

Tracking Colombia's App Economy

October 2016

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All around the world we are seeing the rise of the App Economy— jobs, companies, and economic growth created by the production and distribution of mobile applications (“apps”) that run on smartphones. Since the introduction of the iPhone in 2007, the App Economy has grown from nothing to a powerful economic force that rivals existing industries.¹

In this paper we examine the production and distribution of mobile apps as a source of growth and job creation for Colombia. We find that Colombia had over 83,100 App Economy jobs as of September 2016, including a conservative estimate of spillover jobs. What’s more, Colombia’s connectivity with the global economy, particularly the United States, gives the country the potential to add many more App Economy jobs in the near future.

Going forward, Colombia has several important advantages in positioning itself as a hub for domestic and export app development. Colombia benefits from a growing economy in a time of economic volatility in the region. For 2015, Colombia showed annual growth of 3.1 percent, while the overall Latin American economy contracted. This is a slowdown compared to the growth Colombia experienced in years 2010-2014, due in large part to external factors: the decrease in global demand, particularly from China; and falling oil prices, with petroleum accounting to nearly half of the country’s total exports.³ Growth is expected to slow further in 2016, with economic and political uncertainty, including the ongoing peace process and tax reform.

Yet, the country has fared better than most of its neighbors and continues to be a leader in the region. Furthermore, the Colombian government has made digital inclusion a top priority and, as a result, the country has a fast growing number of mobile phone subscribers and mobile broadband users (Figure 1). With the third largest population in Latin America, the domestic market for apps in Colombia is potentially quite appealing, especially if the country can improve its regulatory and innovation environment.⁴

Colombia also has the potential to become a strong exporter of mobile apps. The country is an attractive low-cost option for offshore app development by U.S. firms

in particular, with Bogotá and Medellín both only one hour behind New York City and two hours ahead of Silicon Valley.

Moreover, the Colombian and U.S. economies are already intricately connected with strong ties due to the bilateral Trade Promotion Agreement. Supply chains are well established and Colombian companies have plenty of experience working with U.S. partners. An important next step for Colombia is to seize the opportunities provided by the new economy, realizing its potential for creating new export markets. Trade is now much more than just traditional goods and services—it is also mobile apps.

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SIGNIFICANCE OF THE APP ECONOMY

This paper is part of our long-term effort to track the growth of the App Economy globally in order to see which countries are benefitting the most. Our goal is to produce a set of globally-consistent and credible estimates for App Economy employment by individual countries and by broad geographical regions, such as states and major cities. Ideally, we should be able to link App Economy growth to policy measures undertaken by governments.

The App Economy is less than a decade old, having only started after the introduction of the iPhone in 2007. The App Economy started in California’s Silicon Valley, home to Apple and Google, but has since spread globally, helping turn New York and London into global tech hubs as well. By our definition, the App Economy is the whole ecosystem of jobs, companies, and income connected with mobile apps.

Colombia has a rapidly growing number of app developers—these are the people who design and create the apps distributed domestically and internationally. Moreover, Colombian companies that do app development also have to hire sales people, project managers, database programmers and other types of workers. Finally, each app developer, by spending money in the local economy, supports a certain number of local jobs.

Figure 1. Colombia’s Mobile Penetration Rates

	Mobile phone subscriptions (in millions)	Mobile phone penetration rate	Mobile broadband connections (in millions)	% Smartphone connections
2010	42.0	92.2%	1.0	2.1%
2011	45.3	98.5%	2.2	4.8%
2012	46.8	100.6%	3.0	6.4%
2013	46.4	98.4%	3.4	7.3%
2014	51.6	108.3%	4.8	10.1%
2015	56.1	116.5%	5.4	11.2%

Data: Colombian Ministry of Information Technology and Communications^{5,6}

Many people mistakenly think of mobile apps as simply games, but in reality, mobile games are only a small part of the App Economy. Games are important, but apps are also developed and used by major multinationals, banks, media companies, retailers, and governments. As of June 2016, there were 2.2 million apps available for Android, and another 2 million available on Apple’s App Store.⁷

Apps have become the front door to the Internet. People send messages to friends on WhatsApp, log onto the Facebook app, or their bank app, or the app of their airline. One could spend an entire day on the Internet while only using apps.

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Moreover, the demand for mobile apps in Colombia is only going to skyrocket in the future. Colombia has long had a vast base of mobile phone users. But it is only recently that mobile broadband connections have begun to surge, having more than quadrupled between 2010-2015.⁸ If this trend continues, as we expect it will, there is enormous potential for growth in the App Economy.

One of the biggest changes coming is the Internet of Things, which is the use of the Internet to help control physical devices and our physical environment.⁹ Farmers will increasingly use apps to aid their agricultural production, nurses and doctors will use apps to manage patient care, and manufacturers will use apps to control their factories.¹⁰

APP ECONOMY EXAMINED

We noted earlier that the App Economy is not simply about games, or about small app developers. In fact, the App Economy turns out to be remarkably diverse. The conventional picture of an app developer is a single person working in a basement, or perhaps a small firm with two or three programmers.

However, as we have researched the App Economy globally over the past three years, we have found that a surprisingly broad range of enterprises are searching for workers who have the ability to develop, maintain, or support mobile applications.¹¹ Tiny app developers and large mobile broadband providers; tech companies and non-tech companies; multinationals, nonprofits, and the government—it's just amazing the types of enterprises that are hiring app developers these days.

Based on our analysis of the App Economy in Colombia, we have found these types of companies who hire App Economy workers:

1. **Large, medium, and small Colombian app developers, who may be creating apps for themselves or for clients.** These companies are the leading edge of the Colombian App Economy. Take Colombian success story ClickDelivery for example. The online food delivery platform launched in 2007 in Bogotá and has since expanded to several cities in Colombia, Peru, and Ecuador. In April 2013, ClickDelivery went mobile¹² and as of September 2016 were looking to hire an Android Developer, an iOS Developer, and a Head of Engineering at its Bogotá headquarters. The interactive digital marketing firm ZAV Group was advertising for a Web and Mobile Programmer position in Bogotá as well. And there is Logistcapp, a transportation app development company that was recruiting a Frontend Developer during the same time period.
2. **Global app companies who are hiring local Colombian developers.** This is potentially a very important source of jobs for Colombia. For example, the management consulting giant McKinsey & Company was looking to hire a Full Stack Developer with experience building mobile apps at either its Bogotá or Lima location. And WorldNet21, a multinational company specializing in product development and R&D in mobile applications and devices, was recruiting a Java Programmer in Bogotá with iOS and Android development experience in September 2016.

Also in September 2016, the Brooklyn-based digital strategy, marketing, and design agency, HUGE, was recruiting for several App Economy positions, including Mobile Software Engineers and QA Engineers, at both its Medellín and Bogotá locations. The Meridian Group, a Silicon Valley software engineering company focused on working with startups was advertising for an Android Developer in Bogotá.

3. **Finance and media companies that engage in app development for consumer use under their own name.** These days, mobile applications are essential for finance companies. Colombia's three largest banks,¹³ Bancolombia, Banco de Bogotá, and Banco Davivienda, all have apps on offer in the Google Play and iTunes App Stores. And PayU, the leading online payment services provider in Latin America, was posting for a Mobile Engineer for iOS and Android in Bogotá in September 2016.

Moreover, apps are a natural fit for media companies. Many of Colombia's leading daily newspapers are embracing mobile—*El Tiempo*, *El Espectador*, *El Colombiano*, and *El País* all offer news apps in the Google and iTunes app stores. Similarly, leading broadcaster Caracol has both a Caracol TV and a Caracol Radio app available.

4. **Other large non-software development companies that are developing apps for internal and customer use.** In every industry, businesses are realizing that apps, and mobile in general, are becoming essential tools for productivity, marketing and customer service. For example, the Colombian national airline, Avianca, has its app on offer in the iTunes App Store and Google Play as well as in the Windows and Blackberry App Stores. And in September 2016, Satrack, a company that provides satellite monitoring of vehicles and other transportation logistics, was recruiting a Development Analyst and an Android/iOS Analyst in Medellín.

5. **Government organizations that develop apps to provide services for their citizens.** App development is not limited to the private sector. For example, Colombia's Ministry of Culture and Education has produced several educational mobile app games for children, such as Cocoroyo and Machin Machón.¹⁴ The Ministry of Health and Social Protection has also launched several mobile apps. One example is ClicSalud, an app that allows users to compare manufacturers prices of pharmaceutical drugs as well as file petitions or complaints within the industry.¹⁵

The Ministry of Agriculture and Rural Development is keeping up with the trend as well with apps focused on the needs of farmers. Two examples are AgroClima, an app that provides guidelines of how much water to use in irrigation based on current weather conditions and AgroInsumos, a user-generated database of current prices on major agricultural inputs.

This is only a small sample of the companies that are developing apps and hiring App Economy workers in Colombia.

TRACKING APP JOBS GLOBALLY

As the App Economy grows in significance globally, it becomes essential to have a consistent set of App Economy job estimates so that policymakers can compare their

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country's performance with that of other countries. For that reason, we have developed a new, standardized methodology for estimating App Economy employment.

This methodology was originally developed in 2012 to estimate the size of the United States App Economy.^{16,17,18} Since then, it has been refined and broadened to provide estimates for developed countries and regions such as Europe and Australia, and developing countries such as Vietnam and Indonesia. Most recently, the methodology was used for App Economy analysis in Argentina and Mexico.

The methodology uses online job postings for workers with app-related skills as a real-time measure of App Economy employment. We benchmark this data against official government statistics and data from comparable countries in order to eliminate many of the well-known problems connected with using big data to measure economic variables.¹⁹

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Job search engines are a wonderful source of data about the current labor market in a country. Companies post their openings on their website or use job boards to place job postings, and those online job postings are collected and indexed in real-time by job search engines such as Indeed (which for Colombia is located at the URL co.indeed.com). That is, the job seeker can input relevant criteria into the job search engine, such as skills, location, and so forth. And then the job search engine will return a list of all the current job postings that match the criteria. In Colombia, the postings may either be in English or Spanish and the methodology used accounts for this.

The main positive is that job postings (or want ads) typically contain detailed information about the skills that the employers are looking for. For instance, if a job posting requires that the job candidate have experience developing apps for iOS—the iPhone/iPad operating system—then we can reasonably conclude that the job is part of the App Economy. Similarly, if a job posting calls for experience developing apps for Android, Windows Phone/Mobile, or Blackberry, we can be reasonably sure that the job is part of the App Economy as well.

For example, Saucó Technologies, a Bogotá-based software engineering company, was advertising an opening for an Android/iOS Engineer Mobile Applications Programmer as of September 2016. The job posting reflected an App Economy position by requiring experiencing in developing mobile apps.

What's more, the search engine results are continually updated. And especially in tech fields, the expectation is that the potential employees will search for jobs using the Internet, so companies are usually very willing to post open positions online, because that's where they will find their workers.

On the other hand, job search engines do have certain problems. Obviously in Colombia not all jobs will be listed on online job postings, but the methodology adjusts for that

omission. Moreover, analyzing the results of job search engines gives us information about the tech labor market that can't be gotten any other way.

MEASURING APP ECONOMY EMPLOYMENT


For this study, a worker is in the App Economy if he or she is in:

- An information and communications technology (ICT)-related job that uses App Economy skills—the ability to develop, maintain, or support mobile applications. We will call this a “core” App Economy job. Core App Economy jobs include app developers; software engineers whose work requires knowledge of mobile applications; security engineers who help keep mobile apps safe from being hacked; and help desk workers who support the use of mobile apps.
- A non-ICT job (such as human resources, marketing, or sales) that supports core App Economy jobs in the same enterprise. We will call this an “indirect” App Economy job.
- A job in the local economy that is supported by the income flowing to core and indirect App Economy workers. These “spillover” jobs include local retail and restaurant jobs, construction jobs, and all the other necessary services.

To estimate the number of core App Economy jobs, we use a multi-step procedure based on data from the universe of online job postings. Our first observation is that online job postings typically describe the skills and knowledge being sought by the employer.

In practice, we compiled a short list of key words and phrases that would generally be associated with App Economy-related skills. These include iOS, Android, Blackberry, “Windows Phone,” “Windows Mobile,” and app. We applied these search terms to the real-time database of job postings developed by Indeed, which gave us an unadjusted count of job postings for core App Economy jobs.

However, that’s only the start. Job postings for an occupation are only a fraction of the number of people employed in that occupation. We develop an estimate for the ratio between the number of job postings for ICT jobs and overall ICT employment based on



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our experiences with other Latin American and European countries. This ratio is applied to the number of App Economy job postings to generate a provisional estimate of core App Economy employment. Crucially, we use a validation procedure to ensure that we are only counting job postings that correspond to core App Economy jobs. We use a conservative estimate of the indirect and spillover effects.²⁰

THE RESULTS

So how large is the Colombian App Economy today? Based on our analysis we find that Colombia had over 83,000 App Economy jobs as of September 2016. That's up from nothing as of 2007, before the iPhone was introduced.

Figure 2. Colombia's App Economy

	Estimated App Jobs	Percent of Total
Colombia	83,100	
Bogotá	51,200	61.6%
Medellín	19,900	23.9%
Other	12,000	14.5%

Data: Indeed, Progressive Policy Institute estimates

Given our estimate of 83,100 App Economy jobs, Colombia has an app intensity rate of 0.4 percent, with app intensity defined as App Economy jobs as a percentage of all jobs.²¹

This may seem low when compared to the U.S. and the European Union, which have average app intensities of 1.2 percent and 0.7 percent, respectively.²² However, Colombia's App Ecosystem is in a nascent stage and there is plenty of room for growth. And already Colombia's app intensity rate matches that of Mexico,²³ another aspiring tech leader in the region.

The country's app ecosystem has enormous potential to grow and many expect to see that happen. For example, *The Wall Street Journal* published a 2015 article titled "Why Chile and Colombia Are Startup Savvy,"²⁴ *TechCrunch* had an article "Colombia Is One Of Latin America's Most Promising New Tech Hubs"²⁵ in late 2014, and Bogotá's *The City Paper* posted a piece titled "Apps Shape Colombia's Digital Future" in July 2015.²⁶

We can take the analysis a bit further by assessing the distribution of mobile operating systems in Colombia's App Economy, since many App Economy job postings note a specific mobile operating system or multiple mobile operating systems that the job candidate is expected to be familiar with.

As of September 2016, we estimate that just over 85 percent of App Economy workers in Colombia (roughly 71,000 jobs) belong to the Android ecosystem. This figure includes Android specific jobs as well as jobs supporting both Android and other operating systems. This compares with the iOS ecosystem at 64 percent of Colombia's specific jobs as well as jobs supporting both iOS and other platforms. The Windows Phone/Windows Mobile ecosystem accounts for nearly 10 percent of App Economy workers and the BlackBerry ecosystem accounts for just over 3 percent.

The numbers sum to more than 100 percent because quite a few jobs specify more than one operating system—requiring, for example, both iOS and Android skills.

Figure 3. Colombia App Economy Jobs by Major Operating System

	App Economy Jobs	Share of Total App Economy Jobs*
Android Ecosystem	71,000	85.5%
iOS Ecosystem	53,300	64.1%
Windows Phone/Mobile Ecosystem	7,800	9.4%
Blackberry Ecosystem	2,800	3.4%

Data: Progressive Policy Institute, Indeed

*Percentages sum to more than 100 because the same position can participate in multiple ecosystems.

LONG-TERM POTENTIAL AND OBSTACLES

App development may offer a speedy route to economic and employment gains for a country such as Colombia that is both an appealing offshoring destination for U.S. companies and a large economy with a robust internal market.

Colombia nurturing its App Economy is a logical means to growth and stability, as it requires far less physical capital than traditional manufacturing markets. The only necessary inputs for mobile app development are a skilled workforce, supportive regulatory policy, and good telecom connections, both domestically and internationally.

According to a 2016 report from the World Economic Forum (WEF), Colombia already has some advantages that help to support its flourishing mobile ecosystem.²⁷ Individual technology usage rates are high—in mobile subscriptions, Internet use, and fixed broadband subscriptions. Additionally, Colombia rates highly on mobile network coverage. These are vital components to have in place for a thriving App Economy and the Colombia government has facilitated these strengths through its robust and successful Vive Digital program.

The ambitious four-year Vive Digital plan began in 2010 and set out to develop the Colombian national digital ecosystem, with a focus on improving broadband connection rates in low-income and rural areas. Through the Vive Digital initiative, Colombia was able to quadruple the number of broadband subscriptions, from 2.2 million connections to 8.8 million between 2010-2014, surpassing its goal of 8.2 million. Additionally, the number of municipalities with fiber optic connections rose from 200 to an astounding 1,078 (nearly 98 percent of all municipalities) within the four-year period, far exceeding the goal of 700.²⁸ The country is now in Phase II of the Vive Digital plan that will continue until 2018 and is expected to deliver similarly strong results.

The Colombian government has further demonstrated its support of the digital ecosystem, with a particular focus on entrepreneurship and startups. In 2012, the Ministry of Information Technology and Communications (MinTIC) started Apps.co, an initiative dedicated to cultivating entrepreneurship, with a focus on mobile application, software, and content development.²⁹ The goal of Apps.co is to give entrepreneurs the tools to convert their innovate ideas into successful startups.

Also in 2012, the Ministry of Industry and Tourism launched iNNpulsas, in order to convert the fragmented market of entrepreneurs, universities, public institutions, and private companies into a cohesive startup ecosystem.³⁰ And iNNpulsas has helped to

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inject some much needed early-stage funding into the ecosystem they are building. By early 2016, iNNpalsa had invested a total of approximately US\$80 million to support the development of 1,200 companies.³¹

Local governments are also making efforts to help develop and grow the entrepreneurial ecosystems in their districts. For example, the government of Medellín helped found RutaN in 2009. It works along the same lines as iNNpalsa and Apps.co, aiming to foster entrepreneurship and build a comprehensive ecosystem.

RutaN provides funding, co-working space, and various other forms of support to entrepreneurs and startups. This support may have helped Medellín earn the title of “Innovative City of the Year” in a 2012 competition run by *Wall Street Journal* and Citibank, having beat out co-finalists Tel Aviv and New York City.³²

Despite these achievements, Colombia has some hurdles to jump as well. The country’s regulatory framework and its business and innovation environment stand as potential barriers to growth facing the country, with both areas having ranked poorly in the 2016 WEF report.³³ These are also vital components for a thriving App Economy and must be improved upon in order for Colombia to realize its potential as a mobile development hub.

For example, a 2014 policy regulated that mobile phone providers in Colombia could no longer sell phones at subsidized rates.³⁴ By contrast, it is common practice in many other countries for providers to give steep discounts on phones, in exchange for the signing of a fixed term contract, allowing the cost of the phone absorbed into the monthly fees. This system provides consumers access to phones and technology they may not have been able to afford if they had to pay the full price up front.

Additionally, restrictions on the import of mobile phones may slow the adoption of smartphones in Colombia. In late-2015 new rules were placed on the import of mobile devices—all imported phones now must be individually registered on a list with MinTIC prior to import.³⁵

Continuing with the types of policies that facilitate App Economy growth will allow Colombia to participate in the global mobile revolution as a producer rather than a consumer.

More broadly, two issues that come up in many countries are mobile-specific taxation and broadband content regulations. Excess taxes on mobile devices or services decrease the affordability of mobile phones, potentially counteracting any efforts to increase mobile penetration rates and mobile broadband usage. Likewise, regulating broadband content providers in the same manner as telecom services can slow down the economic benefits of developing and publishing content, including mobile apps.

If policymakers are serious about fostering a dynamic startup ecosystem and App Economy, then continuing with the types of policies that facilitate App Economy growth

will allow Colombia to participate in the global mobile revolution as a producer rather than a consumer. Putting too many costly restrictions on Colombia's App Economy could divert the growth elsewhere.

By building upon its current strengths and directly addressing the need for improvement in its regulatory and innovation environment, a country such as Colombia can become a leader in the global App Economy, creating good jobs and value-added growth at home.

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