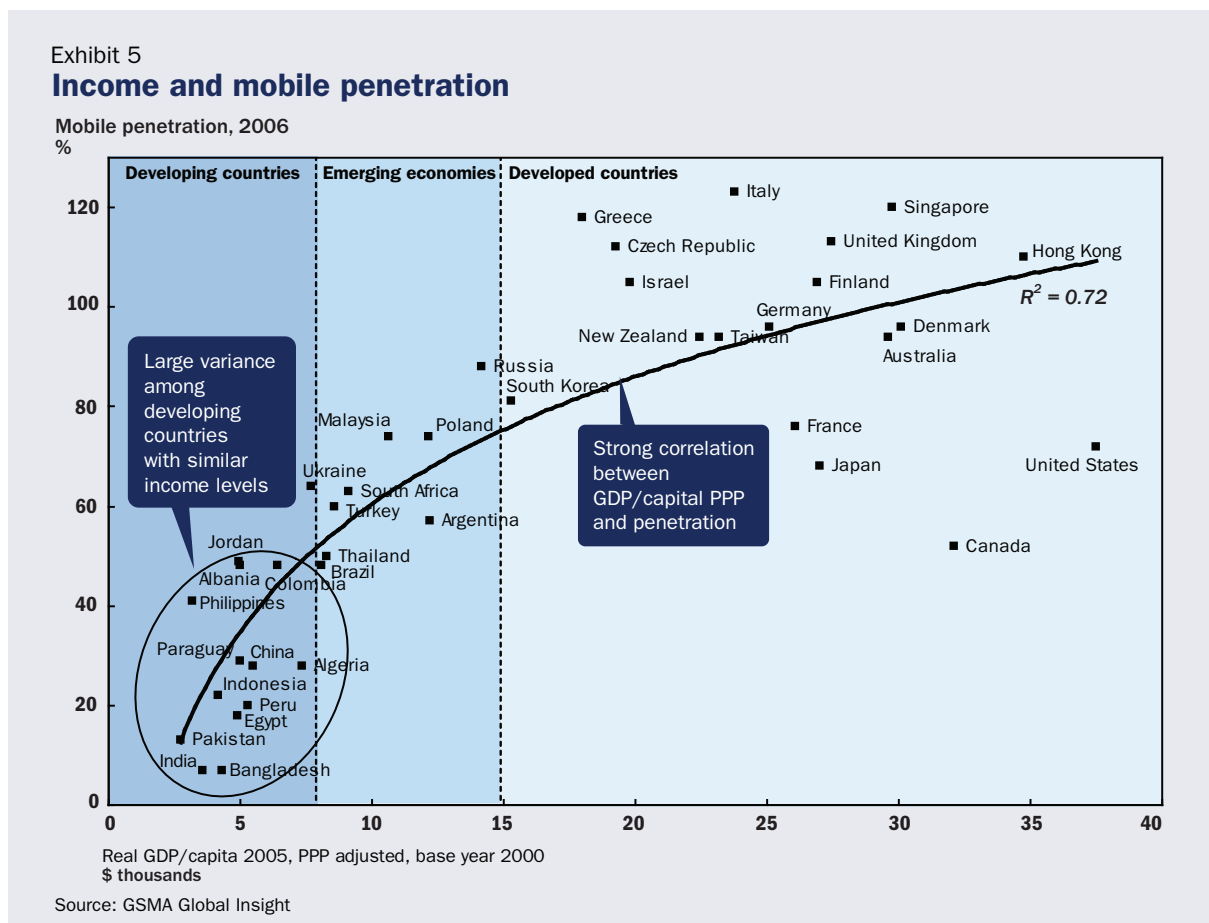
sistent with other recent research showing that in developing countries, if other factors remain constant, 10% higher penetration can translate into a 0.59% increase in GDP.<sup>1</sup> The benefit to India (0.61%) would prove greater than to China (0.40%) or the Philippines (0.38%) because India's current low penetration level would produce a higher marginal effect.

### WHY DO PEOPLE BUY?

Our research has confirmed that wireless penetration is strongly associated with income level (*Exhibit 5*). But among countries with similar income levels, the degree of penetration can vary by a factor of as much as seven.

Clearly, additional variables are at work. Some – such as mobility pricing, network quality, network coverage, and customer service – are associated with the operator. Others, of less concern to the average consumer, are set by the regulator: the number of wireless operators allowed, retail price regulation, and the taxation and interconnection regimes, for example. Still others depend on aspects of the country's economy, including GDP growth, the investment environment, geographic distribution of population, cultural issues, and so on.

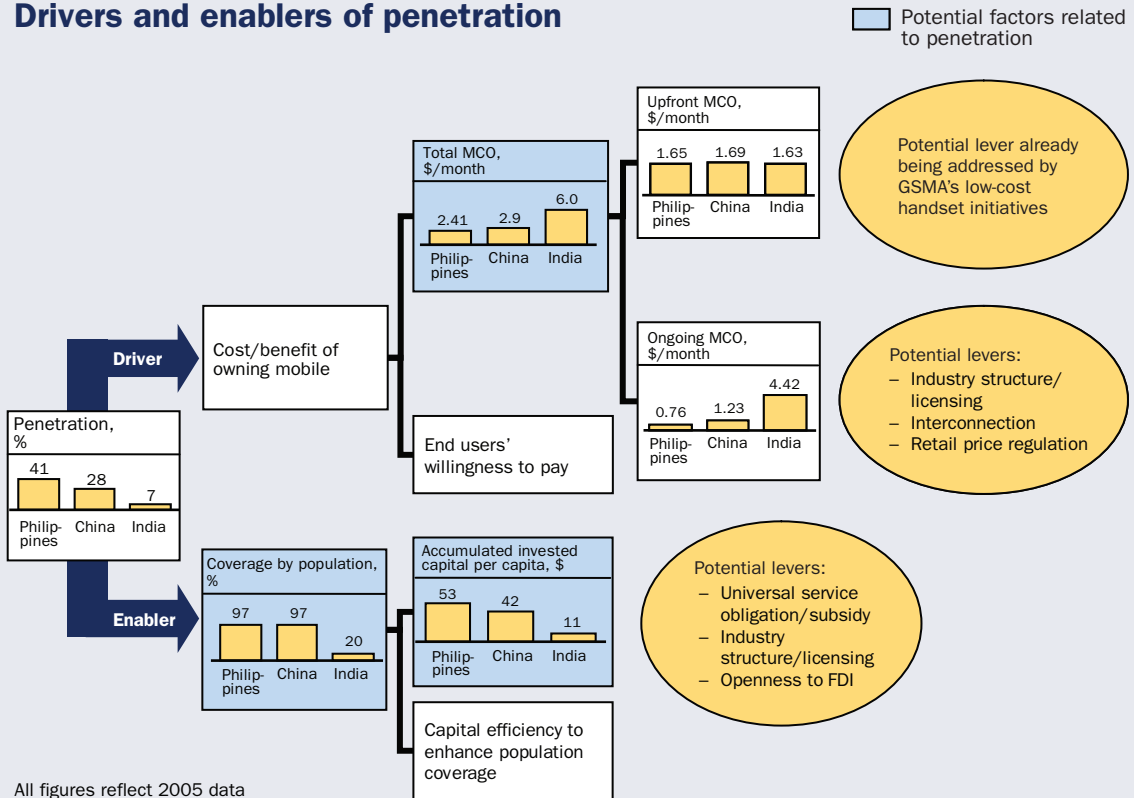
Unsurprisingly, the main determinant of the decision to buy mobile-phone service is the minimum cost of ownership (MCO). An earlier McKinsey study on profitably serving low-end mobile customers established a strong correlation between



1 See Leonard Waverman, "The Impact of Telecoms on Economic Growth in Developing Countries," published in the Vodafone Policy Paper Series, no. 2, March 2005, ([http://www.vodafone.com/assets/files/en/AIMP\\_17032005.pdf](http://www.vodafone.com/assets/files/en/AIMP_17032005.pdf)).

Exhibit 6

## Drivers and enablers of penetration



All figures reflect 2005 data

Sources: Major operators pre-paid plans; McKinsey team analysis

wireless penetration and MCO.<sup>2</sup> In our current work, we have developed a “driver-enabler” framework both to test the determinants of penetration and to identify what influences those determinants (*Exhibit 6*). In addition to verifying the significance of MCO, this work revealed that degree of coverage is an important enabler.

For example, MCO and coverage are highly correlated to the differences among wireless penetration levels in China, India, and the Philippines. In India, penetration was only 15% of that in the Philippines – and 25% of that in China – because estimated MCO appears to be more than twice as

high as in the other two countries. As of 2005, wireless covers only 20% of India’s population (versus 97% in China and the Philippines).

### BREAKING DOWN THE COST OF OWNERSHIP

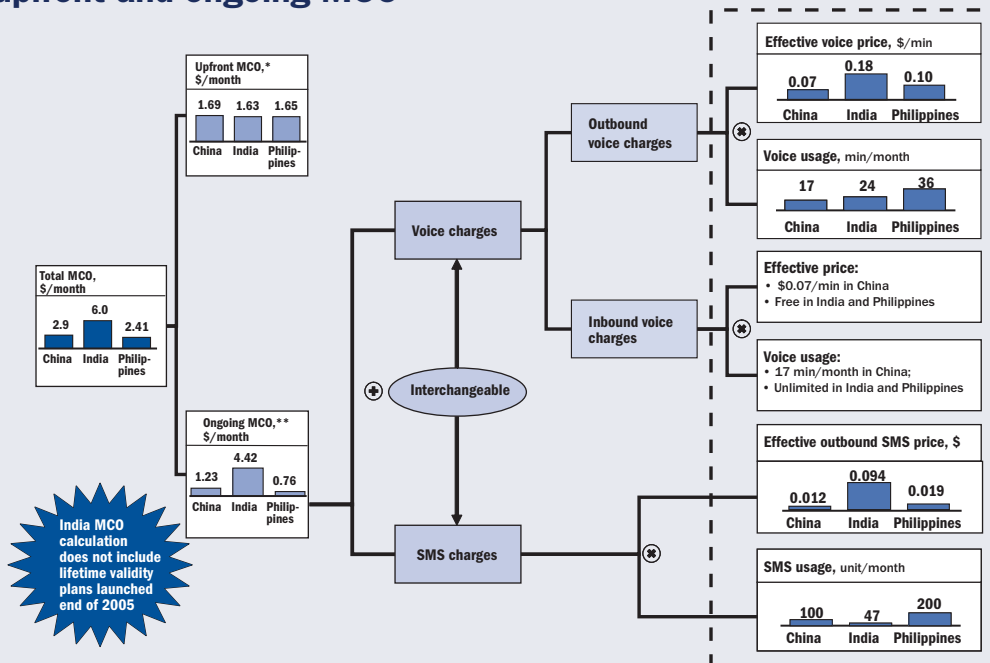
The minimum cost of ownership includes both upfront charges – the cost of the handset and activation, amortized over the average handset life of two years – and ongoing expenses, which we define as the minimum cost to remain active (*Exhibit 7, overleaf*). In the area of upfront costs, GSMA’s work has addressed the need for low-cost handsets.

<sup>2</sup> Rajat Dhawan, Chris Dorian, Rajat Gupta, and Sasi K. Sunkara, “Connecting the Unconnected,” *The McKinsey Quarterly*, 2001 Special Edition: Emerging Markets.



Exhibit 7

## Wireless minimum cost of ownership (MCO) consists of upfront and ongoing MCO



\* Defined as effective monthly handset cost, assuming handset lifetime as two years without terminal value

\*\* Defined as effective MCO of most popular wireless prepaid plan

All figures reflect 2005 data

Sources: GSMA; major operator prepaid plan; literature search; McKinsey team analysis

The portion of MCO attributed to amortized upfront costs is relatively low and very similar in all three countries: \$1.69 per month in China, \$1.63 in India, and \$1.65 in the Philippines. This reflects the reality that handsets are ubiquitous, with similar costs everywhere.

Of course, most users view upfront costs as a one-time expense (\$39 for the handset, say), rather than as a small charge of less than \$2 per month. This affects uptake, as upfront costs can represent a large investment for low-income users, who might not have access to credit to finance the purchase. Among the three countries we studied, there was little difference in the figures, indicating that resistance to a significant initial outlay does not contribute to differences in penetration levels. In other countries, it well might.

We set the minimum ongoing cost at the level of the cheapest broadly available prepaid cards, on the assumption that many low-income users cannot afford postpaid cards. In so doing, we also excluded some attractive one-time offers, especially prevalent in rural areas. On balance, there appears to be a negative correlation between ongoing MCO and penetration levels. As of 2005, ongoing MCO in India was \$4.40, and the penetration rate was 7%. Ongoing MCO in China was \$1.23, since users could buy a \$3.70 prepaid card good for three months. The penetration rate in China was 28%. And in the Philippines, ongoing monthly costs were just \$0.76: Customers could buy a prepaid card for \$3.80 that was valid only for a month but allowed customers to receive free incoming calls and SMS for an additional three months. The penetration rate in the Philippines, 41% in 2005, also appears to be bolstered by low MCO.

## ACCESS FOR ALL

But low costs are not enough. A sufficient portion of the population must have access to service if penetration levels are to rise.

Many analysts assume that coverage is simply a function of the number of operators: As this number increases, the percentage of the population covered will also grow, since competition will result in lower prices and more affordable service. In the countries we studied, however, the reverse seems to be true. Despite the large number of operators – eight – in India, the penetration rate has not budged. Although four operators as of 2005 have market shares of 20% or more, resulting in intense price competition, penetration is 7%. Conversely, China has just two operators but has a penetration level of about 28%, and the Philippines has three players with a penetration level of about 41%.

One possible reason for this counterintuitive finding is that most smaller operators focus on more profitable urban areas and lack the resources or interest to roll out service to rural areas – where many hundreds of millions of people reside. Another is that as more operators enter the market and competition intensifies, many operators' utilization levels and profits could drop, hindering their ability to serve low-income customers creatively and profitably.

## What operators and regulators can do

Our research yielded two main findings. First, there seems to be a negative correlation between minimum cost of ownership and penetration – but as we discuss below, MCO means more than a low average price. Second, penetration increases when coverage is improved. However, the conventional wisdom of adding operators to increase coverage may not always work.

We have seen the enormous value that wireless adds to the economy and the benefits it confers on users. Based on this, it is fair to say that wireless is

now a social good, rather than a luxury product for the elite few. Increasing wireless penetration will have a strongly positive impact on the economy and society. Operators and regulators can each take four steps to improve results and help their nation achieve its full wireless potential.

## FOUR INITIATIVES FOR OPERATORS

Clearly, operators can do their part to improve the main driver and enabler of penetration. First, they should not wait for regulators but should **proactively and creatively lower MCO**. They might establish a free-incoming-call prepaid plan, for example, as pioneered by SMART and Globe Telecom of the Philippines.

We observed this phenomenon recently in India. When operators began to offer free incoming calls beyond the expiration date of prepaid cards, MCO was effectively lowered by as much as 63%, and some smaller players boosted their subscriber base by as much as 50% in a few months. While skeptics may scoff, these moves did not in fact reduce profit margins, as network utilization improved significantly.

Second, to improve coverage in areas with low population density, operators should **consider collectively exploring industry-level actions, such as network sharing**. They should avoid redundant network buildouts in those areas. Three cellular towers in the same small rural village will yield poor returns for all the operators involved.

Third, operators should **do better at communicating to regulators the ways that mobile contributes to economic development**. Operators must press their case and obtain their fair share of the spotlight and preferential treatment from government. The mobile industry is underweighted in the public mind relative to other industries, such as auto manufacturing and computers, which have succeeded in communicating their own importance to the public. Mobile operators can do better.

Finally, as operators pursue their regulatory agenda, they must **provide regulators with “win-win”**

**proposals.** They should avoid negotiating a number of points, such as taxation or interconnection, as a series of isolated topics, but rather assemble these into holistic packages. Further, they must learn to speak the regulators' language. Too often, telecom companies rely for negotiation on engineers, who have their own argot and push unilaterally for operators' interests. Operators' regulatory position should promote enhanced penetration to maximize economic value to end users, not simply to reduce taxes and other charges they face.

#### **AND FOUR FOR REGULATORS**

First, regulators must **approach their work with the clear goal of putting a mobile phone in everyone's hands.** The days when mobile phones were a luxury purchase are gone. Today, mobile telephony is a social good and, for users, is moving from being a privilege to being a right.

Next, regulators should **use total economic benefit as the frame of reference for their work,** rather than relying on traditional inputs such as operators' costs or the allocation of interconnection fees. Pushing for a higher penetration rate should be the starting point when considering any regulatory lever – industry structure, taxation, subsidy, license fees, interconnection regime, and so on.

Third, regulators should **ensure sufficient but not excessive competition:** In a capital-intensive industry, competition among a few players may yield better results (in terms of coverage, penetration, and service quality) than competition among many. Clearly, a minimum number of competitors is needed, but opening the market to many competitors may create perverse incentives that reduce

coverage, focus intense competition on high-end customers, and raise the initial costs for marginal consumers to access network services. Duplicate infrastructure and weakened margins will hinder operators' ability both to extend coverage and to serve low-income segments. A moderate number of players – depending on the circumstances, as few as two or as many as four – should be admitted to the field.

Finally, regulators should **avoid the temptation of mandating lower prices across the board** in order to lower MCO and yield higher penetration. Direct control of prices may yield the opposite of the desired effect. Dictating an artificially low average price destroys operators' profitability and hinders their ability to pursue the steps that drive penetration. Instead, regulators might enable lower MCO by designing a system in which the calling party pays, supported by an appropriate interconnection regime.

\* \* \*

As wireless becomes commonplace, many may take it for granted and assume that all possibilities have been exhausted. But consider this recent statement from a Deutsche Bank analyst: "Last week we could not help but notice Intel's new initiative to bring low-cost laptops to the masses .... We think companies should do what they can to close the digital divide and develop data devices priced within reach of the global billions outside of the major developed markets. We believe there is a huge demand for such a device and that it could have a tremendous impact on their lives and on the global economy. We applaud a low-cost device like this. We even have a name for it – the mobile phone." We think this is an idea to reckon with.

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