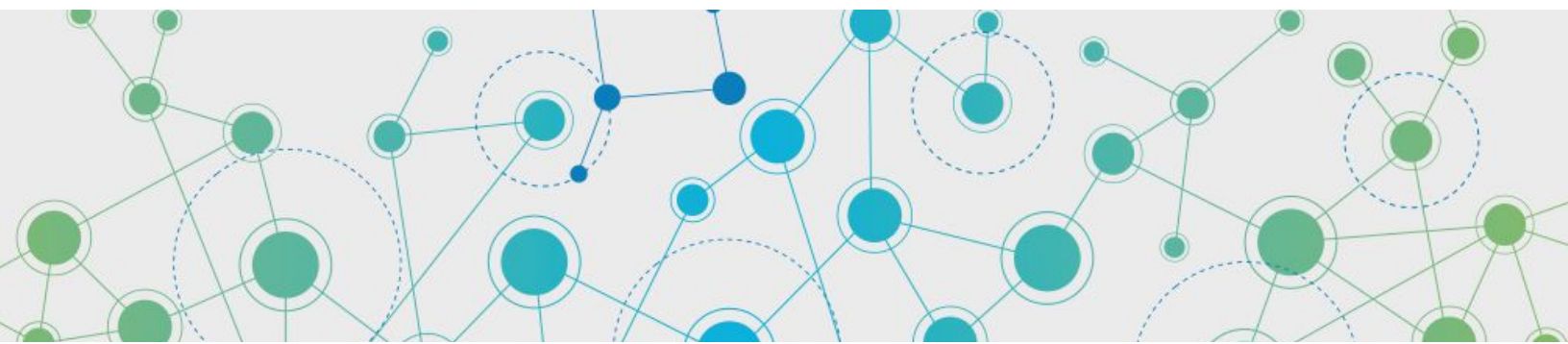




**758Z Inc.**

**Compendium for GAIA**

**Network Setup in Argentina**



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Argentina is a country that presents opportunities for GAIA to access primarily world-class soy and beef products with an adequate communications infrastructure and desirable geographic location. During the next three years communications infrastructure and services will increase in quality as the country continues to encourage foreign direct investment and improves its own fiber-optic networks.

## **Geography**

Argentina is located mostly in the southern half of [South America](#). It is bordered by [Chile](#) directly to the west, [Bolivia](#) and [Paraguay](#) to the north, [Brazil](#) to the northeast, [Uruguay](#) and the [South Atlantic Ocean](#) to the east, and has ocean access to the Atlantic and Pacific to the south. It consists of 2.7 million square kilometers spread between the southern Andes, the plains of the Pampas and an elongated coastline that spans the subtropics in the north to the sub-Antarctic tip of the south. It is the eighth largest country in the world by land area, and second only to Brazil in Latin America. The largest river by length and discharge is the Parana, which connects the major urban area of Rosario and Buenos Aires. It has the fourth largest population in the region, with almost 44 million people. The country is subdivided into 23 provinces and one autonomous city, Buenos Aires, which is the federal capital of the nation. The provinces and the capital have their own constitutions but exist under a federal system.

## **History**

Spanish navigators arrived by 1500, and in 1526 Sebastián Cabot named Rio de la Plata. Even though the Spanish navigators largely did not find wealth, they claimed the territory for the Spanish king. During 300 years, Argentina, as well as most of South America, was a Spanish

territory. Thousands of Spanish settlers arrived to build forts, ports and mines. They founded the capital city of Buenos Aires. The Spanish integrated Argentina into their system by establishing the Vice Royalty of Rio de la Plata in and Buenos Aires became a flourishing port. In 1806 British forces attempted an invasion, but it failed. That boosted the confidence of the colonists who sought independence from Spain. Buenos Aires formally declared independence from Spain on July 9, 1816.

### **Politics**

Argentina is a republican democracy. It's legislature consists of a 7-member Chamber of Deputies, directly elected for a four-year term, and a 72-seat Senate serving a six-year term. Three senators are elected from each state, two from the leading party and one from the runner-up, and one third of the Senate stands for reelection every two years. The executive branch consists of a president, who is elected for a four-year term and may remain in power for one further consecutive term. He is also the head of state and commander-in-chief of the armed forces. There currently exists a fair amount of stability in the political system. The Cambiemos party won a sweeping victory in mid-term congressional elections, held in October 2017. The party won in 13 of Argentina's 23 provinces, including the five biggest population areas, strengthening the position of the current president, Mauricio Macri, as he seeks to complete his pro-market reforms. Macri is expected to run for re-election in 2019.

### **Economy**

Although Argentina is one of South America's largest economies, its recent economic history cannot be described as certain. It had severe boom-and-bust cycles during its history and in 2001 a decade-long recession culminated in near-total economic collapse. More than half the

population lived in poverty as a result. This directly led to civil unrest, and it was not until 2003 that some recovery began, although populist government policies have not been helpful. Since that time Argentina has remained in the class of “developing country” even though it is a member of the G-20 largest global economies. High levels of inflation and corruption are endemic problems that hinder economic stability and growth. Yet since 2015 and subsequent austerity policy development, there are reasons to be optimistic as the economy displays authentic signs of stability. The inflation index has dropped from 41.4% in 2014 to a projected 21.6% in 2017 (Appendix A). Further, the Central Bank of Argentina forecasts increases in national reserves, as well as overall GDP growth through 2021 (Appendix A). While there has been some quarterly contractions during 2018, there was an actual GDP growth for 2017 of 2.9%. Finally its country risk has dropped substantially in recent years, from 10.7% in 2013 to 3.6% in 2017 (Appendix A). Although the Argentine peso has dropped up to 52% in value versus the U.S. dollar in 2018, it actually presents a good opportunity since Argentine natural resources are then potentially less expensive. The drop has already improved a trade surplus with Brazil, one factor in lessening the problems caused by currency instability.

## **Legal Foundations**

Argentina’s telecoms sector is regulated by the National Entity for Communications (Ente Nacional de Comunicaciones, ENACOM). The supervisory organization describes itself as ‘an autonomous and decentralized entity’ that works within the scope of the Ministry of Communications (Ministerio de Comunicaciones, MinCom). ENACOM was formed via the merger of the Federal ICT Authority (Autoridad Federal de Tecnologías de la Información y las Comunicaciones, AFTIC) and the Federal Authority of Audiovisual Communication Services

(Autoridad Federal de Servicios de Comunicacion Audiovisual, AFSCA. This represented one of the first actions by President Mauricio Macri, upon entering office in November 2015. The formation of ENACOM was ratified by Decree 267/15, which was passed on 29 December 2015. AFTIC itself was created in December 2014, replacing the National Communications Commission (Comision Nacional de Comunicaciones, CNC) and the Ministry of Communications (Secretaria de Comunicaciones, SeCom). The CNC was founded in 1996 as a result of the merger of the National Telecommunications Commission (Comision Nacional de Telecomunicaciones, CNT) and the National Post and Telegraph Commission (Comision Nacional de Correos y Telegrafos, CNCT). There is generally a cohesive government decision making body and process that GAIA and partners can appeal to in order to ensure their communications needs are met.

### **Regulatory and Legal Environment**

Deregulation and "demonopolization" of Argentina's telephone service began in 1989 with the privatization of the state-owned monopoly, ENTel. The market was divided between two companies, Telecom and Telefónica, which have been in charge of the fundamental phone network and basic telephone service in, respectively, the Central-North and Central-South regions of the country. These companies were allowed to hold a monopoly in these markets until November of 2000, when the Telecommunications Act of 2000 went into effect. However, even before that time, certain deregulation measures were put in place, such as allowing users to choose (albeit, between Telefónica and Telecom), their long distance carrier. The companies were required to invest heavily, pledging to meet certain quality standards and service expansion goals. This serves as healthy basis for peering in Wide Area Networks (WANs). During that



period, both companies invested more than \$5 billion each in infrastructure. One of the most significant outcomes of the deregulation is the drastic reduction of the prices of access to the public network: from \$2.15 cents to \$1.1 cents per minute.

Argentina's Congress approved a new regulatory framework for the telecommunications sector known as Digital Argentina on December 16, 2014. The most important new piece of this regulatory framework is that it allows telephone companies to offer audiovisual communication services. This was previously prohibited under the bidding for telephone companies issued in 1990 when the state-run telephony firm ENTel was privatized and under the Audiovisual Communication Services Law, which was passed in 2009. In addition to this new framework, which has been characterized as favoring the creation of a convergent market, the formation of a new regulatory authority was approved and net neutrality and conditions of service and competition for licensees in the sector were established. The object of regulation of the new law is the communications transportation infrastructure. It covers telephone networks, broadband connections and cable TV. The bill does not regulate content and established "net neutrality," which means non-discrimination of any type of content.

The new regulatory framework replaces the old telecommunications law that had been in place since 1972 and accompanies the bidding process for the use of the 4G spectrum in mobile telephony. The promise of incorporating convergence in the regulation is new given that the current Audiovisual Communication Services Law was repeatedly criticized for failing to address the digital changes in the audiovisual sector and their relationship to the Internet and telecommunications. The four most important points of the law are : the application and

oversight authority, a definition of the type of service, regulations and “linkages,” and net neutrality. The law delegates a great deal of decision-making power on the orientation of the telecommunications policy to the application authority (AFTIC) without mentioning its objectives, missions or functions. It also defines the market segment that handles distribution as a “public service in competition” and the rest of the services (such as mobile telephony) as of “public interest.” The new law revisits earlier regulation of the interconnection and interoperability of networks assures the creation of linkages between telephony and audiovisual communications. Finally, the law establishes a narrow definition of net neutrality, and even reserves a limit on it for reasons of national security.

### **Challenges and Opportunities**

The Argentine telecommunications sector generally possesses adequate modern technology. However, it also presents a concentration of ownership of telephony and internet services, a significant delay in technological deployment and quality of services, and high rates. It is important to understand to what degree the new regulatory framework can benefit or hinder GAIA. The ambiguity in the wording and discretion that the law grants to the application authority (regulators), can yield both positive and negative results. If GAIA gains local partners that have a comparative advantage in agricultural products as well as understand how to establish and maintain in-country telecommunication networks, it would be a decisive positive action. In regard to concentration, regulatory policy does not seem to affect the dominant positions of current operators. Telecom and other firms are actually being encouraged to enter audiovisual (television) markets. These changes have led to public comment that concentration benefits



current telecommunications companies, particularly Telefónica, as opposed to giving rise to healthy competition. However, it is not clear whether or not only Telefónica would benefit greatly from recent laws given that telephony companies are subject to a more competitive environment in their market base. In addition, in the case of Telefónica, the entry into convergent markets would still be difficult. In regard to quality of service and rates, the new regulatory framework generated greater conditions for competition and could thus be of long term benefit for GAIA and its partners. However, the regulations the government sets out for the law are key for the short term. The actions of the business sector at large, is also generally slow to make the investments necessary to expand infrastructure (such as BNs and necessary measures to improve points of presence on WANs) that would improve the provision of services.

## **Market Competition**

There are three areas in which competition exists in the telecom and Internet market in Argentina: wireless, broadband and wireline. The implications for management are that GAIA may be able to negotiate the best deal for a Buenos Aires provider, yet in the future work with one dominant carrier in the Pampas and other regions for any possible WAN needs.

### **(1) Wireless**

Argentina has four active Mobile Network operators (MNOs) namely - America Movil (AM)-backed Claro, Telefonica unit Movistar, Telecom Personal (a subsidiary of fixed line incumbent Telecom Argentina) and Nextel Argentina. Nextel Argentina merged with Cablevision Holding in 2018, and while the company is mostly into broadband, they are likely to go forward with mobile consolidation as well. The subscriber share is divided between three - Claro (36.6%), Movistar (31.9%) and Personal (30.7%), however there is considerable

competition and these percentages are relatively fluid. The Argentinian Mobile Virtual Network Operator (MVNO) market remains underdeveloped, despite proactive measures from the regulatory authorities. Small coops of firms who do not own the network infrastructure are slowly gaining traction and are an option in some areas. Other licensees of note include: Buenos Aires-based cableco TeleCentro (May 2016), domestic media firm Teledifusora (April 2017), regional cooperative representative Camara de Cooperativas de Telecomunicaciones (Catel – December 2017) and small-scale cable operator Supercanal (January 2018). Catel expected to launch over the Movistar network in 1Q18, but none of the other would-be MVNOs have disclosed concrete launch plans.

## **(2) Broadband**

In contrast to the saturated wireless market, there remains room for growth in Argentina's still developing fixed broadband sector, which boasted an estimated 7.7 million connections as of 30 September 2017 – equivalent to a household penetration rate of roughly 57%. The maintenance of status of being one of the larger economies in Latin America, the country remains well ahead of the curve in the regional broadband rankings; and stood at approximately 43% at the end of 3Q17. Nine-year monopolies on the provision of fixed line services in the south (TdA) and north (Telecom) of Argentina, respectively, both sharing responsibility for Buenos Aires, ended the exclusivity in November 1999. At this point TdA was permitted to expand north, whilst its main rival headed south, marking the beginning of market liberalisation. Although the pair introduced ADSL connectivity in 2001, their respective spheres of influence waned over time, as Cablevision asserted itself and capitalised on its pay-TV business and faster download speeds.

Despite the backing of Latin American powerhouse America Movil (AM), Telmex

Argentina (Claro) has historically struggled to compete with its broadband rivals, and only turned a corner in September 2011, with the deployment of fiber-to-the-home (FTTH) infrastructure. During January 2018 Claro's network covered selected parts of Buenos Aires, Mendoza and Salta, and supported downlink transmission speeds of up to 50Mbps.

Additional players of note include Buenos Aires-based cableco TeleCentro, which offers the country's fastest download speeds via its 1Gbps service, launched in Buenos Aires in November 2017. Nextel Argentina provides legacy digital trunking wireless services using a packet-based integrated digital enhanced network (iDEN) platform, supplied by Motorola, to provide basic voice services, push-to-talk (PTT) and mobile messaging to a mainly corporate user base. It launched services in the 800MHz band in June 1998 and has since expanded its iDEN network. Telecom Personal, a subsidiary of fixed line incumbent Telecom Argentina, is a nationwide provider of GSM-based wireless services. Like its parent, Telecom Personal was initially restricted to operating in the north of the country, where it launched mobile services over an analogue AMPS network in the 1900MHz frequency band in 1996. Telefonica Moviles is the Argentine wireless business of Spanish mobile giant Telefonica. The modern incarnation of the company was formed in January 2005 when Telefonica acquired CDMA operator Movicom BellSouth (Argentina), as part of its USD5.85 billion takeover of ten of Bell South's Latin American subsidiaries. Claro Argentina, formerly known as CTI Movil, was formed from three Argentine companies – CTIHoldings, CTI Interior and CTI PCS – which were collectively owned by Mexican group. Until March 2008 Claro Argentina, along with related operations Claro Paraguay and Claro Uruguay, went under the CTI banner, but were renamed by AM to bring all under the Claro brand already employed in its other Latin American operations. The

company was originally owned by US telco Verizon Communications (formerly GTE), which decided to exit Argentina following the 2001-2002 economic crisis.

### **(3 )Wireline**

To operate as a Telecommunications Company in Argentina, a company must hold a license. There are 496 Basic Telephony Services and Local Telephony Services licenses issued. These licenses can be held by three operator types. The first type of operator is called the Prestadores Historicos or historical incumbents. The only two historical incumbents are Telecom Argentina and Telefonica de Argentina (TdA). The second type of operator is Operadores Independientes or local telecom co-operatives. The nature of co-operatives are legally defined as social economy enterprises rather than market-oriented enterprises. The final type of operator is called the Prestadores Entrantes or commercial telcos. Both the commercial telcos and local telecoms co-operatives are smaller, regional players who have little impact on the broader market and thus are not a major consideration in our recommendation. Many of these current license holders have never launched a commercial endeavor.

TdA and Telecom remain as the dominant residential wireline voice service providers collectively having an 80% share of the country's total PSTN lines. TdA offers prepaid calling cards, and a long-distance plan. They usually bundle their services. They claim to have 4.2 million fixed lines in service. Telecom holds nationwide, non-expiring, non-exclusive licenses for local, domestic long-distance, and international telephony. It's Public Switched Telephone Network is digital. They claim to have 3.8 million fixed lines in service. Another player that has recently entered using fiber solutions is America Movil. However, coops are strongest in remote or low-income regions because the historical incumbents feel there is little profit to be made

from there. Therefore, when choosing a wireline service, it is better to choose from a historically dominant player when setting up initial offices in a more populous areas. This same player will probably have decent infrastructure in rural areas as well, and any expansion can serve as a basis of renegotiating contracts and rates, perhaps using coops and telcos as leverage.

### **Overview of internet and telecom services providers**

Argentina has the highest mobile phone user penetration rate in Latin America.. About 73 percent of the population in Argentina is forecast to use a mobile phone by 2019. This means the number of mobile phone users in Argentina is projected to grow from 30 million in 2014 to nearly 33 million in 2019. The use of mobile internet is also forecast to increase in the coming years. The mobile phone internet user penetration rate in Argentina has passed the 50 percent mark for the first time in 2015, as nearly 55 percent of mobile users accessed the internet through their mobile devices that year. This rate is projected to jump to 75 percent in 2019, showing a promising and growing market for mobile/wireless service providers in the country and thus would have a positive impact on GAIA's telecommunications outlook.

### **Telecom**

Argentina is the most robust and developed market in South America with 3 operators and 61.9 million mobile connections. As of September 2017 the country's 62.075 million wireless subscribers equated to a population penetration rate of 141% – notably higher than the regional average of around 108% at the same date. Given the saturated market conditions, recent growth has remained muted in recent years, and 2014 (-0.4%) and 2015 (-0.5%) both witnessed a contraction in terms of user numbers. 2016 saw a return to growth, with subscriber figures

edging up 1.0% as the widespread availability of 4G LTE technology (see below) spurred growth, but the first nine months of 2017 saw the market contract by around 750,000 subscribers. Argentina is currently home to four active mobile network operators (MNOs): America Movil (AM)-backed Claro, Telefonica unit Movistar, Telecom Personal (a subsidiary of fixed line incumbent Telecom Argentina) and Nextel Argentina. The latter is owned by Cablevision Holding, which merged with Telecom Argentina on 1 January 2018. While the tie-up is most significant in terms of the scope for future broadband and pay-TV synergies, mobile consolidation seems increasingly likely going forward.

With less than six subscriber market share percentage points separating the big three – Claro (36.6%), Movistar (31.9%) and Personal (30.7%) – at the end of September 2017 the trio remain closely matched, and, as such, Claro's position on top remains vulnerable. In June 2016 Nextel agreed to acquire five wireless broadband operators for a total of \$138.2 million, acquiring substantial 900MHz and 2.5GHz spectrum holdings in the process. Although the National Entity for Communications (Ente Nacional de Comunicaciones, ENACOM) duly granted Nextel permission to become the country's fourth LTE provider in February 2017, its expansion plans were put on hold due to its parent company's reorganization and merger, remaining unclear as of January 2018.

After a multi-band spectrum auction in October 2014 Personal and Movistar wasted little time in utilizing their new spectrum, switching on their respective LTE networks in December 2014 within a matter of days of one another. Personal launched its network in the cities of Buenos Aires, Cordoba and Rosario on 22 December 2014, and its network covered 1,040 towns and cities at end-January 2018, stretching from La Quiaca, a small city in the north of the province of

Jujuy, opposite Bolivia, down to Ushuaia, the capital of Tierra del Fuego, which is commonly regarded as the southernmost city in the world. In addition, 4G carrier aggregation (CA) connectivity using the 1700MHz and 700MHz bands is said to be available to 63% of the population. For its part, Movistar's 4G network comprised 4,000 BTS across 23 provincial capitals, Buenos Aires and more than 650 additional locations at the same date, although its LTE-A deployment has been far less aggressive, and covered just two locations. Elsewhere, Claro launched 4G on a commercial basis in June 2015. Coverage was available in Buenos Aires, Mendoza, Cordoba and Rosario from launch, and now covers around 45% of the population.

## **Internet**

In contrast to the saturated wireless market, there remains room for growth in Argentina's still developing fixed broadband sector, which boasted an estimated 7.697 million connections at 30 September 2017 – equivalent to a household penetration rate of roughly 57%. Appropriate for its status as one of the larger economies in Latin America, the country remains well ahead of the curve in regional broadband rankings; at the end of 3Q17 the Latin America and Caribbean regional average stood at approximately 43%. The broadband market has been very competitive for many years between fixed line incumbents Telefonica de Argentina (TdA) and Telecom Argentina, and cable giant Cablevision. However, 1 January 2018 saw the formal merger between Telecom and Cablevision take place, in a move spearheaded by the companies' mutual shareholder, Grupo Fintech. The move was designed to help facilitate Telecom's long-awaited move into the pay-TV segment.



The two fixed line operators originally held nine-year monopolies on the provision of fixed line services in the south (TdA) and north (Telecom) of Argentina, respectively (with both sharing responsibility for the capital Buenos Aires), but exclusivity ended in November 1999, at which point TdA was permitted to expand north, while Telecom moved south. The pair introduced ADSL connectivity in 2001, but their respective spheres of influence waned over time, as Cablevision asserted itself and capitalized on its pay-TV business and faster download speeds. Despite the backing of Latin American powerhouse America Movil (AM), Telmex Argentina (Claro) has historically struggled to compete with its broadband rivals, and only turned a corner in September 2011, with the deployment of fiber-to-the-home (FTTH) infrastructure. At the time of writing (January 2018) Claro's network covered selected parts of Buenos Aires, Mendoza and Salta, and supported downlink transmission speeds of up to 50Mbps. Additional players of note include Buenos Aires-based cableco TeleCentro, which offers the country's fastest download speeds via its 1Gbps service, launched in Buenos Aires in November 2017. Elsewhere, cableco Supercanal Arlink is poised to overhaul its legacy HFC networks with fiber in an effort to improve its competitive position and potentially negotiate a sale. As far as future developments, both TeleCentro and Supercanal are likely to represent logical acquisition targets for Claro, which risks falling further behind Telecom/Cablevision and Telefonica as they both push towards potentially profitable multi-play product bundling.

### **Feasible Locations**

There are a few prime locations for feasible supplier outsourcing based on the fact that the most immediate profitable imports by GAIA will be soybean, corn, wheat, barley, sunflower, sorghum, peanuts and cattle. These can be processed either in the U.S. or to a lesser degree in

Argentina for store brand foods, available in the SUPER GAIA stores (modelled after Super Wal-Mart and Target grocery sections). The partners best positioned in the country and region are Cargill for crop resources and Rioplatense for animal resources. Each has offices in Buenos Aires as well as supply chains that reach into the Buenos Aires and Pampas regions.

The reason that agricultural goods are an excellent initial investment is that Argentina is one of the main crop and cattle producing and exporting nations in the world. Agriculture makes up 54% of Argentina's exports. The country has experienced drought in recent years, thus it may not be ideal for a primary supplier in the near future but merits the development of business ties. Argentina is rich in natural resources, and other raw materials could represent excellent investments in the future if the correct relationships and communications are established. Likely sectors are industrial goods (31% of total exports), crude oil, which is about 818,000 barrels per day, and coal. GAIA should initiate contacts with producers of agricultural commodities (ie. Cargill) and meat (Rioplatense) in Argentina which would enable them to reduce costs on the imports for this particular segment of their business. As these are major players in the export business, GAIA stands to gain a large amount of knowledge through business dealings with these entities.

### **Recommendation for Central Location : Buenos Aires**

The importance of Buenos Aires, the country's chief port and the largest in South America, is related to Argentina's overwhelming dependence on the production and export of agricultural commodities. Buenos Aires is the country's chief point of consumption, processing, and shipping. The city has a varied economy, unlike other regions, which helps it maintain a degree of stability despite the inflation that has often plagued the entire country.

GAIA's suppliers for crops and meat will be Cargill and Rioplatense respectively. Both of these firms have headquarters in Buenos Aires and have a few of their manufacturing plants and slaughter houses in the same city, which could fit GAIA's initial needs. The fact that Buenos Aires is the legal and regulatory center of the country is helpful in terms of telecommunications infrastructure as well as establishing valuable contacts.

### **Recommendation for an Extended Area of Operations : Pampas region**

The Pampas will be the primary region of concern for GAIA beyond the capital city. This is because it is where the majority of agriculture, cattle raising and industry that is beneficial to GAIA takes place and its geographic location enables a relatively easy widening of any supply chain. The lowland has well developed roads and infrastructure as well as river Paraná which is a primary source for shipping and riverine operations. It also provides a base to other areas of secondary interest such as the larger Provincia de Buenos Aires, where are located Cargill port terminals such as Puerto Bahía Blanca and Puerto Diamante. The deployment telecommunications coverage in the area is generally good with an expected further infrastructure investment of \$6.8 billion by the major telecommunications companies by 2021. Mobile reliability is important as it may well be the primary way of communicating with agricultural suppliers in rural areas for status updates. Because of adequate peering, it is only necessary to select a mobile provider for Buenos Aires city. If another office is established GAIA should consider one of the major mobile providers or possibly a MVNO coop if they can be competitive in terms of cost and reliability.

### **Network Structure**

- One building for office purposes

- 3 floors; Floors consist of central cubicle area and exterior offices pre-wired to wiring closet on each floor.
- IT data center will be located on 2nd floor
- 6 LANs with 2 LANs on each floor
- Conduit between floors
- One router which networks together multiple Wi-Fi access points over Ethernet cabling
- Data and voice networks needed
- User count per floor is more than 10
- Needs of the network: File sharing, email and browsing, secure network to maintain secrecy
- Wiring closets will have stackable gigabit ethernet switches

The office which oversees operations which take place between suppliers and GAIA's office will have **50 employees**. Each of the employees in the office have a device which will link the network. They need to perform the process online to follow GAIA's instructions.

### **Recommendation for Service Provider**

Out of the three major players, Claro, Movistar and Telecom Personal, we recommend initial negotiations with Telecom Personal. Telecom Personal's parent company, Telecom Argentina financials for the previous five years boast of growing profits and therefore indicate stability. The firm has the most depth of experience and is in the best position to maintain reliability and speed in their telecommunications network. They can also provide such services

at a reasonable cost. We will judge cost starting with the average U.S. business cost of \$360- a month. This is relatively low and assumes the use of packet switching, as well as the use of fiber technology. This will fit GAIA's initial needs and doesn't preclude future negotiations for increasingly inexpensive Ethernet. Fiber is a good "middle of the road" option that provides quality communications at a reasonable price. We are negotiating from a position of strength because of the relative weakness of the Argentine peso versus the U.S. dollar and the relative competitive parity in market share between Movistar, and Claro. If GAIA can't arrive at an appropriate price with Telecom Argentina it can negotiate with one of its rivals. An assessment of strengths, weaknesses, opportunities and threats by using Argentina Telecom follows:

<u><i>Strengths</i></u>	<u><i>Weakness</i></u>
<ul style="list-style-type: none"> <li>• Covering a wide area of 19 different locations in Buenos Aires</li> <li>• Wide range of band spectrum for 3G use in Buenos Aires metropolitan area from 830.25MHz-834 MHz/875.25MHz-879MHz</li> <li>• Lines available for 4G+ network is more than all other service providers</li> <li>• Received a loan of \$400m from International Finance Corp. to expand and upgrade it's 4G network</li> </ul>	<ul style="list-style-type: none"> <li>• Declining stock price trend</li> <li>• Decreasing subscribers from 19,529,000 → 18,631,000 in the past year</li> </ul>

<u><i>Opportunity</i></u>	<u><i>Threat</i></u>
<ul style="list-style-type: none"> <li>• Achievable download transmission speeds of up to 10Gbps</li> <li>• Investing in national fiber optics network</li> </ul>	<ul style="list-style-type: none"> <li>• New and better technologies being adopted by Personal's key competitors in the industry</li> <li>• Change in regulations</li> </ul>

## Security

GAIA data can be compromised by information theft (confidentiality), sabotage (integrity), or a natural disaster such as a tornado (availability). When preparing a threat scenario, we name the impact area, describe the threat, explain the consequence (violation of confidentiality, integrity or availability), and estimate likelihoods of threats happening (high, medium, or low).

We first examine the potential impact areas for GAIA. The most crucial impact area for GAIA would be productivity. A compromised network would lead to delays and miscommunication causing operating costs to go up. This would require a high priority to fix. Reputation would be the second most crucial aspect for GAIA. If suppliers start to understand that it is difficult to contact this new office, they might choose to work with a different company. Reputation would have a medium priority.

The next part of risk assessment is inventory. The hardware components that would be needed are file servers, client computers, and a router that connects all the LANs. File servers are needed to keep important documents. Client computers are needed for all employees to work

efficiently. The circuit components would be the LANs, BN, and internet access circuits. For software, there may be an ERP application for GAIA in order to manage business transactions and employee data. Organizational data may be stored in a SQL database since it is a standard for relational database management systems.

In the next part of risk assessment, threats are identified and its interactions with assets are outlined. The five threats below were considered in conjunction with establishing a new office. These threats are only a subset of all the threats that may exist. The most outstanding threat is a cyber attack (SecurityFirst, 2018). With the rise of automation, cyber attacks have become more frequent. Cyber attacks include viruses and worms. Viruses and worms are malicious programs designed to infect and destroy crucial data and render networks inoperable. Once either viruses or worms are activated, they will automatically spread. It is imperative that IT professionals keep software up to date for both end-user systems as well as core system computers. Users must also be trained to avoid human engineering attacks such as phishing which may cause employees to unwarily download viruses and worms. The proper way to guard against cyber attacks is to use defense-in-depth. This includes using antivirus software, authentication and password security, biometrics, demilitarized zones, encryption, firewalls, password hashing, logging and auditing, multi-factor authentication, virtual private network, vulnerability scanners. For Ransomware attacks, it is also nice to have a backup in case your data becomes compromised. The consequences of cyber attacks in the case of the establishment of an office in Argentina is very detrimental. Data corruption or breaches in data integrity can have a significant financial impact by increasing the operational cost of the business.



Another important threat is a DDOS attack (SecurityFirst, 2018). One component of the DDOS attack is called the Botnet. Botnets are powerful networks composed of remotely controlled compromised machines called Zombies that are used to launch a massive attack. They can be used to launch a Distributed Denial of Service attack (DDOS) making a network so busy that they cannot process legitimate requests. Each bot would operate at low frequency to avoid detection but as a group, would be devastatingly large. To guard against DDOS attacks, it is imperative to keep organizational machines from becoming botnet Zombies by also using antivirus software, regular OS updates, and cooperatively working with ISP, system software vendors, and law enforcement agencies to prevent outsiders from overloading your infrastructure. Early detection is crucial to protecting business operations. Firewalls can give more control over web traffic. The consequences of DDOS attacks are also a significant threat towards the office network as they directly attack the circuits. Once the threat encroaches on availability and the network is down, becoming too busy to support operational needs, the setback will cause heavy financial damage. This would have less of an impact than the complete destruction of data caused by viruses or worms though.

Another potential threat is Phishing. Phishing attacks are social engineering attacks designed to steal information. In most cases, attacks masquerade as a trusted source and tricks a user into entering credentials to access information. The attacker would then have the same level of access as the one who was tricked. To protect against phishing, it is best to have employees understand more about phishing attacks and their consequences. They have to double check external email links. Generally, phishing attacks are only crucial when it is paired with other

destructive malware like viruses, worms, and botnet zombies. Therefore the risk of phishing attacks would be high and must be prevented to reduce organizational inoperability.

One other threat is employee theft. Employee theft can be characterized by stealing or abusing business information without permission. It is a breach in confidentiality. This organizational security threat can be prevented by using biometrics and monitoring employees while preventing them from doing anything untoward. The priority for the threat of theft is very low. Since the office in Argentina would be exporting soy products, the motive to steal transactional data should be low. Unlike private personal data or financial data, the data in this business should have very low worth to outsiders.

Natural disasters and device failure is another type of threat that the company might have to guard against. One aspect of natural disasters is that it increases the risk of important documents and data leaking out. Since the physical aspect of security, like fences and security guards can become more vulnerable, more thieves become likely. To secure against this threat, it is important to take inventory of information, to understand what information might be destroyed or lost in case of natural disaster. It is also crucial to secure the information in the safest part of the building. This has high importance because the risk rating for Argentina because one of the most expensive natural hazard risks is flooding. This will have an impact on both integrity and availability. There has been significant flooding in Buenos Aires in 2013 and 2015 and it is reported that one of the reasons for the level of destructiveness of the flood is that there was no reliable rain infrastructure.

While looking at the risks that the new office in Argentina would face, it is infeasible to guard against all the threats. It is important to prioritize the most damaging of threats first and

ignore threats that have lower priority and therefore lower cost-effectiveness. In the next part of risk assessment, control strategies are used to go against the above threats. For each threat outlined above, those threats would be classified as either risk acceptance, risk mitigation, or risk sharing. Threats under risk acceptance are allowed to be ignored as the cost effectiveness of implementing a solution may not be worth it. Threats under risk mitigation are high priority threats and must be removed or have their impact reduced. Threats under risk sharing are threats that can be alleviated by purchasing insurance.

An examination of the computer security objectives composed of confidentiality, integrity, and availability, necessary for establishing a new office, reveals that integrity and availability cannot be compromised. Therefore, although confidentiality objectives are important, it is suggested not to put too much effort in that direction. For the threats above that fit under confidentiality, it could include employee theft or phishing attacks. These threats are considered low priority and can be put under risk acceptance or deferred for later consideration. The three other threats must be addressed and mitigated.

Cyber attacks are high priority risks and should be categorized under risk mitigation. One approach for mitigation is antivirus software. The recommendation for antivirus software is CyberArk. It is well known as the market share leader and number one vendor in the privileged access security space. Its customer list includes 40% of the Fortune 100 and 17 of the biggest banks in the world, and it is the only PAM solution certified by the U.S. Department of Defense. Besides antivirus, it is also important to setup authentication and password security and firewalls to filter unwanted traffic. Since this threat can compromise integrity, which will cause operational delays, it is necessary to mitigate these risks as soon as possible.

DDOS attacks are also high priority risks that need to be mitigated. The most appropriate measure against DDOS attacks are firewalls since they will ignore all network traffic in the blacklist. Since this threat targets availability, which may cause operational delays and a hit towards reputation if unaddressed, this risk must also be mitigated as soon as possible.

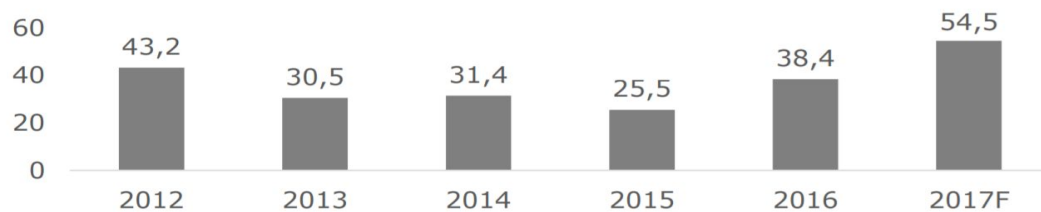
Finally, natural disasters and device failures are medium priority risks because their frequencies tend to be lower than cyber attacks and DDOS attacks. However, it still compromises both integrity and availability. Important information must be inventoried and backup plans of actions should be mapped out before actual disasters hit so employees know how to respond in case of emergencies. Instead of mitigation, it is recommended to share risk through insurance.

## Appendix A (Economic Data, sources EIU, BCRA (Central Bank) and Deloitte)

### Inflation Index (%)

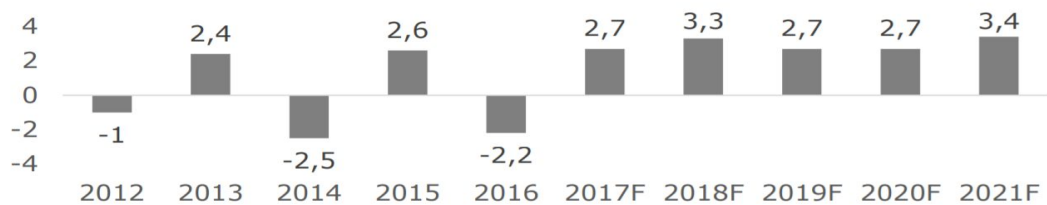


### National Reserves (US\$ Bn)

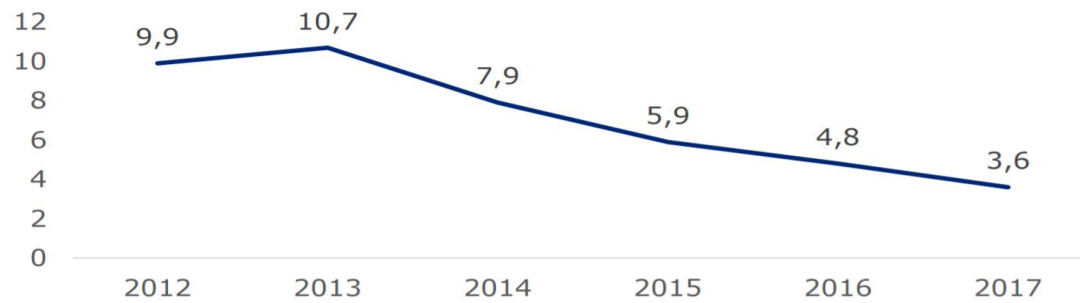


Source: EIU and BCRA (Central Bank).

### GDP Real Growth (%)



### Country Risk (%)



### FINANCIAL REPORT:

	1Q18	1Q17	1Q16	1Q15	1Q14
Revenues	30,698	9,433	7,068	4,559	2,988
Operating costs	(23,572)	(6,585)	(4,820)	(3,021)	(2,214)
<b>Operating income</b>	<b>7,126</b>	<b>2,848</b>	<b>2,248</b>	<b>1,538</b>	<b>774</b>
Earnings from associates	43	40	37	21	9
Earnings from acquisition of companies	-	-	114	-	-
Financial results, net	(2,306)	(11)	(653)	(312)	(813)
<b>Income before income tax expense</b>	<b>4,863</b>	<b>2,877</b>	<b>1,746</b>	<b>1,247</b>	<b>(30)</b>
Income tax gain (expense)	(1,382)	(985)	(544)	(408)	15
<b>Net income (loss)</b>	<b>3,481</b>	<b>1,892</b>	<b>1,202</b>	<b>839</b>	<b>(15)</b>
Other comprehensive income, net of tax	566	(105)	42	(200)	163
<b>Total comprehensive income</b>	<b>4,047</b>	<b>1,787</b>	<b>1,244</b>	<b>639</b>	<b>148</b>
Attributable to Controlling Company	3,894	1,796	1,248	682	146
Attributable to non-controlling interest	153	(9)	(4)	(43)	2

### 5. Statistical data (in physical units in index-term)

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