



India's 3G Wireless Play: An Economic Engine -- or Out of Bandwidth?

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A mix of excitement and concern surrounds India's latest auction of spectrum licenses for third-generation (3G) services, and a soon-to-follow broadband wireless spectrum auction. The winning bids for 3G spectrum totaled Rs. 67,710 crore (US\$15 billion, at Rs. 45 to a dollar), against the government's original expectation of Rs. 35,000 crore (US\$7.78 billion).

A new era awaits the country's 584 million mobile phone users, with a faster and more robust Internet, and better access to data services including e-commerce, social networking and telemedicine. Also ready are mobile device manufacturers with a slew of 3G handsets; providers of hosting, billing and network management services with expanded offerings; and content providers selling cell phone ring tones, wallpapers and graphics.

Amid that euphoria, industry observers worry about the "winner's curse" of successful bidders paying too much for the licenses, which ultimately could decrease margins and dampen future investment enthusiasm. Intense price competition is steadily eating into mobile operators' earnings, and that could force marginal players in the 3G market to eventually succumb to a wave of consolidation, they say. Separately, but coincidentally, operators are also smarting from a recent move by the Telecom Regulatory Authority of India (TRAI) to collect more money from them and restrict their market freedoms.

Although the stock market recoiled sharply following TRAI's proposals, the bidding frenzy continued. Over 34 days of bidding that ended on May 19, mobile operators Bharti Airtel, Vodafone Essar and Reliance Communications agreed to pay Rs. 3,317 crore (US\$737 million) and Rs. 3,247 crore (US\$722 million) each for the coveted Delhi and Mumbai markets. The government had set a base price of Rs. 320 crore (US\$71 million) for each of those two markets. Bharti, Vodafone and Reliance shared licenses for the remainder of the 22 telecom zones on offer with six other bidders that included Idea Cellular and Tata Teleservices.

Paying Too Much?

Wharton marketing professor [Raghuram Iyengar](#) notes that the winning bidders could repeat the disaster that followed the U.K.'s 3G spectrum auction in 2000. At that time, the U.K. raised £22.5 billion (US\$34 billion) for five 3G licenses, "but the participants paid too much and didn't have the infrastructure to get started." However, he adds that India's 3G operators will have a support system of compatible mobile devices and a range of applications at affordable prices, which the British operators didn't have a decade ago. In any event, India's 3G operators will need to contain the cost of debt they raise to finance their bids, or else it will hurt their investments in services, he warns.

"I am not too worried about the money," says [Ravi Bapna](#), a professor of information and decision sciences at the University of Minnesota's Carlson School of Management, who holds a joint appointment at the Indian School of Business in Hyderabad. He predicts that the major operators could recover their 3G investments in about eight years, but "some of the marginal players may have gone [beyond] their bandwidth and reach," he notes.

In fact, Bapna feels that the bid collections in the latest auction will be closer to market value than in the earlier 2G license allocation in 2008. In that round, the government collected only Rs. 1,651 crore (US\$367 million) each from eight operators, on the basis of 2001 valuations. "Prior auctions have not been [conducted] with the same level of transparency as with this round, and there was a lot of



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arbitrariness in the actual mechanism itself," he says.

For the most part, according to Bapna, the mobile services business is different from other industries that have seen bubbles formed by irrational exuberance. "The mobile services industry is an exception, and it is really the only infrastructure success story we have. Take an operator like Bharti [which has 128 million mobile phone subscribers], and an average revenue per user [ARPU] of US\$15-US\$20 a month or about Rs. 1,000. Even if you assume they tap into 1% of their subscriber base in the first year, and steadily increase that by 0.5% each year in the next six to eight years, they will actually more than break even." Estimating operating expenses at 30% and taking into consideration investments in applications, marketing and other services, "the rest is gravy for these guys," he adds. TRAI has allowed 3G operators to launch their services after September 2010.

To recover their investments, the 3G spectrum winners will have to focus on customers with high ARPUs, or the top 100 million subscribers who want more data services, says Rajesh Jain, founder and managing director of Netcore Solutions, a Mumbai-based provider of messaging and mobile data services. "The voice ARPU has an upper threshold, so if the operators have to generate higher revenues, it has to come from data and other value-added services." (Jain is on the advisory board of India Knowledge@Wharton, which partners with Netcore for its mobile edition.)

But to achieve that, mobile operators would need to incentivize start-ups to create 3G applications, according to Jain. "The telecom operators are not capable of driving the innovation themselves; they need to create an ecosystem for it." They could do that by outsourcing their billing function to application developers and incentivize them by sharing up to 80% of the revenues with them, he explains. With value added services, "the current ARPU of Rs. 100 will go up to Rs. 300 or Rs. 400," he suggests, adding that voice-based services alone will not lift ARPUs so high. Japanese mobile operator NTT DoCoMo has done precisely that to spur development of applications, he adds.

India's overall tele-density is 53%. Bapna sees that growing to cover 60% or 70% of the population before any talk of market saturation. Pyramid Research of Cambridge, Mass., forecasts India's mobile penetration rate at 80% by 2014. "It is difficult not to be excited about mobile in India, as it seems a clear-cut growth opportunity for all industry players," Elizabeth Bramson-Boudreau, an analyst-at-large at Pyramid, wrote in a March report on the 3G auctions. "In fact, India's 410 million net subscription additions over the 2009-2014 period put it above all other countries in the world, including China, in terms of subscription additions over the next five years."

Bharti Telecom leads India's wireless phone services market with a 22% share, followed by Reliance and Vodafone at above 17% each and Idea Cellular at 11%, according to TRAI data as of March 2010. Nine other providers, including the public sector Mahanagar Telephone Nigam Ltd (MTNL) and Bharat Sanchar Nigam Ltd (BSNL), share the rest of the market. In landline services, BSNL and MTNL have 37 million subscribers, or 85% of the market, but they account for a tele-density of just about 3%, according to TRAI.

Finding Profit amid Declining Revenues

The stakes, however, are getting bigger as India's mobile operators see their ARPUs decline steadily under severe price competition. The monthly ARPU was Rs. 144 (US\$3.20) in the last quarter of 2009, down 12.4% from the previous quarter, for the majority of the industry that uses the so-called GSM technology (or global system for mobile communications), according to TRAI data. The monthly ARPU fell 7% to Rs. 82 (US\$1.80) in the same period for operators using CDMA (code division multiple access) technology.

Subhendu Mohanty, Motorola India's country head for networks business, has factored in those pressures, as he prepares to boost his company's network optimization, operations and maintenance services for mobile operators. (Motorola India's two other business units cover mobile devices and enterprise/mobility services.) He agrees the 3G bids "have obviously gone beyond anybody's estimation" and that they will "put pressure on operators in a low-ARPU country." All the same, he predicts operators will not face big challenges in rolling out 3G networks, adding that both applications and devices for them are available at affordable prices.

Mohanty is now focusing on the market emerging beyond 3G in broadband wireless services (WiMax, in industry parlance) and 4G networks. In March, TRAI produced discussion papers on auctioning licenses for 4G services, which would allow users to watch TV broadcasts and play online games at 10 times their 3G speeds. "For WiMax, the ecosystems have been built and devices are available at affordable prices," Mohanty says. "It is going to be fairly easy for operators to introduce WiMax." TRAI set the WiMax auction among 11 bidders to begin two days after the end of the 3G round.

Games, Music and More

Nokia, which leads the market for mobile devices with a share of nearly 60%, has a portfolio of more than 20 3G-enabled handsets, says V. Ramnath, head, operator channel for Nokia India. The most affordable 3G device in that range is the Nokia 2730, priced at Rs. 4,689 (US\$104). He cites a recent report by research services firm Evalueserve which predicts that the Indian market is likely to have 395 million 3G handsets by 2013; about 20 million Indians currently use 3G-enabled handsets. "Services such as video downloads, music downloads, Internet applications and search will see an upsurge." The urban markets would account for 80% of the total 3G customer base in the next three years, he says, again citing the Evalueserve report.

Makers of mobile devices have in recent weeks unveiled a range of new products to tap into the expanding market. Motorola India has launched "Milestone," an Android-based device, and is also in talks with a few mobile operators to incorporate its so-called iSIM technology that allows subscribers to access four cell numbers on the same handset. The technology works by attaching a wafer to a SIM (or subscriber identity module) card, the component in a handset that stores contacts and identification information. Mohanty doesn't see the iSIM cannibalizing Motorola's devices business or those of others. "When the country is adding up to 20 million subscribers each month, there is room for everybody to grow." Also, it is common in India for subscribers to use multiple SIM cards, he adds. "They buy tariff plans based on what is attractive in the day, afternoon and evening."

Others that have unveiled new device offerings include Sony Ericsson, Spice Mobile and Taiwan's High Tech Computer Corp.; the latter is marketing a smart phone in partnership with Bharti Airtel and Qualcomm. Bharti Airtel and Vodafone Essar also plan to launch Apple's iPhone 3G handsets with their mobile services. The country has more than 50 mobile phone marketers, many of them recent entrants such as Micromax, Karbonn and Lava.

The fever has spread to providers of other types of content, such as mobile gaming downloads. Nitish Mittersain, CEO of Nazara Technologies in Mumbai, a dominant player in mobile gaming offerings, says his market of roughly US\$60 million "should grow by 100% this year and by between 100% and 200% next year, when the 3G impact [takes place]." His 10-year-old firm offers downloads of games based on cricket and movies, and, according to Mittersain, controls 40% of the mobile gaming market. With existing 2G and 2.5G technology, users can, for example, inhabit the role of Indian cricket legend Sachin Tendulkar to play a game. With 3G capabilities, including better connectivity and bandwidth, Nazara could introduce multiple players in such a game, he notes. Nazara has currently contracted with Indian cricketer Virender Sehwag, and has earlier worked with Tendulkar and the Indian cricket team's captain, M. S. Dhoni.

Not everybody is expecting a big boost from 3G, but like Mohanty, they are looking at future markets. The expanded market with 3G and WiMax offerings will offer limited upside for firms that sell ringtones and music for mobile phones, says Taron Mohan, founder and CEO of MobiSoft Telesolutions in New Delhi. MobiSoft's PhoneyTunes division markets ringtones featuring popular film and other music, wallpapers and games for mobile phones for between 10 cents and 80 cents for each download. "3G won't be any good for content players; the only people who will benefit are those in gaming [downloads]," says Mohan. Providers of ringtones also face threats these days from free music downloads over the Internet, he adds.

Beyond 3G and Sunset Business Models

Mohan foresaw the imminent plateau in the market for PhoneyTunes; he has built his company's main business around providing hosting platforms for mobile phone operators to manage billing, subscriptions and marketing campaigns. MobiSoft is also diversifying into marketing content on memory cards in a

technical collaboration with SanDisk in Milpitas, Calif., a leading supplier of flash memory data storage products such as cards for cameras and mobile games. A four-gigabyte card can hold a thousand songs, and such products help lower marketing costs for music companies, he says. "We could, for example, market a memory card with the 500 best songs of reggae."

"India as a market has always come up with surprises, whether it's our start with text messaging or caller ring back tones," says Manish Kasliwal, a member of the Indian Merchants Chamber's committees on mobile value-added services, electronics and telecommunications. "The Indian mobile phone market is all about ABC -- A for astrology, B for Bollywood and C for cricket," he notes. "If you can develop applications around these [categories], you could be successful." Kasliwal, who is also head of strategic marketing at L&T Infotech in Mumbai, emphasizes that these are his personal views.

He is not, however, overly bullish about the 3G opportunity. "I don't think 3G is going to swing the market in one direction. It has not been a major success in the majority of the countries where it was launched, and there is not a strong business case for 3G yet." (Bidders in the 3G round have stayed away from commenting on the speculation surrounding the price bids, except for continuing to sound optimistic.) In fact, Kasliwal sees the heightened interest for 3G spectrum as being rooted in the operators' shortages in their existing 2G and 2.5G spectrums.

"Everybody is hungry for spectrum; everybody is running at 95%-plus capacity of the network," he says. "If they have to add more subscribers, they don't have spectrum available in 2G. They will use the 3G spectrum to vacate some of the subscribers from 2G networks and move high-end subscribers to 3G networks." That also explains the peaking of bids for 3G spectrum in the major metros of New Delhi and Mumbai. "Every operator would start with 3G in the urban market, and as they start seeing subscription rates go up, they might extend their 2G networks to the rural markets," Kasliwal adds.

"The pricing for 3G licenses has gone so high partly because of a scarcity of spectrum," says Jain. "The incumbent operators are going to pay whatever it takes [for additional spectrum]."

Will the Math Add Up?

Kasliwal cautions against any further delay in the rollout of 3G services. "We have waited too long for this auction," he says. Bapna notes that the 3G auction is four years too late; he recalls making presentations to TRAI on approaches to it in earlier years. He also sees a way for the government to get some other things right. "[The bids are] a lot of money, but if some part of it gets ploughed back into infrastructure development in the rural areas, it will be the icing on the cake and we could see better overall outcomes."

Wharton's Iyengar wonders if the 3G operators would have enough incentive to cater to the rural markets. "Given that some of the companies are going to pay a lot of money [for the bids], they would have to offer high-end services to recover that," he says. "Would they actually stop developing and looking at the needs of the low end of the market? Will 3G services be beneficial only to a small minority of people?"

Mobile-phone operators have touted the potential of 3G and especially 4G to play a catalyst's role in economic development, such as in extending telemedicine, education and other services to rural India, which has little access to broadband connectivity and low PC penetration. "For every 10 percentage-point increase in the penetration of broadband services, there is an increase in the economic growth of 1.3 percentage points," Tata Teleservices noted in a March 2010 note to TRAI on the forthcoming 4G auction, citing a World Bank analysis of 120 countries. The World Bank report said: "The growth effect of broadband is stronger and [more] significant in developing countries like India than in developed countries and is higher than that of telephony and Internet."

In its comments to TRAI on 4G networks, Reliance Communications said: "Wireless broadband can play a critical role of bringing the benefits of broadband to rural and underserved areas in the country, where it is the most efficient means of delivering these services." Wireless mobile broadband services "can translate into increases in economic growth and job creation and therefore broadband is not just a conduit but a force multiplier." Adds Nokia's Ramnath: "The rural market will see more headroom as mobile will continue to emerge as an info/commercial tool and a sign of empowerment."

Against that backdrop, telecom industry analysts see as unhelpful TRAI's latest proposals on 2G spectrum

allocation, the charges it wants to levy on existing operators and rules on merger & acquisition activity. To accommodate their growing subscriber base, many mobile operators have over the years received more than their original allocation of 6.2 MHz (each megahertz refers to a million cycles per second, a measure of the speed in processing data). But TRAI now wants them to pay a one-time fee for the extra spectrum they have, and at prices set by the 3G auction, explains Himanshu Shah, a telecom analyst at HDFC Securities. For an operator with 10 MHz in the Mumbai market, that translates into a one-time payment of Rs. 2,400 crore (US\$533 million). That could mean additional spectrum fees from the industry of between Rs. 10,000 crore and Rs. 12,000 crore (between US\$2.2 billion and US\$2.7 billion), according to an estimate by ICICI Securities.

Regulator's Move a "Huge Negative"

Other TRAI moves include a call for a cap of 8 MHz in all service areas and 10 MHz per operator in Mumbai and Delhi (for those on GSM technology). Also, those operators 900 MHz band spectrum are being asked to switch over to the less efficient 1,800 MHz whenever they renew their license, in an apparent effort to reuse the former for 3G services, an ICICI Direct report says. The 900 MHz spectrum entails lesser capital expenditure than 1,800 MHz, explains Shah. Other recommendations include a cap of 30% on the market share of a merged entity. With that, TRAI is "essentially ruling out M&A activity involving a large incumbent," says Sneha Venkatraman, an analyst at HDFC Securities. "These could impact incumbent mobile telephony companies severely, unless [following] consultations they get diluted majorly." The TRAI proposals would be "hugely negative" for the telecom industry, and Bharti Airtel, BSNL, Idea Cellular and Vodafone Essar would be the worst affected, she adds.

Thomas W. Hazlett, a professor at George Mason University Law School in Arlington, Va., has studied spectrum allocation policies in several countries, and doesn't like what he sees in India's 3G auction. (Two years ago, Hazlett had filed a policy analysis with TRAI in a one-off consulting arrangement with Vodafone.) "What do you need for development in the wireless sector? You need spectrum, and specifically in this case, you need abundant bandwidth with relatively few restrictions," he says. "What gets the market going is to get lots of spectrum out in the market early; you allow firms to invest in a competitive sense, one against another, to provide quality services and then they upgrade the technologies over time.

"They are really playing a dangerous game with consumer welfare," says Hazlett of TRAI's call for a cap of 8 MHz, adding that "it is tiny and makes it very difficult for you to invest and market your services." The policy would "bias the network for cheaper technology," he notes. He agrees with ICICI Direct's assessment that consumers will not feel a direct hit from the increased costs to providers, since those costs may not be reflected in the retail prices they pay for services. "But the fact that these costs [spectrum caps, ownership limits, spectrum taxes] will lessen investment incentives is a very real threat to consumer welfare," he says. "Less capital spending will reduce the coverage, quality and service levels of networks. Consumers will lose."

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