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Chile: The Road to the App Economy

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INTRODUCTION

Apple's introduction of the iPhone in 2007 initiated a profound and transformative new economic innovation. While central bankers and national leaders struggled with a deep financial crisis and stagnation, the fervent demand for iPhones – and the wave of smartphones that followed – was a rare force for growth.

Today, there are five billion mobile broadband subscriptions, an unprecedented rate of adoption for a new technology.¹ Use of mobile data is rising at 65 percent per year, a stunning number that shows its revolutionary impact.²

More than just hardware, the smartphone also inaugurated a new era for software developers around the world. Apple's opening of the App Store in 2008, followed by Android Market (now Google Play) and other app stores, created a way for iOS and Android developers to write mobile applications that could run on smartphones anywhere.

The iPhone and the App Store were the beginning of a global App Economy: an army of app developers writing mobile applications for billions of users.³ For the most part, these developers are not hobbyists writing games in their basements. Instead, as more and more people are linked to the Internet through their smartphone and mobile data connections, mobile apps have become an essential way for businesses, nonprofits, and governments to

interact with their customers, members, and citizens. (Indeed, data shows that people spend most of their Internet time interacting with apps).

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Moreover, the long-term growth prospects of the App Economy are still strong. Yes, the great surge of new game, media, and e-commerce apps is probably close to its peak. However, the rise of the Internet of Things (IoT) means more objects and physical processes will be connected to the Internet.

Increasingly, individuals will be using mobile apps to interface with their homes, their travel, their entertainment, their cars, their schools, their health providers, and their state and local governments. Employees in many enterprises are using mobile apps to monitor or control work processes. These apps will be highly functional and sophisticated, serving an essential role in interacting with our environment.

THIS PAPER

The App Economy has an important role to play in Chile's economy. As of February 2018, we estimate that the Chilean App Economy totals 20,720 jobs. Additionally, we provide an overall breakdown of App Economy employment by operating system, comparing the number of jobs in the iOS ecosystem with the number of jobs in the Android ecosystem.

There are several reasons we have focused on App Economy jobs. First, the invention of the smartphone was one of the two most important technological innovations over the past decade,

in terms of economic impact, so it's natural to want to know how many jobs it is creating.

Second, the App Economy is one of the main forces propelling the global boom in tech-related jobs. Recent research shows that the 10 leading U.S. tech/telecom companies employ 1.6 million workers, up 82 percent from 10 years earlier. Many of these new jobs are connected with the mobile broadband and smartphones.⁴ The same is true in Europe as well.

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Third, we focus on the App Economy because it can be a potent force driving export-oriented growth. Mobile apps can be easily developed in a country such as Chile, and then shipped around the world.

MEASURING THE APP ECONOMY

We have chosen to use employment as our preferred metric for measuring the economic impact of the App Economy. Our methodology (described in the Methodology section) is based on analyzing databases of online job postings. These job postings typically contain information about the skills required for the job and the location of the job. We are then able to search for jobs that require App Economy-related skills, such as knowledge of iOS or Android. In this way we can develop an estimate of App Economy jobs by country and region.

Our methodology for using online job postings to estimate the size of the App Economy was originally introduced in 2012, in a widely-quoted paper that reported the first estimate of U.S. App Economy jobs.⁵ In December 2015 we extended and standardized the original methodology so it could be applied to a wide variety of countries,

languages, and economic environments. Our goal was to produce a set of globally-consistent and credible estimates for App Economy employment by individual countries, broad geographical regions, and, where possible, by the largest cities.

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

- An IT-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 use of mobile apps.
- A non-IT job (such as sales, marketing, finance, human resources, or administrative staff) 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 goods and services purchased by the enterprise that employs core and indirect App Economy workers, or by the income flowing to these workers. These **“spillover” jobs** include local professional services such as bank tellers, law offices, and building managers; telecom, electric, and cable installers and maintainers; education, recreation, lodging, and restaurant jobs; and all the other necessary services. We use a conservative estimate of the indirect and spillover effects, as discussed in the Methodology.

RESULTS

Table 1 provides the number of App Economy jobs in Chile. As of February 2018, we estimate the Chilean App Economy includes 20,720 jobs. This includes core App Economy jobs, indirect App Economy jobs, and a conservative estimate of spillover jobs.

TABLE 1: Chilean App Economy Employment

	THOUSANDS OF JOBS (FEBRUARY 2018)
Chile	20.7

Data: Progressive Policy Institute, Indeed

Obviously, Chile’s App Economy employment falls far short of Brazil, which had 312,000 App Economy jobs in January 2017.⁶ However, Chile’s App Economy compares favorably to smaller European countries such as Belgium (25,000 App Economy jobs in January 2017) and Ireland (15,000 App Economy jobs).⁷

Operating System

The two major smartphone operating systems today are iOS and Android. Employers looking for app developers often specify in which operating system or systems they want their hires to have expertise. This enables us to assign jobs to either the iOS ecosystem or the Android ecosystem – or both.

Table 2 shows the distribution of App Economy jobs in Chile by mobile operating system. The numbers sum to more than 100 percent because

some jobs specify more than one operating system – say, both iOS and Android skills.

TABLE 2: Chilean App Economy Jobs by Operating System

	THOUSANDS OF JOBS (DECEMBER 2017)	SHARE OF ALL APP ECONOMY JOBS
iOS ecosystem	13.1	63%
Android ecosystem	16.8	81%

Data: Progressive Policy Institute, Indeed

EXAMPLES

A variety of sectors can be found in Chile’s App Economy, which is mostly concentrated in Santiago. Of course, the tech sector is hiring mobile developers. As of February 2018, IT firm Baytex SA was hiring senior iOS and Android developers. Mobile development company Mavericks was looking for an iOS mobile developer. Software development company MobDev had an opening for an iOS developer. Software design firm ReignDesign was hiring an iOS developer. PyS Consultants was searching for a mobile developer with Android development experience. IT firm Xinerger had an opening for an Android developer, while digital communications company Naturalphone was hiring an Android programmer. Digital production company Acceleration Labs was looking for a mobile programmer with iOS and Android experience.

As of January 2018, technology consulting firm Nisum was advertising for a senior iOS developer in Santiago. IT firm ACL Tecnologia was looking for an iOS developer in Santiago. Technology consulting firm Seidor Chile SA was searching for iOS and Android mobile developers in Santiago. IT firm Sitrack was hiring

a Java developer with experience in Android applications in Huechuraba.

The Chilean App Economy has also spilled over into the education, marketing, retail, and food sectors. As of February 2018, education startup Kidint Chile posted a want ad for an iOS developer in Santiago. Processim Labs, which develops teaching tools for mobile platforms, was hiring a junior programmer with knowledge of mobile applications in Santiago. As of February 2018, digital marketing firm Mundo Box was looking for a senior mobile application developer in Santiago. As of January 2018, marketing firm Snuuper was hiring a junior front-end developer with mobile development experience in Santiago.

As of February 2018, e-commerce company Mercado Libre had an opening for a mobile software engineer with iOS experience in Santiago. As of January 2018, global retail company Cencosud was hiring an Android developer in Santiago. As of February 2018, Better Food Spa was hiring an iOS development leader. Food retail company Alimentos Corpora SpA was hiring an Android developer.

And here are examples of other industries hiring App Economy workers: as of February 2018, theft prevention company Grupo Alto was hiring a mobile programmer analyst in Santiago. Holding company Grupo Solunegocios SA was looking for an expert developer on Android in Santiago. Caja Los Andes posted a want ad for a Java programmer with knowledge of iOS and Android in Santiago. Geopositioning company TREMON was hiring a web and mobile developer in Santiago. Television technology company SmartboxTV had an opening for an iOS developer. Pet monitoring platform ePet was hiring a full-stack developer with iOS experience. As of January 2018, management consultant firm Gott & Man was looking for an Android developer in Santiago.

LONG-TERM POTENTIAL AND OBSTACLES

Chile is one of South America's most stable and prosperous nations. Classified by the World Bank as a high-income country, the country has cut inflation and unemployment to single digits, significantly reduced poverty since 2006, and grown exports.^{8,9,10,11} Annual GDP growth, which has slowed in recent years, is projected to accelerate again.

The Chilean information and communications technology (ICT) sector could offer an important source of economic growth in the coming years. The International Telecommunications Union found Chile to rank 66th and 65th in terms of access and use, respectively.¹² Indeed, according to the United Nations, only 64 percent of Chileans are Internet users.¹³ Expanding access and use of Internet and mobile products would foster more growth, especially as more business and tasks are carried out via apps and through e-commerce.

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Historically, Chile has been recognized as a hemispheric leader for its openness to trade and alignment with international standards. Chile does not impose import taxes on mobile phones, which allows both app developers and users better access to high-end smartphones, which fosters innovation.

However, that doesn't offset the harm to the climate for app development that other regulatory burdens may pose. In recent years, Chile has adopted some country-unique standards and requirements, among them duplicative mobile device testing and labeling mandates. Such regulations can increase cost of access to the smartest of the smart phones, thus impede the growth of this sector and disincentivize apps developers from creating solutions for the domestic market. Meaningful consultation with the ICT sector, developers, and potential users of apps before imposing regulations that could impact the growth of the app economy should be integral to regulatory decision-making. Carefully crafted regulations that are the least burdensome, while still addressing legitimate regulatory concerns, will allow tech entrepreneurs and start ups to flourish.

Additionally, more can be done to create a regulatory environment that allows tech entrepreneurs and startups to flourish. Last year, the GSM Association released a report proposing regulatory reforms to modernize

Chile's digital ecosystem.¹⁴ Among other things, GSMA called for reducing bureaucracy around the installation of telecommunications cables and towers, developing a regulatory framework for the deployment of telecommunications infrastructure, and optimizing the use of radio spectrum to catalyze further growth in the Chilean ICT sector. Streamlining regulation and making efficient use of finite spectrum resources would facilitate growth in mobile development as 5G wireless and the IoT come online.

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CONCLUSION

Since its invention in 2007, the iPhone has supplied an important source of jobs and economic growth for Chile. We estimate Chile's App Economy employment to total 20,720

as of February 2018. This includes core App Economy jobs, indirect App Economy jobs, and a conservative estimate of spillover jobs. App Economy jobs span sectors across the economy, ranging from tech and education to finance and others.

Chile is one of South America's most stable and prosperous economies. The country has made significant strides in taming inflation, unemployment, and poverty while growing exports and its economy. However, GDP growth has slowed in recent years. The Chilean ICT sector could provide an important source of economic growth in the years to come, as a sizeable number of Chileans do not have or use the Internet. Expanding ICT access, streamlining regulations, and efficiently allocating limited spectrum resources would help enable the next generation of economic growth as the IoT and 5G wireless come online.

Appendix

METHODOLOGY

Our methodology consists of six distinct steps:

1. Identification of App Economy job postings

Using summary statistics generated by searches on indeed.com, we identified job postings for App Economy jobs containing one of the following keywords: iOS, Android, and Spanish equivalents for related phrases such as “mobile.”

2. Validation

Invariably, some job postings identified in Step 1 will not fit the criteria of an App Economy worker (e.g., a job posting for a truck driver using an app). We therefore validated the sample by manually examining a sample of the job postings from Step 1 to eliminate those that do not fit our criteria of an App Economy worker. This allows us to estimate a validation ratio we applied to the results of Step 1.

3. Identification of IT job postings in Chile, and estimation of the ratio of job postings to employment for overall IT occupations

We constructed a keyword list to identify job postings for IT occupations in Chile. This included a core list of Spanish and English words and phrases commonly found in job postings for IT occupations.

We then validated the outcome using the same methodology as Step 2, manually examining a sample of job postings to assess which actually correspond to IT occupations. Then the resulting number was used to estimate the ratio of job postings to employment for overall IT occupations.

4. Estimation of App Economy core jobs for Chile

We multiplied the ratio generated in Step 3 and the validated number of App Economy job postings generated in Step 2. The result gave us the estimate of core App Economy jobs for Chile in February 2018.

5. Estimation of total App Economy employment for Chile

Using the same multipliers as in our previous work, we estimated the total number of App Economy jobs in Chile. We assumed that each core App Economy job is supported by one job-equivalent at the same company (e.g., managers, human resources, accounting). Then we assume that each company job generates one job in the rest of the economy. This is a very conservative assumption for spillovers.

6. Estimation of the total employment in the iOS and Android ecosystems in Chile

Out of the set of job postings containing the terms “iOS” or “Android,” we identified the share that contain terms belonging to the iOS ecosystem (Apple, iPad, iPhone, iOS) and the share belonging to the Android ecosystem (Android, Google). Then those shares were applied to all Argentine App Economy employment.

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