Upcoming 3G/WiMAX Auctions to Trigger a Broadband Access Revolution in Latin America

HIGHLIGHTS

In 2009, Pyramid Research expects 3G or WiMAX auctions to take place in Argentina, Brazil, Chile, Mexico, Peru and Venezuela. We believe these spectrum auctions are essential stepping stones for the further development of broadband in the region and will contribute to the overall growth in broadband subscription penetration, fixed and 3G mobile combined, from 9% at year-end 2008 to 70% at year-end 2014.

Regulators are hoping that the award of additional spectrum — by injecting competition into the market — will help address certain key inhibitors to adoption, such as the limited reach of existing broadband networks and the region’s current high price for broadband connectivity.

In markets where the auctions impose no restrictions on incumbents or current frequency holders, we expect to see existing mobile players compete against existing fixed and pay-TV players trying to gain a foothold in the mobile market. In markets where restrictions have been established, we may see the entry of players new to the region.

We believe the greatest impact of the new players will come from the response that they will elicit from existing, larger market players: Lower prices, wider network reach and innovation through new services and applications.
Introduction

Fixed broadband penetration in Latin America, which stood at 5.0% at year-end 2008, is significantly below the global average of 6.5%. The region’s 3G mobile penetration, at 3.4%, also ranks well below the global average of 7.8%, giving Latin America one of the lowest overall broadband penetration rates worldwide (see Exhibit 1). Understanding the link between broadband adoption and economic development, governments throughout Latin America have made the deployment of broadband a central theme of their political agendas. One such initiative is aimed at improving access to computing devices. Governments in Brazil, Colombia, Mexico, Peru and Uruguay have embraced the “one laptop per child” program, which has led to the distribution of more than 400,000 laptops across Latin America. They have also pursued, alone or in concert with private entities, initiatives such as Argentina’s educ.ar proniño, País Digital and Fundación Telmex, all of which are aimed at closing the digital divide. Despite these various efforts, overall connectivity, particularly wireless broadband connectivity, remains low in the region.

Exhibit 1: Broadband penetration of total population, by region, 2008

Pyramid Research has long maintained that for a broadband market to develop fully, there must be parallel advancements in three key areas: Devices, applications and access networks. Without further enhancements to Latin America’s underdeveloped last-mile networks, the government initiatives around computing devices and applications will be met with only limited success. Understanding this and the limitations inherent in wired technologies, regulators throughout Latin America, which have been slow to push forward initiatives aimed at enhancing last-mile connectivity, are now looking to accelerate the award of broadband spectrum, specifically for WiMAX and 3G, in order to close the connectivity gap. Through these awards, Latin American regulators hope to inject additional competition into the market that will in
turn reduce prices, extend coverage to underserved areas and make more bandwidth capacity available for the introduction of robust Internet applications.

In 2009, Pyramid Research expects 3G or WiMAX auctions to take place in Argentina, Brazil, Chile, Mexico, Peru and Venezuela. **We believe these spectrum auctions are essential stepping stones for the further development of broadband in the region and will contribute to the overall growth in broadband subscription penetration, fixed and 3G mobile combined, from 9% at year-end 2008 to 70% at year-end 2014.**

This Telecom Insider analyzes the impact of the upcoming spectrum auctions on the competitive environment of markets in Latin America and the expansion of broadband services in Latin America, identifying some of the opportunities that will open for industry players and subscribers. The report includes case studies examining three markets in more detail: Chile, Brazil and Mexico.
WiMAX and 3G spectrum awards in Latin America

Broadband development in Latin America faces several key challenges, including low per-capita incomes, worsening economic conditions in certain markets, low PC and mobile computing penetration levels, limited reach of existing broadband networks and comparatively high prices for services (see Exhibit 2). Although some inhibitors are difficult to address in the short term, regulators are hoping that the award of additional spectrum — by injecting competition into the market — will help address certain key inhibitors, such as the limited reach of existing broadband networks and the region’s current high price for broadband connectivity.

Exhibit 2: Average price of fixed broadband connections, by region, 2009

<table>
<thead>
<tr>
<th>Region</th>
<th>Average monthly fixed broadband fee (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Europe</td>
<td>$39</td>
</tr>
<tr>
<td>North America</td>
<td>$37</td>
</tr>
<tr>
<td>Latin America</td>
<td>$28</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>$28</td>
</tr>
<tr>
<td>Africa &amp; Middle East</td>
<td>$25</td>
</tr>
<tr>
<td>Central &amp; Eastern Europe</td>
<td>$25</td>
</tr>
</tbody>
</table>

Source: Pyramid Research, Fixed Communications Forecasts, Q1 2009

A. Latin American regulators move to award 3G and WiMAX spectrum, finally

Latin America’s fixed broadband penetration, at 5.0%, is 30% below the global average, but ahead of Asia-Pacific and Africa & the Middle East, which stood at 4.3% and 1.6% respectively. Pyramid Research projects that the number of Latin American terrestrial broadband net additions, which have been steadily increasing, will begin to flatten in 2009-2010, averaging 8.5m per year. This is due to a combination of factors, including the economic situation currently affecting the region and its impact on the purchasing power of middle-income households (which are next in line to subscribe to broadband services); poor-quality networks in outlying areas; and the start of fixed-to-mobile substitution in the broadband space. By 2014, we believe, fixed broadband penetration of population will be 13%, versus 14% for narrowband, leaving limited room for additional growth through terrestrial access platforms.
Given some of the above limitations of terrestrial networks, growth in broadband will ultimately have to come from wireless or mobile platforms. Recognizing this, governments in other regions moved aggressively several years ago to award 3G and WiMAX spectrum, explaining why the same regions that lag Latin America from a fixed broadband penetration perspective are ahead of it in terms of mobile broadband penetration. Latin American regulators are now trying to do some catching up, while raising some much-needed funds, and have scheduled dozens of spectrum auctions in the 800MHz, 1.7GHz, 1.9GHz, 2.1GHz, 2.3GHz, 2.5GHz, 3.4GHz and 3.5GHz bands per the schedule outlined in Exhibit 3.

Exhibit 3: Timeline for spectrum auctions in Latin America, 2009

B. One of the main objectives of the auctions is to promote competition by bringing in new players

Latin America ranks as one of the least competitive telecom regions globally, with two operating consortia — Telmex/América Móvil and Telefónica — controlling 62% of the region’s 600m fixed and mobile access lines (see Exhibit 4). Both of these operators have invested heavily in their broadband deployments and have launched innovative bundling and subscription computing programs in order to offset declines in the fixed narrowband subscriber base and drive further broadband adoption. Nevertheless, there are limits to what two operators can do, particularly when their primary interest remains, rightly so, a positive return on their hefty investments.
Regulators have undertaken several rounds of frequency auctions in an effort to inject the market with additional competition. Either through direct participation or through acquisitions, much of the spectrum that regulators have awarded has ended up in the hands of the region’s two main operators. As an example, Telmex and its international spinoff Telmex International hold WiMAX licenses in some of Latin America’s largest markets, including Argentina, Brazil, Chile, Ecuador, Mexico and Peru.

In an attempt to encourage the entry of new players in the market through upcoming 3G and WiMAX auctions, regulators in Venezuela, Chile and Mexico are establishing strict limits on incumbents or current frequency holders. Colombian regulators are also considering certain exclusions, but have yet to reach a resolution. Limitations range from explicitly prohibiting certain players from participating to establishing spectrum caps or setting coverage requirements that would be less appealing to larger players (see Exhibit 5). These types of limitations encourage participation by new market entrants in two ways. First, when deep-pocketed and powerful market players are locked out, more companies are able to participate in the process, potentially at a lower cost. Second, these limitations enable new entrants to face incumbents with one less weapon in their arsenal, making the challenge less daunting and the requisite investment less risky.
<table>
<thead>
<tr>
<th>Country</th>
<th>Frequency</th>
<th>Players excluded</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venezuela</td>
<td>1.7GHz (3G)</td>
<td>Movistar, Movilnet</td>
<td>Venezuela’s two largest mobile service providers, Movistar and Movilnet, are excluded from participating in 3G auctions expected in Q4 2009. This opens the market for third player Digitel as well as new players such as China Telecom that are interested in Venezuela’s 3G licenses.</td>
</tr>
<tr>
<td>Chile</td>
<td>1.7-2.1GHz (3G), 2.3-2.5GHz (WiMAX)</td>
<td>Movistar, Claro, Entel PCS</td>
<td>Regulators have established a cap on the total spectrum held by operators at 60MHz, preventing companies such as Movistar, Claro and Entel, which all hold 60MHz of spectrum, from participating. We expect current MVNO permit holders (more than 10 at last count) and pay-TV operators to be the main beneficiaries of these restrictions.</td>
</tr>
<tr>
<td>Mexico</td>
<td>3.4GHz, 3.7GHz (WiMAX)</td>
<td>No operator is explicitly excluded, although rules make it less attractive for incumbents to participate.</td>
<td>Mexican regulators have established strict coverage requirements at the municipal level, aimed to dissuade larger players and encourage the emergence of smaller, municipality-based players that fill the holes left by the larger, nationally focused players.</td>
</tr>
</tbody>
</table>

Source: Regulators, Pyramid Research (2009)

In markets where there are no restrictions, we expect to see existing mobile players compete against existing fixed and pay-TV players trying to gain a foothold in the mobile market. In markets where restrictions have been established, we may see the entry of players new to the region, including China Telecom, which has expressed interest in auctions in Chile and Argentina, and Vodafone, which has expressed interest in participating in the Chilean contest (see Exhibit 6).
### Exhibit 6: Potential auction participants, by country

<table>
<thead>
<tr>
<th>Country</th>
<th>Likely participants</th>
</tr>
</thead>
</table>
| Argentina | Nextel — existing mobile operator (using iDEN technology)  
Grupo Clarín — media/pay-TV operator  
China Telecom — new market entrant  
Claro — existing mobile operator  
Movistar — existing mobile operator |
| Brazil | Telefónica — existing fixed operator  
Oi — existing fixed and mobile operator  
GVT — existing fixed operator (niche player)  
CTBC — existing fixed operator (niche player) |
| Chile | Nextel — existing mobile operator (niche player)  
VTR — existing pay-TV and broadband operator  
Telsur — existing fixed operator (niche player)  
Vodafone — new market entrant |
| Mexico | Nextel — existing mobile operator employing iDEN technology  
Telcel — existing mobile operator  
Movistar — existing mobile operator  
Cablevisión/Televisa — existing pay-TV player  
Axtel — existing competitive fixed operator  
T-Mobile — new market entrant |
| Peru | China Telecom — new market entrant |
| Venezuela | Digitel — existing mobile operator (niche player) |

*Source: Pyramid Research (2009)*

### C. New broadband subscriptions will largely be mobile — provided that auctions move forward as planned

The impact of new players will come less from their direct contribution to overall line buildouts — in fact, we expect most new entrants to remain niche players with single-digit market shares throughout the next five years. Rather, we believe the greatest impact of the new players will come from the response that they will elicit from existing, larger market players. By introducing services targeting new geographies and new customer segments, and potentially stealing customers away from larger market players, we expect the new entrants to force existing operators to lower prices (either directly or through bundles), to extend their network reach and to innovate with new services and applications. The result will be an expansion of Latin America’s broadband subscriber base (including fixed and 3G subscriptions) from 48m at year-end 2008 to 426m at year-end 2014, a compound annual growth rate of 44% (see Exhibit 7). Pyramid Research expects a full 87% of broadband net additions to come from mobile platforms, either 3G or WiMAX. Failure to move swiftly toward the award of 3G and WiMAX spectrum will put these projections at risk.
From a geographical perspective, we expect more than half of all net additions of fixed broadband and 3G mobile service to come in Brazil and Mexico, and 85% of net additions to come in the region’s seven largest markets (see Exhibit 8).

**Exhibit 8: Fixed broadband and 3G net subscription additions by country, 2008-2014: 378m**

Source: Pyramid Research Fixed Communications Forecasts, Latin America, Q1 2009, Pyramid Research Mobile Data Forecasts, Latin America, Q1 2009
CASE STUDY: Chile

Although small in size, Chile remains an important market in Latin America as a result of its technological leadership in the region. It was the first market in Latin America to see a commercial deployment of 3G and one of the first to move toward commercial bundling of broadband and pay-TV services. As of year-end 2008, more than 97% of the country’s population lived within the coverage area of a 3G mobile network. It is thus no surprise that its fixed broadband and 3G penetration rates — 9.2% and 8.5% respectively — are almost twice the Latin American averages.

Chile has also long been considered one of the most competitive markets in Latin America, being among the first to liberalize its telecom sector and masterminding the division of the government-owned incumbent network into local and long-distance units to ensure that no single player enjoyed near-monopoly status. Nevertheless, like other telecommunications markets in the region, Chile’s is becoming increasingly concentrated. In the mobile sector specifically, two players — Entel PCS and Movistar — account for 80% of all subscriptions. In addition, market growth rates are declining. Pyramid Research projects that telecommunications service revenue will grow only 4% in 2009, compared with 12% in 2008. It is within this context that Chile’s telecom regulator, Subtel, is looking to jump-start market growth by introducing new players, specifically new wireless broadband operators. To that end, it has freed spectrum in four distinct bands, 1.7GHz, 2.1GHz, 2.3GHz and 2.5GHz, that are suitable for WiMAX and 3G. Concerned that the spectrum would end up in the hands of existing players, thereby limiting the entry of new competitors, the regulators decided to cap spectrum holdings at 60MHz. Although the auction rules do not explicitly forbid the participation of existing operators, the fact that Entel PCS, Claro and Movistar hold 60MHz, 55MHz and 55MHz of spectrum respectively does effectively eliminate them from participation.

We expect the first of these auctions, in the 1.7GHz and 2.1GHz bands for 3G, to take place in April 2009. WiMAX auctions in the 2.3GHz and 2.5GHz bands will most likely follow in the second half of the year. There is enough spectrum for up to four operators, so we expect participation from a wide variety of players. Niche mobile operator Nextel, which has struggled for years to penetrate the Chilean market, ranks high on our list of companies likely to bid for 3G spectrum. Fixed local operator Telsur, which currently provides service to a small number of mobile subscriptions through an MVNO arrangement, is also a likely participant, as is leading cable operator VTR. Both of these players will seek to add spectrum to enhance their multiplay offerings and more effectively compete against Entel and Telefónica. Vodafone, which entered into a strategic agreement with Entel Chile in May 2008 to sell Vodafone-branded services and applications in Chile, is also looking at the upcoming 3G spectrum auction as a means of gaining a more direct foothold in the Latin American market, which is noticeably absent in Vodafone’s global portfolio.

In Chile, as elsewhere, we do not expect market entrants to win a substantial number of subscriptions. In fact, we expect the combined market shares of the top three mobile players — Entel PCS, Movistar and Claro — to decline only from 99.2% to 95.8% through 2014, less than four percentage points. We do, however, expect new entrants to act as catalysts for further market growth: Total fixed broadband and 3G subscriptions will grow from a combined 2.9m at year-end 2008 to 16.0m at year-end 2014, a compound annual growth rate of 33% (see Exhibit 9).
CASE STUDY: Brazil

Brazil is Latin America’s largest telecommunications market, with 150m mobile subscriptions and 53m fixed and broadband connections at the end of 2008. It is also, arguably, the most competitive, with the mobile market rather evenly split between four large competitors and the fixed market characterized by two large incumbents and numerous smaller players, following the merger of Brasil Telecom and Telemar/Oi. Despite attempts by the regulator, Anatel, to infuse the market with competition by establishing separate operating regions and limiting the scope of expansion for existing players, penetration rates in Brazil remain well below those of other, less developed markets in the region. Mobile penetration reached 79% of the population at year-end 2008, well below the rates found in Argentina (110%), Chile (95%), El Salvador (101%), Guatemala (85%), Colombia (91%) and Venezuela (100%).

Given the financial challenges faced by several operators in the face of regulatory decisions aimed at increasing competitive pressures, the regulator is now looking to arm existing players with additional tools to improve their performance and Brazil’s overall connectivity levels. One such tool is the award of frequency spectrum. In late 2007, Anatel undertook 3G licensing for the first time through an auction process. One of the consequences of this was the addition of 30m subscriptions in 2008: In a year when other markets started seeing a drop in net additions, Brazil saw net additions climb 41%. In fact, Brazilian operators added more than 42% of the region’s total 72m net additions in 2008. Pleased with these results, regulators are now looking to award additional spectrum in the 1.9GHz and 2.1GHz bands for 3G and in the 3.4GHz band for WiMAX — not only to continue increasing connectivity levels, but also to extend access to outlying areas. We expect the WiMAX licensing process to take place in May 2009, with several blocks of 25MHz being awarded, and 3G licensing to take place before the end of 2009.
Although the regulator has also assessed the impact of awarding spectrum in the 450MHz and 2.5GHz bands, Pyramid Research does not expect Anatel to move forward with the award of spectrum in these bands before 2010.

Unlike Chile’s Subtel, Anatel does not have as its main objective to foster competition as a means of increasing connectivity levels. Rather, understanding that competitive pressures are alive and well in Brazil, it is aiming instead to increase connectivity levels by making more capacity available to existing players. As a result, in what may be considered a break from the past given Anatel’s history, it is not imposing any restrictions on participation. We therefore expect most if not all spectrum blocks put up for auction to end up in the hands of existing mobile players or competing fixed players like Telmex (with its subsidiaries Embratel and NET Serviços) or GVT. Given the already intense competition in Brazil, we do not expect new players to enter through the upcoming spectrum awards.

Because of the auction process, Pyramid Research expects fixed broadband and 3G broadband adoption rates to rise significantly in Brazil throughout the forecast period. Total fixed broadband and mobile 3G subscriptions will climb from a combined 13.9m at year-end 2008 to 145m at year-end 2014, a compound annual growth rate of 48% (see Exhibit 10).

### Exhibit 10: Fixed broadband and 3G subscriptions in Brazil, 2005-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Fixed broadband</th>
<th>3G mobile service</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>50</td>
<td>0</td>
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<tr>
<td>2010</td>
<td>60</td>
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<tr>
<td>2011</td>
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<tr>
<td>2012</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>90</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Pyramid Research Fixed Communications Forecasts, Latin America, Q1 2009, Pyramid Research Mobile Data Forecasts, Latin America, Q1 2009

**CASE STUDY: Mexico**

Mexico is Latin America’s second largest telecommunications market, accounting for roughly one-fifth of the region’s revenue total. Like Brazil, the market remains underpenetrated in comparison with its peers: It had a mobile subscription penetration rate of 73% of the population at year-end 2008, compared with the Latin America average of 81%. Unlike Brazil, however, the Mexican market is highly concentrated, with Telcel and Telmex combined...
accounting for nearly three-fourths of Mexico’s total telecommunications service revenue. Competing players have struggled to make much of a dent in either operator’s position.

In an effort to boost overall penetration levels, the Mexican Ministry of Communications published in 2008 a spectrum auctions program, which it is planning to put into place in 2009. The program essentially allocates spectrum in several bands, including the 1.7GHz, 2.1GHz, 1.9GHz, 3.4GHz and 3.7GHz bands, for the use of mobile broadband (3G) and WiMAX services. Despite the regulator’s desire to see new players enter the market through the upcoming auctions, it has not established explicit rules preventing existing operators from participating, nor has it established restrictions on participation as it did in previous auctions, when it required existing players to wait a predetermined time before deploying their networks in order to give new players a head start. We expect most 3G and PCS spectrum in the 1.7GHz, 2.1GHz and 1.9GHz bands to end up in the hands of existing mobile operators — Telcel, Movistar, Nextel — which will leverage additional spectrum to accelerate 3G deployments and extend their network capacity in more areas. Other potential participants may include Cablevisión/Televisa, a leading player in the pay-TV space in Mexico, and Axtel, Telmex’s main rival in the fixed space. An outside contender is T-Mobile, which would seek to extend its presence in the Americas from just the US market to neighboring Mexico. More likely we will see new entrants come in through the WiMAX auction process. Given that the regulator has allocated WiMAX spectrum in the 3.4GHz and 3.7GHz bands on a regional and municipal basis, we may see new niche players entering the market through more affordable regional or municipal licenses rather than nationwide licenses. The government has even suggested that smaller players entering through these regional or municipal auctions may have increased access to government financing.

Even though Pyramid Research does not expect a major transformation in Mexico’s competitive landscape as a result of these auctions, we do believe the additional capacity obtained by existing operators will fuel broadband expansion in Mexico, helping the country catch up with its peers by the end of the forecast period. Should cable operators or Axtel gain access to additional spectrum, this will also put more competitive pressure on incumbent fixed operator Telmex, which currently lacks a mobile offering in its portfolio. We expect total fixed broadband and mobile 3G subscriptions to climb from a combined 10.3m at year-end 2008 to 85.3m at year-end 2014, a compound annual growth rate of 42% (see Exhibit 11).
Exhibit 11: Fixed broadband and 3G subscriptions in Mexico, 2005-2014

Source: Pyramid Research Latin America Fixed Communications Forecasts, Q1 2009, Latin America Mobile Data Forecasts, Q1 2009
Conclusions

Key findings

- There remains a significant connectivity gap in Latin America, with overall fixed and mobile broadband penetration rates that are well below the global averages.

- As a result, broadband access has become a priority for all governments in Latin America. Aware of the significant connectivity gap, most regulatory bodies in Latin America are looking to award 3G and WiMAX licenses in 2009.

- Although several governments are hoping to use the upcoming spectrum auctions to increase competitive pressures in their markets, thereby extending coverage to outlying areas and reducing prices, Pyramid Research maintains that most of the spectrum will end up in the hands of existing players.

- These spectrum auctions will have a significant impact on the adoption of mobile broadband services in their respective countries and will increase penetration by means of fostering competition. Overall broadband connections — fixed and 3G — will increase from 48m at year-end 2008 to 426m at year-end 2014. A full 87% of all broadband net additions will come from mobile platforms (3G or WiMAX).

Recommendations

- **Existing fixed and pay-TV players** — Leveraging upcoming spectrum auctions is an effective way of moving closer to full triple- and quadruple-play bundles, which will be essential to remaining competitive over the long term.

- **New entrants** — Assess current levels of both penetration and competition when deciding to bid for spectrum. A market like Mexico may seem attractive given penetration levels well below the regional average, but poses significant challenges given the concentration of the market in the hands of two players.

- **Vendors** — Numerous opportunities for equipment contracts will emerge across Latin America in the coming months. We believe most opportunities will be capacity expansion opportunities versus greenfield opportunities. Nevertheless, look to existing pay-TV and fixed operators absent from the mobile space for potential new clients.
**Related resources**

**Recent reports from Pyramid Research**

**Mobile Broadband Computing Services: Complement or Substitute for Fixed Broadband?**
Research Report published March 2009
This report examines mobile broadband services enabled by 3G and WiMAX networks on a global, regional and market-by-market basis, focusing on service plans offered for computing devices (mainly netbooks, laptops and MIDs). It assesses the positioning of mobile broadband relative to fixed alternatives, helping to identify the best strategies for both developed and emerging markets. Built on extensive case studies, the report provides a five-year outlook on mobile broadband computing trends, including subscriber numbers, penetration levels and revenue expectations.

**Latin America Mobile Data Forecasts, Q1 2009**
Forecasts published March 2009
Updated on a quarterly basis, our Mobile Data Forecast products provide complete pictures of demand trends for 18 geographical markets in Latin America. The Excel output includes five years of historical data and five years of market projections for metrics such as penetration, mobile subscriptions (by type of package, by operator or MVNO and by network technology), users of specific data services (SMS, music, etc.), MOU, ARPS (by operator, by subscription type, by service, by application) and revenue (by messaging and non-messaging applications). The Forecasts are based on extensive field research and use a consistent methodology, aiming to capture the total spending on mobile data services in each market.

**Latin America Fixed Communications Demand, Q1 2009**
Forecasts published March 2009
Updated on a quarterly basis, our Fixed Communications Forecast products provide a complete picture of wireline voice and data communications in each of 19 Latin American markets. The Excel output includes five years of historical data and five years of market projections for metrics such as demographics and economic trends, penetration of broadband and narrowband lines, Internet users, business users, voice telephony lines, VoIP, PCs, IPTV and revenue. We believe our Fixed Communications Forecasts are superior because they capture granular data gathered through extensive field research and use a thorough methodology consistently applied to all markets.

**Mobile Advertising in Emerging Markets: Market Trends and Strategies for the Third Screen**
Research Report published February 2009
Leading operators are pushing a variety of advertising methods, from sponsored messaging and alert services to more sophisticated content over mobile portals, and mobile advertising will markedly boost mobile data service revenue. This report looks at mobile advertising initiatives and the revenue potential in emerging markets, with a particular emphasis on Brazil, China, India, Indonesia, Mexico, Romania, Russia, South Africa and Turkey. We also put our findings in context by making comparisons with global trends and developed markets, such as the US and UK.

**Communications Markets in Brazil**
*Country Intelligence Report published February 2009*
Total telecom revenue in Brazil in 2008 reached $55.8bn, up $7.4bn from 2007 fueled by mobile penetration jumping to 79%. Data services also made a significant contribution to growth. Both fixed and mobile voice revenue will decline, however. This Country Intelligence Report analyzes Brazil’s communications, media and technology industries, including key trends, regulatory pressures and the competitive landscape, making it an excellent complement to our Forecast products.

**Global Fixed and Mobile Broadband Outlook: The Transformation of Networks, Business Models and Growth Opportunities**
*Research Report published December 2008*
This 79-page Report delivers Pyramid Research’s global projections of fixed and mobile broadband adoption and revenue trends, identifying the best practices, broadband technologies, services and markets that will drive future growth. It also examines the evolution of fixed and mobile broadband business models, convergence services and the role of IMS, with a focus on winning strategies for the three pillars of this new applications-focused framework — access, content and devices.

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