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The Rise of the Mexican App Economy

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INTRODUCTION

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 Mexico. We find that Mexico had over 225,000 App Economy jobs as of March 2016. What’s more, Mexico’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.

Mexico has long benefited from strong relationships with its global trading partners and has been an enthusiastic supporter of the proposed Trans-Pacific

Partnership agreement. An important next step for Mexico 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 digital goods, such as mobile apps.

Mexico is also benefiting from a relatively stable economy in a time of volatility in the region. Mexico has managed to register slow but steady growth rates over the past few years. For 2015, Mexico showed annual growth of 2.5 percent, while the overall Latin American economy contracted by 0.3 percent.² As the global economy stabilizes and Mexico continues its steady growth amongst a region plagued with uncertainty, the country can further strengthen its position as an economic leader in Latin America.

Moving forward, Mexico has several important advantages as a hub for export app development. Mexico is an attractive low-cost option for offshore app development by U.S. firms, with Mexico City

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only one hour behind New York City and two hours ahead of Silicon Valley. And the Mexican and U.S. economies are already intricately connected with strong ties as trading partners due to NAFTA. Supply chains are well established and Mexican companies have plenty of experience working with U.S. partners.

Moreover, Mexico has the second largest economy in Latin America, making its domestic market for apps quite appealing as well.³ The country has a growing number of Internet users (Figure 1) with approximately 65 million people online as of 2015. And 77 percent of these users are accessing the Internet via smartphones.⁴

This trend will continue to advance as mobile broadband penetration rates surge. According to data from GSMA Intelligence, there were nearly 50 million 3G/4G mobile broadband connections in Mexico as of early 2015, and that figure is expected to double by 2020.⁵

FIGURE 1: MEXICO'S GROWING INTERNET USER BASE

	Internet Penetration Rate	Growth from Previous Year
2010	34%	9,7%
2011	40%	17,6%
2012	43%	7,5%
2013	49%	14,0%
2014	51%	4,1%
2015	59%	15,7%

Data: AMIPCI⁶

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. Mexico has a rapidly growing number

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of app developers—these are the people who design and create the apps distributed domestically and internationally. Moreover, Mexican 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.

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 July 2015, there were 1.6 million apps available for Android, and another 1.5 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, their bank app, or the app of their airline. One could spend an entire day on the Internet while only using apps.

The demand for new mobile apps is only going to skyrocket in the future. One of the biggest changes coming is the Internet of Things (IoT), which is the use of the Internet to help control physical

devices and our physical environment.⁸ 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.⁹

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.¹⁰ 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 Mexico, we have found these types of companies who hire App Economy workers:

1. **Large, medium, and small Mexican app developers, who may be creating apps for themselves or for clients.** These companies are the leading edge of the App Economy. Take mobile app development company NA-AT Technologies for example. They specialize in FinTech, having developed over 100 apps for their financial sector clients. In July 2016, they had openings posted for more than 20 positions requiring App Economy skills. And there is Virtual Market, a company that created a cash register-type digital terminal that helps small grocers and convenience stores track, analyze, and manage their daily business. They were looking to hire a Junior Android Developer and an Android Programmer Trainee in the state of Querétaro as of July 2016.
2. **Global app companies who are hiring local Mexican developers.** This is potentially a very important source of jobs for Mexico. For example, the

enterprise mobility service company Propelics, headquartered in San Jose, California, was looking to fill eight App Economy positions in Guadalajara in July 2016, such as Mobile Tester and Mobile UX/UI Designer. And Segundamano, a Barcelona-based company providing a network of local online classified platforms in Spain and Latin America, posted for various Mexico Citybased App Economy positions in June 2016. They were advertising for an iOS Developer, Frontend Developer, and Mobile Tester/QA Specialist.

There are numerous examples of companies based in Mexico that specialize in mobile development and software outsourcing with clients worldwide that were advertising open positions in July 2016. For example, Sferia, a company specializing in smart devices and mobile app development, was posting for several positions requiring App Economy skills in Mexico City. There is also the software development company Inflection Point Systems that specializes in mobile applications and was looking to hire a Senior .NET Software Developer at its Monterrey engineering center.

3. **Media, software, finance and retail companies that engage in app development for consumer use under their own name.** These days, mobile applications are essential for media and software companies. For example, the Mexican television and media giant Televisa was looking to hire a Systems Engineer with mobile application development experience in Mexico City in March 2016. Many of Mexico's leading daily newspapers are embracing mobile as well—Milenio, La Jornada, and Reforma all have news apps for offer in both the iTunes App Store and the Google Play Store. And Mexico's most successful newspaper, El Universal, sees more of their readers accessing content on mobile and tablets than on computers.¹¹

Moreover, apps are a natural fit for retail and finance companies. For example, financial services provider Billpocket provides a mobile device system that allows businesses to use a smartphone as a point of sale terminal. In July 2016, they were recruiting an iOS Application Developer in Guadalajara for work on the



system. And in the retail sector, Linio, provider of Mexico's largest online marketplace, was advertising for several App Economy positions in Mexico City, including iOS and Android Mobile Software Engineers.

4. **Other large non-tech 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, Copemsa, a leading Mexican parking meter operator that allows customers to use mobile apps to pay parking meters, was looking to hire a Web Developer with Android, iOS, and Windows 10 Mobile development experience in Mexico City as of March 2016. And in July 2016, Energetika, a company focused on providing innovative energy savings solutions, was advertising for a Systems Engineer App Developer in Mexico City.
5. **Government organizations that develop apps to provide services for their citizens.** App development is not limited to the private sector. For example, Mexico's Secretariat of Communications and Transportation has produced several apps. They offer SCT Mappir, a map and navigational app; SCT Consulta Licencias, an app for scanning and authenticating Mexican Federal

Licenses; and SCT Jure, an app intended to promote transparency by allowing users to easily search the Mexican constitution as well as federal laws and regulations.¹² The government of Mexico City is keeping up with the trend as well with a city newspaper app, a tax collection app, and an app that allows users to log complaints or report crimes to the Attorney General, among several others.¹³

This is only a small sample of the companies that are currently hiring App Economy workers in Mexico.

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 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.^{14,15,16} 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.

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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 in order to eliminate many of the wellknown problems connected with using big data to measure economic variables.¹⁷

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 Mexico is located at the URL indeed.com.mx). 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 Mexico, 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, Luxoft, an IT service provider headquartered in Switzerland, was advertising openings for an iOS Engineer and an Android Engineer at its Guadalajara office as of March 2016. Both job postings reflected App Economy jobs by requiring skills necessary to build 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 Mexico some jobs will not be listed on online job postings, especially since many people still don't have smartphones. Still, 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, since most positions are not empty. We develop an estimate for the ratio between the number of job postings for ICT jobs and overall ICT employment. 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.¹⁸

FIGURE 2: MEXICO'S APP ECONOMY

	Estimated App Economy Jobs	Percent of total
Mexico	226,300	
Mexico City	118,400	52.3%
Monterrey	20,200	8.9%
Guadalajara	17,400	7.7%
Other	70,300	31.1%

Data: Progressive Policy Institute, Indeed

THE RESULT

So how large is the Mexican App Economy today? Based on our analysis we find that Mexico had over 225,000 App Economy jobs as of March 2016. That's up from nothing as of 2007, before the iPhone was introduced.

Given our estimate of 226,300 App Economy jobs, Mexico has an app intensity rate of 0.4 percent, with app intensity defined as App Economy jobs as a percentage of all jobs.¹⁹

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.²⁰ However, Mexico's App Economy is in a nascent stage as the country has only recently solidified its role as a major tech hub in Latin America.

The country's app ecosystem has enormous potential to grow and many expect to see that happen. For example, The Washington Post recently published an article titled "Is Mexico the Next Silicon Valley? Tech Boom Takes Root in Guadalajara,"²¹ USA Today had an article "Mexico's New Economy Starts to Take Off"²² earlier this year, and TechCrunch posted a piece in early 2015 detailing the dynamic startup ecosystem in Mexico.²³

We can take the analysis a bit further by assessing the distribution of mobile operating systems in Mexico'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 March 2016, we estimate that just under 78 percent of App Economy workers in Mexico (roughly 176,000 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 66 percent of Mexican App Economy workers (approximately 150,000 thousand jobs). This figure similarly includes iOS specific jobs as well as jobs supporting both iOS and other platforms. The Blackberry ecosystem accounts for 3.5 percent and the Windows Phone/Windows Mobile ecosystem accounts for roughly 3 percent of App Economy workers.

Mexico's App Economy is in a nascent stage as the country has only recently solidified its role as a major tech hub in Latin America. The country's app ecosystem has enormous potential to grow and many expect to see that happen.

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.

LONG-TERM POTENTIAL AND OBSTACLES

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

Mexico 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 and good telecom connections, both domestically and internationally.

However, Mexico'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 a 2015 report from the World Economic Forum (WEF) on ICT network readiness.²⁴ These are also important components for a thriving App Economy.

FIGURE 3: MEXICO APP ECONOMY JOBS BY MAJOR OPERATING SYSTEM

	Estimated App Economy Jobs	Share of Total App Economy Jobs*
Android Ecosystem	175,800	77.7%
iOS Ecosystem	150,100	66.3%
Blackberry Ecosystem	7,900	3.5%
Windows Phone/ Mobile Ecosystem	6,700	2.9%

Data: Progressive Policy Institute, Indeed
**Percentages sum to more than 100 because the same position can participate in multiple ecosystems.*

The Mexican government has begun to make strides in reducing regulatory burdens and facilitating business and innovation. Already, there have been several reforms to increase accessibility and reduce the costs of Internet and mobile broadband services.

As of December 2014, the Federal Electricity Commission (CFE) began allowing Telecommunications of Mexico use of its national fiber-optic cable network. The state-owned telecom company hopes to further expand the 40,000 kilometer-long network, eventually providing Internet access to 98 percent of households.²⁵

As for the mobile sector, the federal government introduced a regulatory reform in July 2014 aimed at restricting market dominance. Before the reform, the mobile sector was controlled by just six companies, with one company, América Móvil, accounting for 70 percent of the wireless market.²⁶ The hope is that by increasing competition, this reform will achieve the goal of reducing costs and increasing accessibility of mobile services. But in the mobile sector there is the issue of excess mobile-specific taxation. Mobile services are not only taxed the standard VAT like most other goods and services in the country but also face additional taxes, such as the Special Tax of Production and Services. The result is that the taxes on mobile devices and service comprise almost 19 percent of the total cost of mobile ownership²⁷— raising revenue but creating an additional barrier to affordability and digital inclusion.

In terms of facilitating business and innovation, Mexico has made gains in eliminating some of the burdensome regulations associated with starting a business. Early in 2016, President Enrique Peña Nieto enacted a reform on the General Corporations Law that makes it much simpler for entrepreneurs to incorporate their new businesses. A procedure that previously required the use of notary publics, cost 20,000 pesos, and could take up to 6 days can now be completed online within 24 hours at no cost.²⁸

Outside of regulatory improvements, the federal government is working in additional ways to support the App Economy and the burgeoning startup ecosystem in Mexico. In 2013, the Secretariat of the Economy launched the National Institute of Entrepreneurship (INADEM), an independent policy center dedicated to nurturing entrepreneurship, innovation, productivity, and small business development in Mexico. In 2014 alone, INADEM allocated more than \$650 million in funding to 620,000 startups and small businesses, helping to launch 6,000 new companies and create 73,000 new jobs.²⁹



State and local governments are also making efforts to help develop and grow the entrepreneurial ecosystems in their districts. For example, Mexico City's government launched Laboratory for the City in 2013. The Laboratory provides funding and space to foster "civic innovation and urban creativity."³⁰ And there is the Vortex IT Park in the state of Queretaro. Backed by both the federal and state governments, the technology park was developed in 2014 with the goal of making a center for innovation and living labs available to businesses, entrepreneurs, universities, and research centers.³¹

Meanwhile, the Digital Creative City (CCD)³² project is underway in Guadalajara, transforming the historic city into a global digital hub. With funding from the federal, state, and municipal governments, the multi-faceted project began with the development of a 100-acre campus of creative spaces for people to work and live. To further transform Guadalajara into a comprehensive Smart City, the project also includes investment in education and infrastructure improvements extending beyond the campus. IoT technologies will be incorporated throughout the project's implementation to enhance the efficiency and sustainability of all aspects of the CCD.³³

And it's not just the government that is paving the way for the App Economy and the startup ecosystem. The business community is coming together and making advancements in the sector

as well. Accelerator Mexican.VC (launched in 2010 and acquired by 500 Startups in 2012)³⁴ has been credited with fueling the startup ecosystem by having helped fund Mexico's "first batch of serious startups."³⁵ And there is also Startup Mexico,³⁶ an innovation company and campus, which has worked to turn Mexico's fragmented startup market into a well-functioning ecosystem that helps entrepreneurs innovate and grow their businesses.³⁷

And that well-functioning ecosystem is making major progress. Mexico now has over 100 incubators and more than 20 accelerators.³⁸ Additionally, there are now 60 venture capital funds in Mexico—up from only two funds in 2008 and 14 in 2012.³⁹

The App Economy has the potential to accelerate Mexico's economic development, but excess government regulations can unnecessarily choke off App Economy growth in Mexico. The country continuing to support the types of policies that facilitate App Economy growth will allow Mexico to participate in the global mobile revolution as a producer rather than a consumer. Putting too many costly restrictions on Mexico's App Economy will only 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 Mexico can become a leader in the global App Economy, creating good jobs and value-added growth at home.

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