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Red Compartida: The Largest Telecommunications Project in the History of Mexico

Investment Analysis and Opportunity Framework

The Shared Network (Red Compartida, in Spanish) is the first Public-Private Partnership in the world to adopt the Open Procurement Data Standard (EDCA), a model promoted by the World Bank to provide information on all stages of a public contest, from planning to its implementation.

The Red Compartida network will be “wholesale only” which means that the company, the builder and the one who operates the network, will not be a provider of mobile services, they will provide other mobile operators access to the network who will then to provide consumer mobile services.

The advantage of a wholesale only network is that many new players can enter the Mexican consumer market at once. The cost of building a mobile network is prohibitive and requires billions of dollars in capital outlay. By providing the infrastructure through a wholesale only network, the cost of offering a new consumer service to Mexican customers will be significantly reduced.

The Mexican Government expects that the construction of the wholesale network, and the resulting entry of new providers to the Mexican market, will generate 13 billion dollars of Foreign Direct Investment over a three-year period. If the network gets fully deployed, we believe the dollars will be significantly greater.

Mexcap has done an evaluation of the opportunities and challenges in the telecommunications market in Mexico and presents in finding in the following report.

About Mexcap and Red Compartida

Mexcap is a Dallas based company focused on redeploying capital received from the sale of XC Networks and providing consulting services to entities who want access to their expertise and experience of its former executives.

The professionals at Mexcap (Tom Spackman, Arturo Bedolla and Harish Raman) have just completed a consulting engagement for Black and Veatch, one of the largest and most respected telecom infrastructure and engineering companies in the world. We have acted as Black and Veatch’s proxy in Mexico as they are attempting to open new markets. The project included provision of personnel, technical, strategic and financial services to Rivada/Black & Veatch partnership, who are bidding trying to become the Mexican Government’s partner to deploy a 4G/5G Network.

This engagement has allowed us to gain deep expertise and understanding of **all** aspects of the proposed “Red Compartida” project. Unfortunately, Rivada/Black & Veatch was not the successful bidder; however, the results of the auction are being challenges in the Federal Courts, both in the United States and Mexico¹.

¹ <http://www.irishtimes.com/business/technology/declan-ganley-to-sue-mexico-over-7bn-mobile-network-bid-1.2855123>)

We believe that the winner of the auction, Altán Redes, will prevail in court and will begin building the network in the coming months. This will be a new wholesale player offering 4G/5G services with 90 MHz in the 700 MHz frequency, selling capacity primarily to new operators which have no networks (MVNOs). For analogy purposes for those who live in Texas, think of this as a type of ONCOR electric delivery system but where to builder, owner and operator of the transmission system (wireless data) is prohibited (by law) from selling to the end user. It will be a massive infrastructure project as wholesale only next generation network which we value, including the value of the spectrum contributed by the government, at USD\$20B+ (Approx. \$400,000+ million Mexican Pesos)

This new project is considered the most important for the Mexican Telecommunications Reform and will be the base for the development and digital technology access for millions of Mexicans.

- 92.2% of the Mexican population will have access to the best communication technology.
- It will offer 4G (en route to 5G) mobile coverage to more than 100 million Mexicans.

Following the signing of the agreement between Altán and Promtel (Organismo Promotor de Inversiones en Telecomunicaciones²), a trust will be established to which it will provide 50 million dollars and the contribution of the guarantee of compliance, and in this way, the deployment of the Shared Network begins: start of operations is scheduled to be March 31, 2018. We think this date is aggressive.

Altán has stated that the model of Public-Private Partnership is considered as optimum in order to exploit an asset provided by the State, in this case the radio spectrum, but also requires a strong additional investment, which can only be addressed together with private initiative investment.

Borjón Figueroa, a PROMTEL executive, stated that this partnership will allow the deployment of a state-of-the-art shared Network, that will provide 4G coverage to over 100 million Mexicans.

The signing of the contract was carried out within the deadlines established in the Bases of the Competition, in addition Altán Redes will carry out the deployment that will commence its commercial operation no later than March 31, 2018.

The Shared Network will allow those who do not enjoy these services to join the digital world, it will increase competition, as there will be more companies offering telecommunication services, that will not have to deploy their own networks," said Ruiz Esparza head of SCT (Mexico's Secretary of Communications).

Initial estimates call for \$ 7 billion over the life of the project, and will greatly expand access to high-quality mobile Internet and telephony services at affordable prices. We think the amount of investment to deliver a fully deployed network could be a multiple of the initial estimates.

Next Generation Network and How the Network Will Get Deployed

The Shared Network is a wholesale-only wireless open access network where the Mexican Government is contributing the right to use 2 bands in the premium 700MHz spectrum (703-749MHz and 758-803MHz) and a 30,000km backbone fiber pair. The *Red Compartida* will sell capacity and services to its clients, which are the telecom providers, either to the ones who already have a network

² <https://www.promtel.gob.mx>

in Mexico (Mobile Network Operators –MNOs-such as AMX, AT&T and Telefonica – although again, only if they open their networks which we do not believe will happen in the near future) and to the ones who prefer to offer service without a network (MVNOs –Mobile Virtual Network Operators- or new “virtual” carrier marketing entrants) By 2023 the network should cover 92% of the population.

It will start in Mexico City, Monterrey and Guadalajara and then move next to Northern Mexico (the Border), Riviera Maya (Cancun) and Baja California (Cancun) and finally tertiary markets. Mexcap believes this deployment schedule offers an excellent opportunity in the border regions between the United States and Mexico.

There are two theories on building the network to meet the governments’ population coverage requirements:

- Build a skeleton network that meets the technical letter of the law on coverage, but a network that most likely will not be able to handle the traffic on the network. This solution costs less on CAPEX (Capital Expenditure, which are funds used to acquire or upgrade physical assets and it is often used to undertake new projects or investments), but could wreck the service model.
- Build a robust network able to handle gigabit level demand profiles. These costs significantly more but will maximize user experience on the network.

We believe there are three specific opportunities for Mexcap:

- Build support facilities (Fiber Networks, Data Centers, POPs and Towers) for these new networks. These facilities could be utilized by other carriers and/or for service to enterprise customers.
- Start a MVNO that sells and markets this new network. Target customers would be consumers and machine to machine applications.
- Provide consulting expertise and project management to operators, investors or governments involved to this project.

Marketing and Sale Strategy

Unlike traditional auction methods where federal governments auction spectrum to the highest cash bidder, in this case, the President of Mexico directed a tender whereby the government contributed spectrum to a joint venture and went looking for an operating partner. The other joint venture partner will be required to provide capital and expertise to run the network.

The Red Compartida which will be run, as previously mentioned, by Altán Redes, a multinational consortium formed by 4 groups of participants: strategic partners, financial investors, development institutions and local industrial partners. The sole strategic partner is the group Multitel, responsible for the management of the network. Multitel chairman, Eugenio Galdón, has substantial experience in large projects such as creating the first Spanish quad-play, which operates under ONO brand.

The financial investors own 65% of the participation, with a fund managed by Morgan Stanley Infrastructure having the biggest share (33% of participation). The development institutions group holds 27% and is comprised of the International Finance Corporation (IFC) and a fund it owns, called China Mexico Fund (CMF). Lastly, Megacable and Axtel as local industry partners, where each hold 4% of the total and do not participate on the board to avoid the antitrust limitations imposed by SCT. The Government wanted a brand new entrant and therefore prohibited existing carriers from participating in the tender.

Altán will sell services to MVNOs (Mobile Virtual Network Operators), MNOs (Mobile Network Operators, such as AMX, AT&T and Telefonica) and FNOs (Fixed Network Operators).. The shared

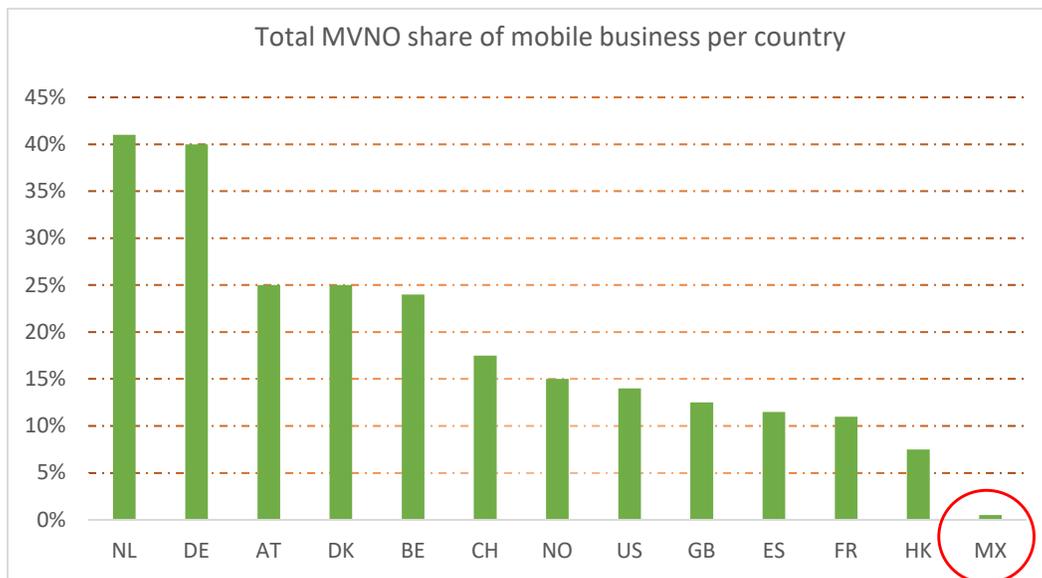
network is regulated mainly on prices, quality and how it is being managed. Altán also has obligations with the Mexican government, which will receive (1) 400M MXN annually; (2) 1% of the network's revenues; and (3) direct and indirect taxes.

A New Competitiveness Model for Mexico

MVNOs will be able to put competitive pressure on traditional carriers, forging a better competitive landscape. By allowing retailers to use its infrastructure, the project eliminates the entry barriers for new players and increases competition for the existing ones. In theory, the shared network will provide a free competitive market, and should enhance the sector performance.

The MVNOs' share is negligible in Mexico: since 2007, 14 MVNOs have entered the market, but they still hold less than 1% of mobile market share. The reason is that the Mobile Network Operators (AMX, AT&T and TEF) didn't have any incentive to cooperate with the virtual operators, as they are potential direct competitors; hence they made it less attractive for MVNOs to use their networks, by either charging high prices for network access or other anti-competitive practices. This is classic business behavior employed by incumbents for over 100 years. . The following graphic show how MVNOs have a lot of space to grow in Mexico.

Figure 1: Total MVNO share of mobile business per country



Source: IFT, McKinsey & Company, "Virtually Mobile: What drives MVNO success", June 2014, JP Morgan estimates

The virtual operators' outlook is much brighter with the shared network as Altán is not a Carrier and will not compete with the company renting their services as the consortium is not allowed to sell directly to the final customer. Instead, they have incentives to open access to existing and new entrants. We believe new technologies such as machine to machine communication (think smart car, etc.) will benefit from this new model and spur technology innovation on a massive and meaningful way.

On the other hand, mobile network operators have an opportunity to increase their capacity, as they will have easy access to the 700MHz spectrum, which is good for indoor penetration and higher

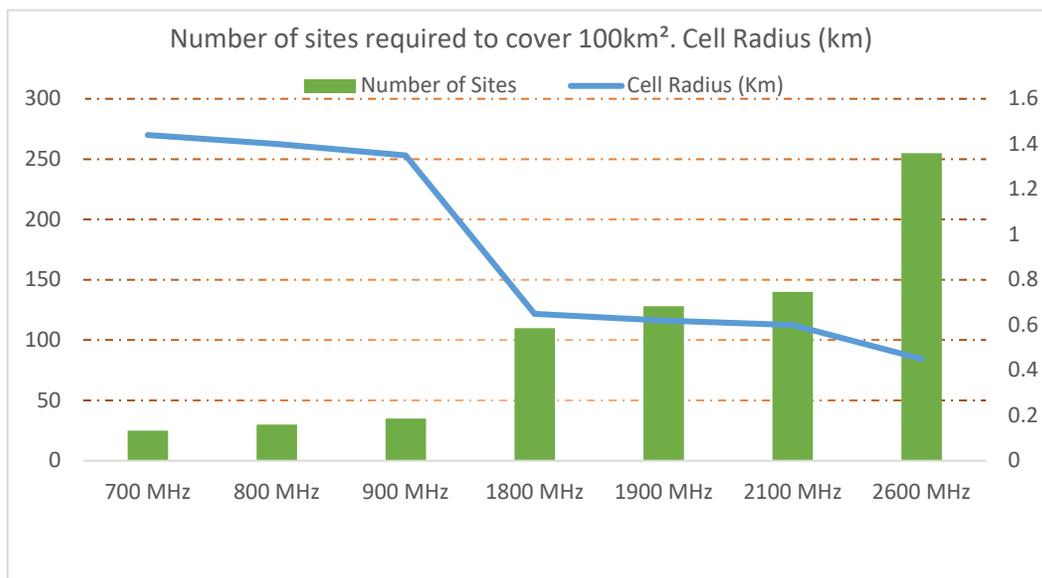
coverage ratio, allowing them to reach sparse areas with fewer towers. Herein lies one of the main problems. Existing MNO's will have to open access to their proprietary networks to gain access to Red Compartida which we believe they will be reluctant to do so.

Current Spectrum Ownership in Mexico

The government contributed a large block (90 MHz) at low frequency (700 MHz). We believe this is a competitive advantage to the shared network as it allows extremely high capacity service to users and reduces costs to a level that is attractive for carriers to serve regions neglected by traditional operators. The 700MHz spectrum has a superior propagation and in-building penetration, requiring fewer sites needed to cover the same area and theoretically less CapEx. The larger band blocks of 45MHz each make the spectrum more efficient. Altán will pay only \$20m for the spectrum, which is significantly less than other spectrum prices (\$220 m on average)

Now, Mexico has around 324MHz of operating spectrum available for telecommunications, with AMX holding the largest share with 41%, followed by AT&T's 39% share.

Figure 2 Number of sites required to cover 100 square KM (Cell Radius).



Source: IFT and JP Morgan estimates

Figure 3 Mexican total usable spectrum per band MHz.

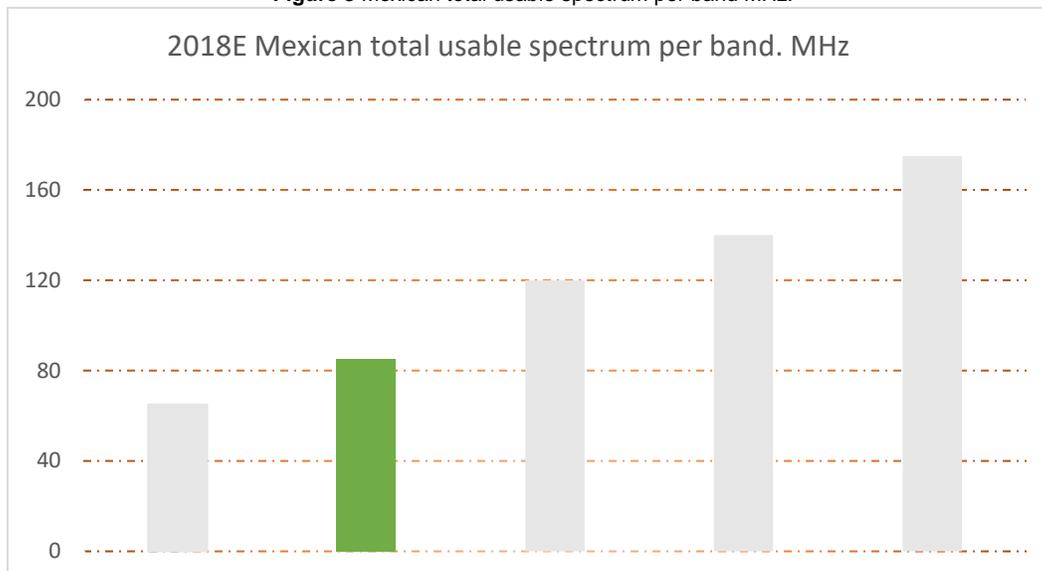
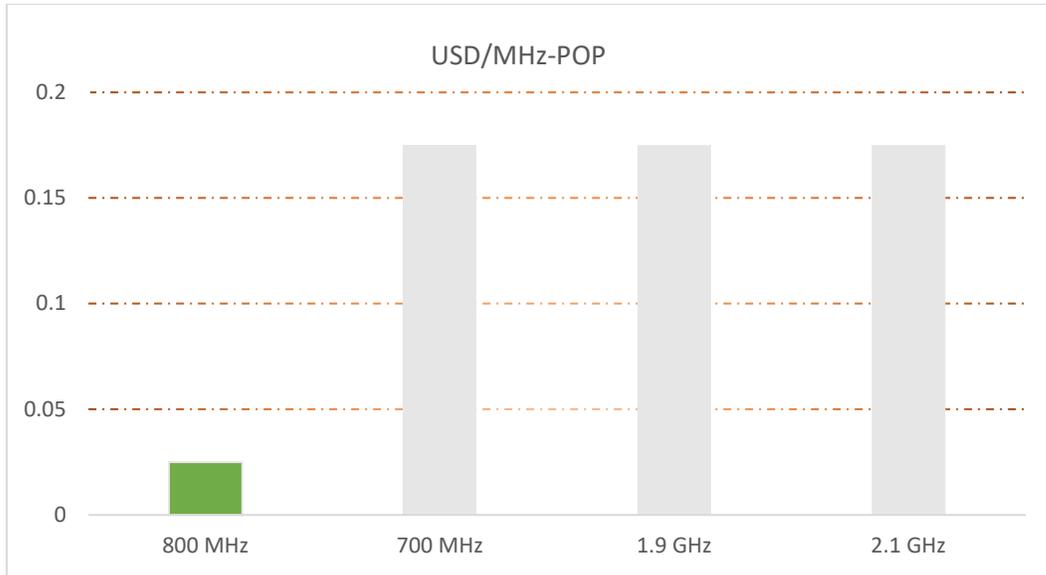
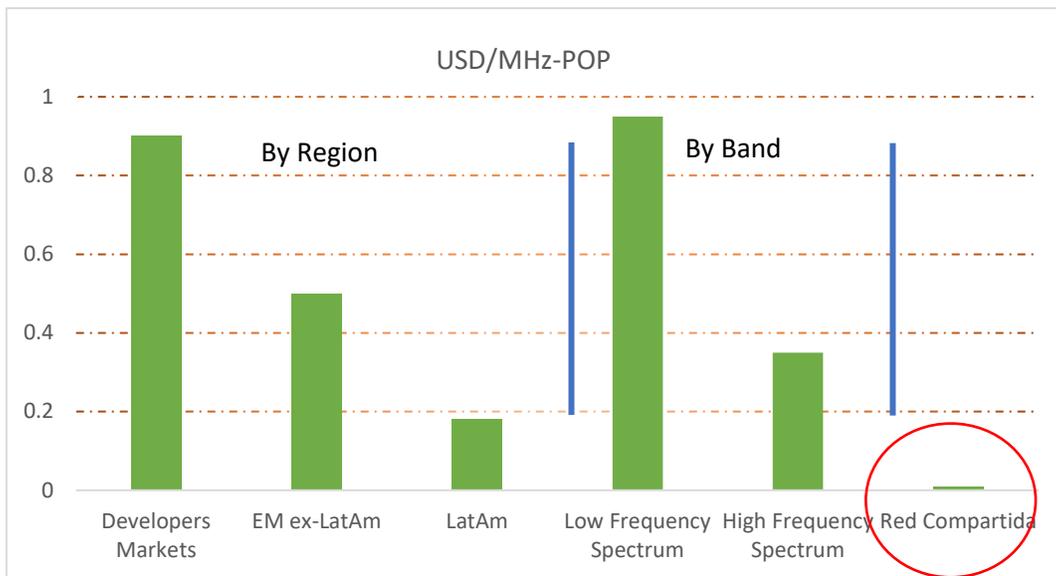


Figure 4 Red Compartida has the lowest cost among MX frequencies



Source: IFT and JP Morgan estimates

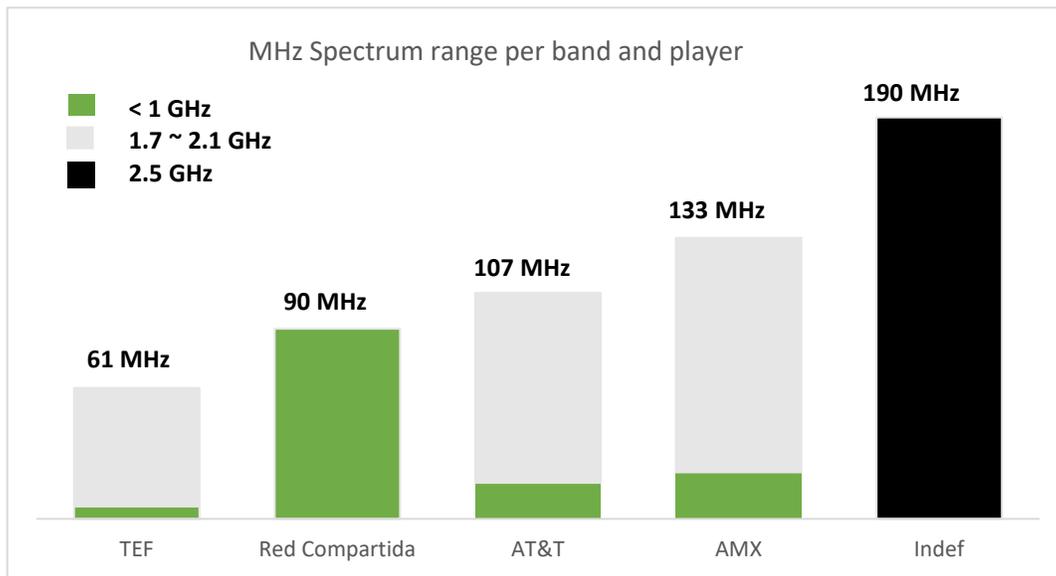
Figure 5 Red Compartida will have the cheapest 700 MHz Spectrum (USD/MHz-POP).



Source: Company Flings press releases and JP Morgan estimates

Red Compartida's spectrum holding of 90MHz is more than what AMX held in 2015, and remains more than what Movistar has today.

Figure 6: Red Compartida has the biggest share in sub 1GHz spectrum



Source: IFT and J.P. Morgan estimates. *Auction scheduled for 1Q17. ** Does not take into account iDen spectrum for AT&T

The shared network will add 90MHz to the existing spectrum base, happening simultaneously with the 2.5GHz auction, which is scheduled to take place in 1Q17 and will add a further 190MHz. If followed thoroughly, there will be around 600MHz of spectrum available in Mexico by 2018, and the 700MHz band will account for 15% of it. This shows the scale of the Red Compartida project.

Opportunities and Challenges for Competitors.

Telefónica

Red Compartida should be of particular interest to Telefónica, in our view, as TEF has a limited amount of sub 1 GHz spectrum, reaching only 25% of the population with this spectrum and 700 MHz which has a better indoor coverage. Moreover, Telefonica has not invested much in Mexico. In the last 3 years, TEF has been the company which has invested the least in Mexico, with only EUR 765m in the last 3 years, equivalent 16% of its Mexican revenues. The rumor on the street is that Telefonica would like to exit the Mexico market; however, given antitrust stance of the regulators we find it hard to believe that an existing provider could buy this network.

AT&T

Red Compartida already caught AT&T's attention. In a recent interview with El Economista, AT&T Mexico COO, Carlos Blanco, was quoted as saying that Red Compartida could be useful to continue the expansion of AT&T's network in some areas depending on the business conditions. The Red Compartida could also improve AT&T's indoor coverage in areas where AT&T does not have spectrum below 1 GHz (regions 1-4, which account for c. 25% of Mexican population).

Impact on AT&T and AMT³

AT&T could benefit as it would be able to access the sub 1GHz spectrum in the few areas in which

³ <http://www.americantower.com.mx/en/index.htm>

it currently does not have spectrum (c. 25% of population). AT&T will only be able to use the capacity on the Red Compartida's network unless they allow other carriers to access their network, we do not believe they will go for this trade. On the other hand, it may face additional competition from MVNO. With this analysis, we expect a limited but negative impact to AT&T long term. As for AMT, which currently has around 33% share of Mexican towers, we believe the impact is clearly positive, but perhaps not meaningful.

Moreover, AMT will benefit from AT&T in Mexico, on March 8th, 2017, "AT&T announced that it would invest about \$3 billion in Mexico by year end 2018. Jonathan Schildkraut of Evercore ISI noted the firm had been expected an aggressive investment cycle from AT&T following its Iusacell and Nextel Mexico acquisitions. "We estimate that American Tower has roughly 1/3 of the towers in Mexico and any incremental network buildout presents a material opportunity," Schildkraut wrote. " This investment by AT&T underscores our positive outlook for the region. In our June 1 Evercore ISI Telecom Newsletter "Mexican Plan to Boost Wireless Competition Could be Boon for Towers," we highlighted the Mexican government's plan for a wholesale network and the possible upside from a likely AT&T investment cycle. With AT&T committing to spending \$3 billion, we believe American Tower will benefit

The Red Compartida could lead to higher competition from MVNOs for AT&T in Mexico. AT&T has 10.7m subscribers at the end of 3Q16 in Mexico and we estimate the company will add ~2.5m subscribers a year long term. We could see slower growth if MVNOs gain traction utilizing the Red Compartida. However, we do not expect to see any substantial impact until the Red Compartida reaches the 70% coverage ratio milestone in 2020 and beyond.

We note that AT&T knew the shared network was coming, so there should be no changes to its strategic plan. Also, AT&T prefers to have network ownership economics, and prefers to grow via its MLA with America

MEGACABLE

Megacable, which participates with a non-voting 4% stake in the Altán consortium, will be able to offer mobile services through MVNOs, which allows them to offer quad-play services (TV, Internet, fixed and mobile). Televisa will also have the same ability, though it seems less interested as it did not commit any capital upfront, contrary to Megacable and Axtel.

TELESITES

Telesites, a holding company, established by a América Móvil in a spin-off, is a holding company focused on constructing, installing, maintaining, operating and marketing, directly or through its subsidiaries, various types of towers, other support structures, physical space for the location of towers, and non-electronic components, in each case used for the installation of wireless communication transmission equipment, as well as to providing other relevant services related directly or indirectly to the telecommunications sector⁴.

Telesites could be a main winner, as Altán could need more than 10,000 sites by 2021. To reduce investments, we expect most of the infrastructure, probably 80%, to be leased from the market leaders in Mexico: Telesites and AMT (American Towers).

AT&T's competition from MVNOs

AT&T has rapidly built out its LTE network in Mexico and signed an MLA with AMT to accelerate its

⁴ <https://www.sec.gov/Archives/edgar/data/1129137/000119312515394470/d76691d6k.htm>

deployment, which has led to weak demand for Telesites. While AT&T has completed the majority of its LTE deployment, the company does plan to grow from 74m LTE covered pops at the end of 3Q16 to 100m by YE18 (83% of Mexican population). AT&T reported 10.7m wireless subscribers at the end of 3Q16 in Mexico (743k adds in the quarter). We expect AT&T to end 2016 at 11.4m subs and end 2017 at 14.1m. AT&T had equipment on over 8,600 cell sites post acquisitions and we estimate that could utilize up to 10,000-12,000 sites by YE18 as it expands the coverage. In Mexico, we estimate the company has an average of 107 MHz of spectrum in the 800 MHz, AWS and PCS bands (excluding iDen).

Importantly, while AT&T's acquired prepaid customers could be at risk to MVNOs, we expect AT&T to focus much of its efforts going forward on building a high-quality network to appeal to higher end consumer and business wireless subscribers, which should be less impacted by MVNO competition. In addition, the company has a roaming advantage for Mexican subscribers that want to roam in the US, which MVNOs are unlikely to have at competitive rates. We believe Mexico will continue to be an attractive market for AT&T, despite the introduction of the Red Compartida.

Challenges for Red Compartida's Infrastructure Deployment.

Cellular companies are experiencing challenges to expand in the Mexican market and these challenges are expected to be addressed with the deployment of Red Compartida. Future growth potential is enormous for current players and for newcomers interested into gaining market share, increasing revenues and obtaining investment returns by modernizing and expanding networks and services.

The Mexican Government is addressing lack of regulation that inhibit carrier's deployment of new infrastructure to allow for aerial, underground and tower construction. Today there is poor coverage and many problems that impede customers full access to networks, such as timely site acquisitions, zoning and access to proper permits. Local authorities have administrative processes that differ from municipality to municipality. Many carriers are proceeding with networks deployments without proper permits in order to enable faster network growth and creating litigation issues with local authorities.

Existing available infrastructure provided by American Tower, Telesites and others could offer a partial solution but is often too expensive or inadequate to handle loads and capacity. Existing infrastructure belonging to the Electricity Federal Commission (CFE) infrastructure, that consists of conduits, low and medium voltage posts and towers will not offer a solution as most of that infrastructure is already maxed out in urban areas. The Mexican Government is in the process of releasing the data base of Federal Real Estate that can be used by carriers as telecom sites, but there are still many unknowns and governmental processes will add time deployment.

The Red Privada networks will also need satellite communications, licensed and unlicensed microwave backhaul and deep fiber networks. Parts of this infrastructure is available from existing Mexican carriers and will be a windfall for those who have existing fiber in the ground or on poles. However, a massive complex network must be engineered and built taking into account existing infrastructure, distance, capacity, and available bandwidth. We believe a key factor to deployment of the transport backbone and metropolitan radio access network will be Red Compartida's ability to negotiate dark fiber IRUs and capacity from existing carriers.

Red Compartida will be a wholesale network and must be designed and deployed to be fully redundant. We expect it will offer the best coverage and eventually become the most efficient, reliable, and fastest network in Mexico. To cover 92% of the population with minimum 1Meg up – 4Megs down as required by the regulator, the network will be deployed in dense urban, urban, suburban, "Pueblos Mágicos" and

highways. Unfortunately, this will result in most of the southern part of the country remaining with poor coverage and speeds...ironic given this was one of the stated goals of the project.

Another very important issue to resolve will be the coordination between Red Compartida and the USA government (FCC) for the interference and frequency coordination for the use of 700 MHz along the US Mexico border which will become an important infrastructure asset not only for commercial use but for National Security purposes, Public safety, civil protection, health and transportation. Mexcap has a deep expertise in the area and we see multiple business opportunities.

If Altan can finance this project and existing carriers do not conspire to block its deployment, Red Compartida will be Mexico's largest and most important technology initiative in its history. The network will provide Mexicans will next generation service, spur technology innovation to for years to come and create many new companies.

About Mexcap and its Principals

Mexcap is an entity focused on redeploying capital received from the sale of XC Networks and providing consulting services to entities who want access to their expertise and experience of its former executives. XC Networks was sold to Transtelco on November 16, 2013 in a transaction approaching \$100 million dollars that generated for its investors an annualized internal rate (IRR) of over 50% during the 13 years Tom and Arturo led the organization. Tom and Arturo signed 3 years non-compete agreements which expired last year.

XC was a communication provider with operations throughout the western United States and northern regions of the Republic of Mexico. We believed in facilities based approach to building our networks and whenever possible owned and controlled the network elements necessary to deliver service. To that end, XC Networks owned spectrum in the 10.5GHz and 23GHz frequency bands, acquired or built 50 communications centers both in the United States and Mexico and installed hundreds of kilometers on proprietary fiber including 6 international crossing. We connected border communities back to urban peering points. XC Networks' propriety facilities based infrastructure, coupled with its ownership of spectrum and fiber required to operate these networks, gave XC Networks a competitive advantage in the markets we served allowing us to deliver superior returns to our investors.

Thomas J. Spackman.

He is a Managing Director of Mexcap and the CEO of BCP Distributions, the liquidating entity of XC Networks. He is the founder and former Chairman and CEO of XC Networks, an international telecommunications firm specializing in high capacity fiber and wireless networks, data centers and towers.

While at XC Networks, Mr. Spackman led the strategic, financial, legal and regulatory functions of the organization. XC Networks holds multiple public network and spectrum concessions issued by the Mexican Secretary of Communication and Transportation which were acquired under Mr. Spackman's direction.

Mr. Spackman is a licensed attorney in the state of Texas and a member of the Federal Communications Bar. He has a long history of entrepreneurial ventures as an investor, lawyer and chief executive in the financial, real estate, oil and gas and telecommunication industries.

Arturo Bedolla.

He is a Managing Director of Mexcap. Prior to its sale in November of 2013, Mr. Bedolla was president of XC Networks where he led the operational, sales and technical functions of the organization, both in

the United States and Mexico.

Mr. Bedolla received his Telecomm Engineering Degree from Escuela Superior de Ingeniería Mecánica y Eléctrica along with degrees from Instituto de Investigaciones Eléctricas, IPADE and the Centro de Estudios Científicos y Tecnológicos. Mr. Bedolla was a delegate representing the Republic of Mexico at the 2007 ITU World Radio Conference providing technical expertise to the Secretary of Communications and Transportation and COFETEL.

Mr. Bedolla has 25 years of experience in the international telecommunications industry including leading the deployment, network design, operations and administration of wire line, wireless and satellite systems in the United States and Mexico.

Harish Raman.

He is a Managing Director of Mexcap. Mr. Raman received his MBA in Finance from Southern Methodist University Cox School of Business and obtained his Computer Science engineering degree from National Institute of Technology, Warangal, India.

Mr. Raman was Chief Financial Officer to XC Networks prior to its sale. Mr. Raman has extensive experience in financial advisory, merger and acquisitions, investment banking, corporate finance and technology management.

Mariana Via.

She has 10-year experience in the research and consulting industry. She worked for Accenture as a Strategy Analyst in the Mexican Market for eCommerce, Telecommunications and Banking. For Technology Forecasters (TFI), she was part of projects that involved collaboration with supply chain and engineering executives at OEM and EMS electronic companies in Mexico. While at TFI, she analyzed industry trends, manufacturing and engineering outsourcing strategies and conducted research studies on Nearshore Design and Electronic Manufacturing Services Industry.

She earned her undergraduate degree in Economics from Universidad Iberoamericana in Mexico City and holds a Master in Science Administration degree from Central Michigan University. She was named one of Mexico's "30 Most Promising in their 30's" in 2007 by CNN-Expansion, a leading magazine in Mexico. She is fluent in Spanish, English and French.

