▲ Pyramid Research

Operator Strategies for Successful WiMAX Services Deployments

TABLE OF CONTENTS

HIGHLIGHTS

Pyramid Research conducted interviews with WiMAX operator executives to uncover what works and what doesn't and identify the key factors behind successful WiMAX deployments.

With the growing demand for broadband connectivity as the main driver, operators have picked WiMAX as a future-proof, all-IP broadband technology that is available today from a growing number of suppliers — one that is faster and less expensive to deploy than fixed technologies. WiMAX is not for the faint of heart however, and will require relentless commitment from service providers and their vendors to keep the momentum.

Successful WiMAX operators will place a greater emphasis on smart networks, diversifying revenue-generating services and devices in an effort to maximize network utilization, create new revenue streams and avoid becoming marginalized.

WiMAX business models are as much about innovative cost management as they are about driving revenue, particularly in this challenging economic environment. The WiMAX network architecture is inherently cost-effective thanks to its flat, all-IP architecture, but there are further steps that can be taken to shave costs.

A lower cost base would allow operators to transfer savings to end users in the form of lower access prices, which are a key driver of service uptake worldwide, particularly in the residential market.

Introduction

More than 150 WiMAX networks have been turned on over the past year, according to the WiMAX Forum, to reach a total of 472 networks across 139 countries in April 2009. Pyramid Research conducted interviews with 17 WiMAX operator executives to gain insight into these operators' network technology selection criteria, their strategies for positioning and differentiating WiMAX services, and their overall network deployment and commercial experience to date. The aim: to uncover what works and what doesn't and identify the key factors behind successful WiMAX deployments. The interviews were conducted between April 2008 and May 2009. The interviewed operators are representative of the different types of operators adopting WiMAX technology (mainly 802.16e) and are located across the world (**Exhibit 1**).

Exhibit 1: Interviewed operators by region and by type
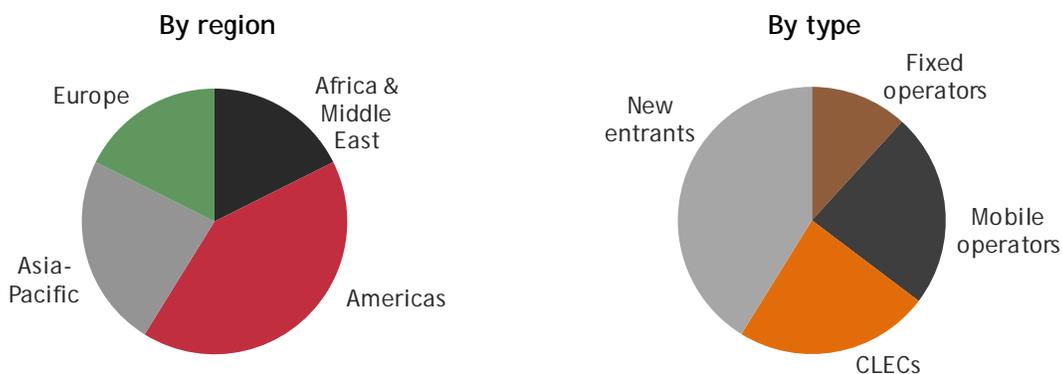
Source: Pyramid Research

Why operators pick WiMAX

The main incentive to deploy WiMAX has been growing demand for broadband connectivity, particularly in areas inadequately served by existing broadband networks (see **Exhibit 2** for sweet spots for WiMAX). WiMAX operators have essentially identified a largely untapped opportunity in their respective markets and chosen a competitive broadband technology that is available today — one that is faster and less expensive to deploy than fixed technologies.

Other important factors driving operators to deploy WiMAX are:

- **Speed to market:** Wireless networks can be rolled out much quicker than fixed networks. OneMax reports launching its network in six months in the Dominican Republic, and Umniah's WiMAX launch in Jordan took less than nine months. Installing the network does not require the operator to acquire rights of way, which could take significant amounts of time. Moreover, wireless networks may be the optimal way of providing connectivity in many emerging markets due to the lack of effective city planning.

- **Surgical network deployment opportunities:** With WiMAX, operators can build out their networks as they need to. Hence, operators have been able to focus on specific areas where there is strong demand, allowing them to generate a higher return on investment and to manage capex per subscriber.

- **Mobility and multiple-use scenarios:** Many WiMAX operators are excited about mobility on WiMAX and the emergence of personal broadband. This is a key factor differentiating WiMAX

from DSL. The mere fact that WiMAX operators can provide a range of applications that take advantage of the three modes of the WiMAX network — fixed, portable and mobile — could substantially expand their target customer markets and enhance their value proposition, assuming these services can be priced at affordable levels.

- **IP architecture**: Because WiMAX is an IP-based technology, the introduction of new services should take less time, leading to new revenue streams. Besides, an IP core is future-proof: if need be, operators could deploy different technologies in the last mile.

- **Cost of spectrum**: Compared with spectrum for 3G, WiMAX spectrum has been less expensive worldwide.

Exhibit 2: Market attractiveness framework: 3G+ penetration of population vs. broadband penetration of households (2009E)
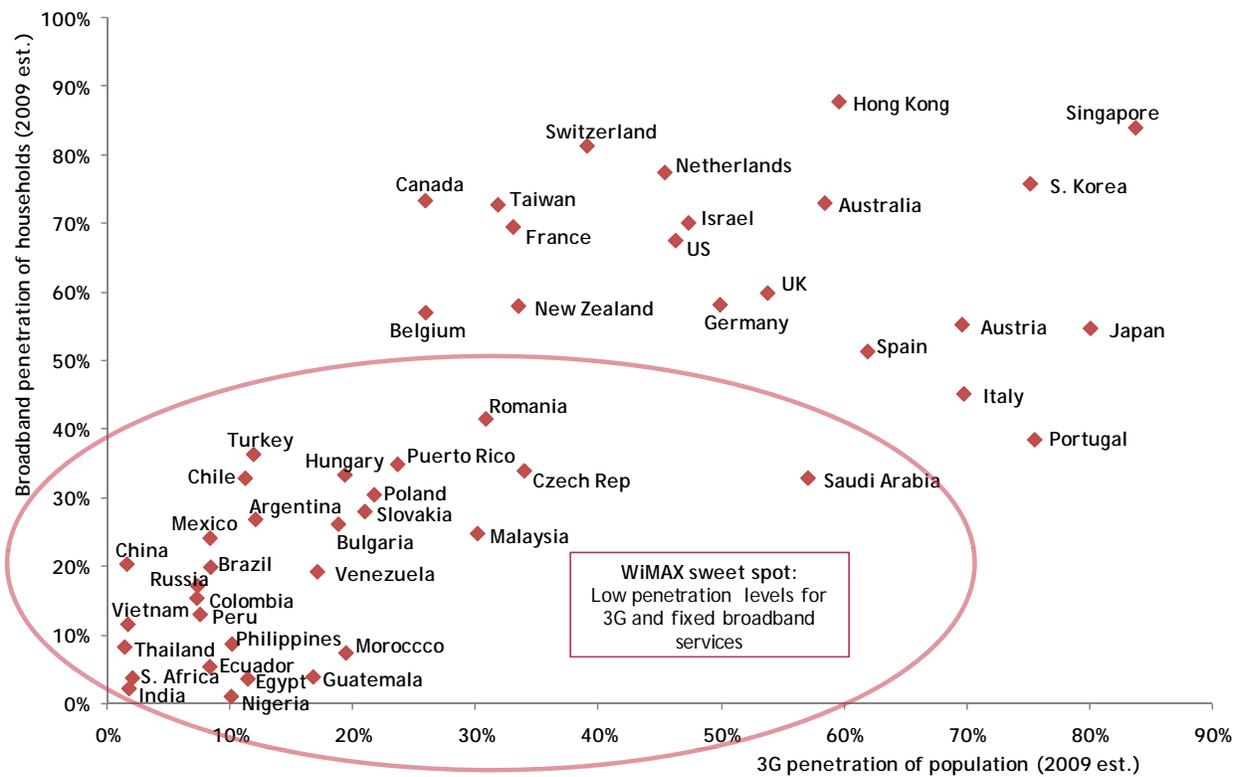
Source: Pyramid Research

Positioning strategies for WiMAX

Our review of commercial WiMAX networks has showed that service providers have generally positioned WiMAX as a DSL substitute, providing mainly fixed and portable Internet access services. In the short term, enabled by less expensive CPEs as well as advanced radio capabilities, most service providers plan to offer VoIP and mobility and to expand deeper into the residential market. In the medium term, mobility will also pave the way for fixed-mobile convergence offerings for both business and residential customers. Pointing to WiMAX's flexible IP architecture, operators consider deploying other access technologies to complement WiMAX, if necessary, in order to remain competitive in the long term.

In general, the addressable market for WiMAX services has been held back by the limited availability and affordability of CPEs. The early adopters include small and midsized enterprises (SMEs), small offices/home offices (SOHOs) and high-end residential customers. The initial network deployments have been in urban areas, which reportedly generate up to eight times higher returns than rural areas. Indeed, one of the operators surveyed indicated that it takes about 80 months to recoup the costs in rural areas, whereas in urban areas it takes five months or less.

The mix of business and residential subscribers varies, however, depending on the WiMAX CPEs offered by an operator. Those operators that have been operational for a number of years, primarily offering outdoor antennas, report business users constituting 70-80% of their base. In contrast, those with plug-and-play CPEs — indoor modems, PC cards, USB modems — actually have residential users accounting for the majority of their subscriptions. At Malaysian WiMAX operator Packet One, for instance, about 90% of subscribers come from the residential market. Similarly, the US operator Xanadoo reports that more than 90% of its customers are on consumer service plans. Even in such consumer-centric WiMAX businesses, however, the importance of business users cannot be understated: according to Danske Telecom in Denmark, its business customers generate about 20% of its revenue but generate only 10% of the traffic volume.

Through innovative commercial offerings that help lower the barriers to entry, some operators have been able to penetrate deeper into the residential customer segment. Russian WiMAX operator Enforta, for instance, targets multidwelling units, allowing multiple households or businesses to share a terminal for connectivity at a lower price. From its launch of services targeting multidwelling units in the first half of 2008 to year-end 2008, the operator's residential base grew an impressive 70%. Other approaches that help broaden the reach of WiMAX include introducing service plans with lower data rates or lower download limits, prepaid pricing schemes and service bundles. Zain Bahrain and Digicel Jamaica, which provide bundles of GSM and WiMAX, exploit cross-sell and up-sell opportunities among their existing mobile customers. Bulgarian WiMAX operator Max Telecom bundles broadband and VoIP, throwing in TV for free.

To avoid confusing end users, most of the operators intentionally keep from referring to WiMAX as the underlying technology. Chilean WiMAX operator Entel, for example, serves its business customers with either its DSL network or WiMAX depending on network coverage, without making any distinction. We have found that WiMAX operators generally highlight the following in differentiating their services from other broadband offerings in their markets:

- **Simple, no-frills services and pricing**: WiMAX operators emphasize the simplicity of service activation and pricing plans as well as the lack of a need to purchase a phone line or pay line rental in addition to the WiMAX subscription.

- **Service availability, quality and security**: In emerging markets in particular, limited broadband competition has resulted in inadequate service availability and quality as

well as high prices. WiMAX operators enjoy plenty of room for differentiation in such markets, since they can both deploy a network from scratch within a much shorter timeframe than their fixed-network competitors and offer services supported by SLAs if need be.

- **Instant gratification — quick setup, plug-and-play networking, speed of deployment:** Concerning the simplicity of service activation mentioned above, WiMAX operators highlight how quickly and easily new customers can get service on their networks. This is a strong proposition in emerging markets in particular, where the waiting lines for Internet access tend to be extremely long. In Chile, Telmex promises to install and set up WiMAX service in five business days or less. Enforta claims that many of its customers select WiMAX because it can install the service in four days or less. Max Telecom promotes self installation in as little as 30 minutes.

- **Portable and mobile broadband access:** This is essentially the ability to access the Internet at different locations using the same broadband connection, something that DSL cannot offer. WiMAX operators report encouraging response rates from promotions built around mobility via PC cards and USB dongles, particularly among young professionals.

- **Higher download limits:** Service plans for broadband access — whether via DSL or WiMAX — generally include a cap on downloading. In emerging markets, many WiMAX operators offer higher download limits than their DSL competitors.

- **Superior customer care:** WiMAX operators try to differentiate themselves from incumbents with a quality customer care organization. Often in emerging markets, incumbents have enjoyed monopolistic market powers and haven't had to compete for the end user's business by providing a superior service. WiMAX operators look to up the ante on this front and attract customers who are frustrated with the existing offerings.
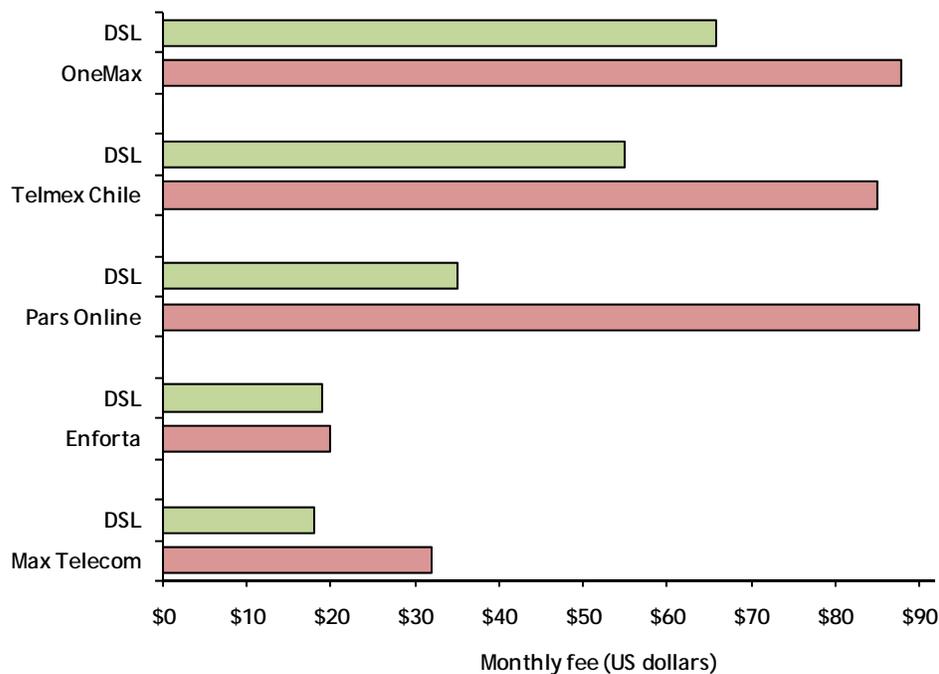
Service and pricing strategy

Internet access has been the main service provided over WiMAX networks to date. Downlink throughput is as high as 4Mbps but can be reduced to 128Kbps for basic "broadband" plans, which are rolled out in an effort to expand the addressable market. Interestingly, most of the operators shy away from promoting actual data speeds; instead they try to guide customers to the right package based on their needs. Scarlet of Curacao, for example, offers six service plans for the residential market, but doesn't readily disclose the data rates for any of them. Two of the plans are targeted at students and travelers, and the remaining four are simply named Fastest, Faster, Fast and Basic. Sri Lankan WiMAX operator Dialog Broadband Networks reports that it retracted its claims of providing faster data speeds than the incumbent's network not long after its launch in 2007 when customers — possibly unaware of the implications of shared bandwidth — began to complain about not experiencing the advertised speeds.

Some of the interviewed operators have already deployed VoIP; others have plans to do so as early as later in 2009 but first want to ensure that they can provide it with QoS, since voice services could carve out a significant amount of network capacity if the network design is not optimal. Operators expect to see an increase of 40-50% in ARPU and lower churn rates for customers of voice and broadband services. In emerging markets, where PC penetration remains low, VoIP will likely strengthen the value proposition of WiMAX networks and attract more subscribers.

Depending on the extent of their focus on the business market, WiMAX operators have rolled out a slew of corporate applications, from IP VPN services and mobility to IP Centrex, backup connections, custom systems integration services and video calling as well as conferencing. Moreover, operators are providing SLAs to guarantee network reliability and performance over WiMAX networks; these are very attractive to business users. Wateen Telecom reports strong uptake for its IP Centrex services in Pakistan. Jordanian operator Umniah offers three levels of QoS — platinum, gold and silver — supported by SLAs. Digicel's enterprise service, which consolidates voice, Internet and data services on a single platform under an SLA, has helped the operator acquire 80% of the large-business market in Jamaica within the first 15 months of service.

As new entrants in the broadband market, WiMAX operators should at least match the incumbents' prices and speeds where they compete head-to-head. If the WiMAX operator provides subsidies for CPEs, however, prices for WiMAX services tend to be higher than for DSL at similar or equal download speeds. Take Max Telecom: compared with the Bulgarian incumbent BTC's DSL service, Max's WiMAX connectivity offers almost four times higher uplink throughput, but its monthly fee under a 12-month contract is nearly twice as high. Price competitiveness is a key catalyst for WiMAX adoption in the residential market in particular. While WiMAX operators try to play the value-for-money card by highlighting faster uplinks, more generous download limits, free on-net calls and the fact that customers don't have to pay for a phone line or a line rental, they have also had to roll out more affordable service plans with lower speeds and download limits. We believe the most powerful pricing proposition is service bundling: operators can significantly improve the perceived value of their services through bundles.

Exhibit 3: WiMAX prices versus DSL prices, select markets, H1 2009

Chart axis label: Monthly fee (US dollars)

Categories (top to bottom): OneMax (DSL, WiMAX), Telmex Chile (DSL, WiMAX), Pars Online (DSL, WiMAX), Enforta (DSL, WiMAX), Max Telecom (DSL, WiMAX)

Source: Pyramid Research

CPE and distribution strategy

The number and variety of WiMAX Forum-certified CPEs are on the rise; at the end of May 2009, there were 58 subscriber units certified by the Forum, including outdoor antennas, desktop modems, PC cards, USB dongles and laptops with WiMAX embedded. To ensure the best coverage, most of the WiMAX operators we have interviewed have employed a mix of outdoor and indoor antennas for business users. Some use outdoor CPEs for residential customers as well because of a more limited selection of CPEs for the 802.16d standard.

Most of the WiMAX operators offer subsidies for CPEs in return for a one-, two- or three-year contract. Xanadoo sells PC cards at US$49.95 after a rebate of $50 if the customer opts for a one-year contract, or for free in return for a two-year contract. Scarlet Curacao, which doesn't currently provide CPE subsidies, explains that it sells CPEs at cost to generate cash flow.

The wider use of plug-and-play devices — desktop modems, PC cards, USB dongles, laptops with embedded modems and other upcoming devices — should help drive WiMAX adoption but will also deliver significant cost savings for the operators. Given that customers can generally install these devices and activate service online by themselves, operators will save on CPE installation expenses. Scarlet Curacao, for instance, claims only about 5% of its customers require a truck roll, since the operator doesn't offer outdoor antennas at all. Online service activation separates the hardware sale and service provisioning and allows the operator to maintain its control over the presentation of services, rather than rely on distribution partners. Moreover, some of these devices may allow operators to significantly reduce or do away with CPE subsidies, which currently account for as much as two-thirds of subscriber acquisition costs.
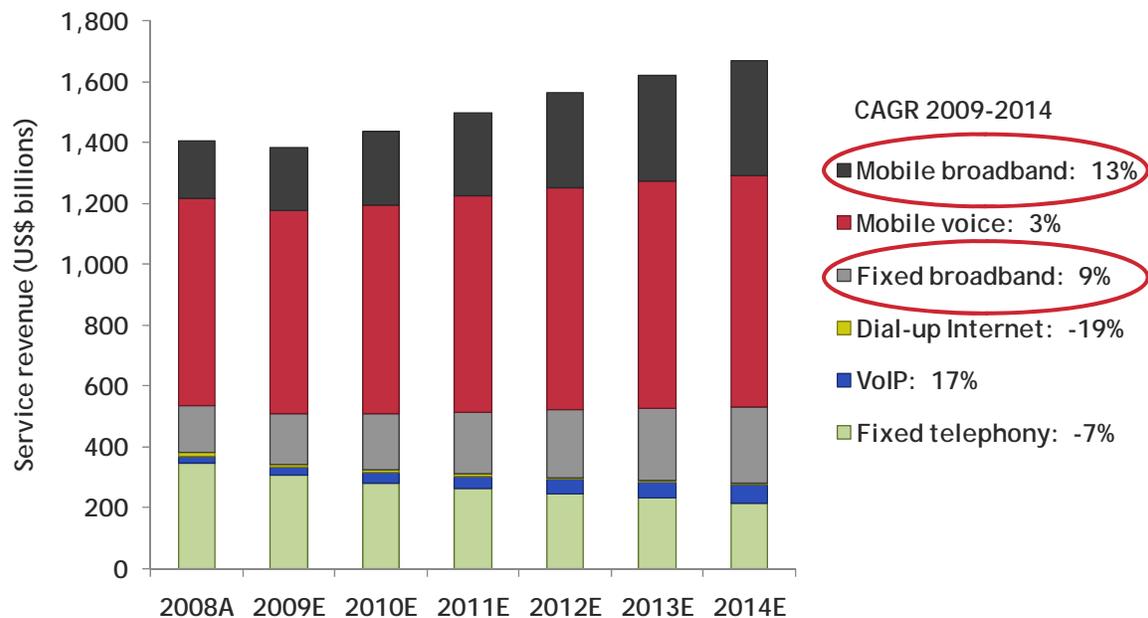
WiMAX operators use their own channels as well as retailers to distribute products and services. Xanadoo reports that more than 60% of its customers are acquired through direct channels.

Those with existing distribution networks, such as Zain in Bahrain, Digicel in Central America and Dialog in Sri Lanka, undoubtedly enjoy operational leverage and some savings. Nonetheless, the generally longer sales cycles of WiMAX compared with mobile voice products have required adjustments in the distribution process and in traditional sales commissions and incentive schemes, as well as an investment in employee training.

Making the WiMAX business model work

Communications and media business models worldwide are undergoing an overhaul. Core markets are being saturated, barriers to market entry are lowered as new technologies and service delivery channels emerge, and service consumption has taken a whole new shape. The Internet has become the means to all ends, and broadband will be the main driver of revenue growth for fixed and mobile operators over the next five years. By our estimates, fixed and mobile broadband service revenue will nearly double and amount to $629bn by 2014, 38% of total telecommunications service revenue, up from $338bn in 2008.

Exhibit 4: Global telecommunications service revenue, 2008-2014

CAGR 2009-2014

Mobile broadband: 13%
Mobile voice: 3%
Fixed broadband: 9%
Dial-up Internet: -19%
VoIP: 17%
Fixed telephony: -7%

Source: Pyramid Research, Fixed and Mobile Forecasts, Q1 2009

The WiMAX business model — no matter which iteration and where the network is deployed — is based on a new technology. To capture a significant share of the broadband opportunity over the next five years, it will therefore require relentless commitment from all players across the value chain. Significant funding is needed to cover startup costs and establish a competitive business; as one operator executive said, it's not for the faint of heart. WiMAX faces considerable competitive pressures and does not readily enjoy the economies of scale that its competition has.

Our interviews with operators worldwide that are pioneering WiMAX services uncovered many important lessons learned as well as best practices, as summarized above. Accordingly, we highlight the following as key factors making the WiMAX business model work:

- **Diversify revenue-generating services and devices to maximize network utilization and create new revenue streams.**

  In the age of Google, network infrastructure is valued less than eyeballs, and ownership of the customer is not so much a function of the access line they subscribe to, but of the applications and services they are using and paying for. In this application-centric environment, a WiMAX operator cannot merely provide infrastructure, or it is bound to be marginalized sooner than later. To be successful, WiMAX has to have a value proposition built around the power of its services. At the end of the day, WiMAX is just a data pipe, and what matters to customers are the functionality and the user's experience of the network.

  Moreover, any communications network business is — for the most part — about traffic: a network not operating at capacity is wasting resources and can lead to a suboptimal return on investment. Hence, a key factor making a WiMAX operation successful is its ability to maximize network utilization; besides acquiring new subscribers, operators should also emphasize broadening their existing customer relationships by introducing new services and devices. For instance, operators estimate that selling VoIP to a broadband customer will raise ARPU 40-50%. The embedded device model promises to act as a Trojan horse, enabling consumers to discover WiMAX services on their own and driving usage of broadband services through different business models (such as subscriptions or ad hoc network access). Add to that other services and applications that are targeted at specific customer segments, and WiMAX operators could experience a significant uptick in adoption and ARPU levels and ensure that they are transformed into providers of smart networks rather than dumb pipes.

- **Optimize RF network to fully exploit the benefits of WiMAX.**

  The operators we interviewed talked about their need to attract more subscribers, to deliver higher data speeds and services with QoS, and to expand their network coverage —geographically as well as in buildings, while deploying as few base transceiver stations (BTSs) as possible to minimize capital and maintenance expenditures. Advanced RF technologies such as beamforming and MIMO promise to expand the range and capacity of a BTS and deliver higher spectral efficiency and faster data speeds. With these technologies in place, operators are able to maximize asset utilization and deploy fewer BTSs for capex and ultimately opex savings. An operator in the Americas claims it was able to make do with about two-thirds as many BTSs as would have been needed if it had not adopted beamforming technology.

  Not all the operators we interviewed had these RF technologies in place, but in order to strengthen their geographic and indoor coverage and network capacity, all of them expressed their intent to deploy the technologies as soon as their vendors made them available.

- **Reducing the total cost of ownership to ensure price competitiveness: critical for WiMAX adoption**

  WiMAX business models are as much about innovative cost management as they are about driving revenue, particularly in this challenging economic environment. A lower cost base would allow operators to transfer savings to end users in the form of lower access prices, which are a key driver of service uptake worldwide, particularly in the residential market. The WiMAX network architecture is inherently cost-effective thanks to its flat, all-IP architecture, but there are further steps that can be taken to shave costs. WiMAX operators should minimize acquisition costs other than marketing and necessary channel expenses, build on any existing services and customer base, focus on

optimizing their third-party sales incentives, synchronize network expansion with subscriber revenue and customer demand in order to manage capex and opex, push technology optimization tools, and in the most aggressive of cases, outsource network operations entirely (**Exhibit 5**).

Exhibit 5: Strategies for capex and opex savings

Capex savings	Conduct thorough trials in own environment
	Fully understand equipment capabilities to develop realistic cost estimates and launch schedule
	Build as you need; take advantage of WiMAX's flexibility in network coverage and synchronize network expansion with demand
	Build vendor partnerships that share the risk
Opex savings	Simplify processes, products and services
	Minimize number of touches: employ self-provisioning tools, over-the-air refills
	Use indirect distribution channels with commissions based on usage
	Substantially reduce or entirely forgo subsidies

Source: Pyramid Research

Recommendations

There are some elements that are common to all successful broadband deployments:

- The most successful operators have not always been "first to market": they have been "best to market."

- Broadband product launches that happen before the network is ready and the coverage adequate often lead to a backlash from early adopters — those most likely to have higher ARPU profiles.

- Successful operators have not necessarily priced their broadband packages as the lowest on the market, but have focused instead on other value-added elements to add to their value proposition: from unlimited voice plans to higher throughput and quicker installations.

- End users are not interested in broadband in and of itself; rather, they are interested in the applications and services that broadband enables. Successful operators pay as much attention to the breadth and depth of their library of content and applications as they do to the quality and speed of their network.

- Successful operators work hand-in-hand with manufacturers to ensure that their customers get the most out of their user experience. Operators are even teaming with notebook makers like Hewlett-Packard and Lenovo to make PC-broadband bundles available to their clients.

- Wide-scale adoption of mobile broadband offerings goes hand in hand with the introduction of flat-rate pricing. Often voice becomes the value-added service, in the form of an all-you-can eat plan layered on top of a broadband offering. Users remain reluctant to sign up for pay-per-usage models.

About Pyramid Research

Pyramid Research (http://www.pyr.com) offers practical solutions to the complex demands our clients face in the global telecommunications, media and technology industries. Our analysis is uniquely positioned at the intersection of emerging markets, emerging technologies and emerging business models, powered by the bottom-up methodology of our market forecasts for more than 100 countries–a distinction that has remained unmatched for nearly 25 years. As the telecom research arm of the Light Reading Communications Network, Pyramid Research works with Heavy Reading, providing the communications industry's most comprehensive market data, trusted research and insightful technology analysis.

Contact

Email: info@pyr.com
Web: www.pyramidresearch.com

World headquarters
10 Canal Park
Cambridge, MA 02141
USA
Tel: +1 617 871 1900
Fax: +1 617 871 1933

Latin America
Waterford Business Park
5201 Blue Lagoon Drive
Suite 971 Miami, FL 33126
USA
Tel: +1 305 629 3615
Fax: +1 305 629 3100

Asia-Pacific
18/F — Caroline Center
Lee Gardens Two
28 Yun Ping Road
Causeway Bay, Hong Kong
Tel +852 2516 1329
Fax +852 2856 2907

Europe
UBM, Ludgate House
245 Blackfriars Road
London, SE1 9UY
United Kingdom
Tel: +44 20 7560 4471
Fax: +44 20 7560 4485