



Japan's App Economy

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The introduction of Apple's iPhone in 2007 initiated a profound and transformative new economic innovation. Today, less than a decade later, there are 4 billion smartphone subscriptions globally, an unprecedented rate of adoption for a new technology.¹ Mobile data usage is rising at 55% per year, a stunning number that shows its revolutionary impact.²

More than just hardware, the smartphone also inaugurated up a new era for software developers around the world. Apple's launch 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 from anywhere in the world, with the ability to sell and distribute them globally.

Indeed, the iPhone and the App Store were the beginnings 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.

And the App Economy shows no signs of slowing down. The rise of the Internet of Things means that more and more objects and physical processes will be connected to the Internet. In this world, consumers will increasingly use mobile apps as their interface to their home, their travel, their entertainment, their car, their schools, and their health providers. These apps will be highly functional and sophisticated, serving an essential role in interacting with our environment.

This paper examines the economic impact of the App Economy in Japan. We estimate that App Economy employment in Japan totaled 579,000 as of April 2016.

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TRACKING APP JOBS GLOBALLY

This paper is part of a larger research project examining App Economy employment in different countries and regions, including the United States and the European Union.

There are several reasons why 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, from the perspective of economic impact, so it's natural to want to know how many jobs it is creating.⁴

The other reason we have focused on App Economy employment has to do with the broad ongoing debate about the link between technological innovation and jobs. There's a pervasive worry, especially in the aftermath of the financial crisis, that new technologies destroy jobs without creating very many new ones.⁵

Unfortunately, government economic statistics are much better at tracking the reduction of existing jobs than identifying the growth of new types of jobs. For reasons of both budget limitations and inertia, it takes years for new occupations such as 'web developers' to get their own categories in the employment statistics, if it ever happens at all. Without data—specifically data about the contribution of the App Economy to individual countries—policy makers in Tokyo, or Berlin, or Washington can't make the right decisions.

As an alternative to traditional economic statistics, our methodology uses online job postings for workers with app-related skills as a real-time measure of App Economy employment. 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 Japan is located at the URL jp.indeed.com).

The main positive is that job postings (or want ads) typically contain detailed information about the skills that the employers are looking for. What's more, the search engine results are continually updated. 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. Analyzing the results of job search engines gives us information about the tech labor market that can't be gotten any other way.

The job postings are analyzed using a variant of a methodology originally introduced in 2012, in a widely-quoted paper that reported the first estimate of U.S. App Economy jobs.⁶ We later extended and standardized the original methodology so it could be applied to a wide variety of countries, languages, and economic environments.⁷

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THE JAPANESE APP ECONOMY EXAMINED

Based on our analysis we find that Japan had over 579,000 App Economy jobs as of April 2016 (Figure 1). That's up from nothing as of 2007, before the iPhone was introduced.

Core App Economy jobs are workers who build, maintain, or support mobile applications. These jobs require knowledge of a smartphone operating system such as iOS or Android. Core App Economy jobs include app developers at both small and large companies, whether they are Japanese-based or subsidiaries of non-Japanese companies. In addition, our App Economy employment figure also includes a conservative estimate of the spillover jobs created by core App Economy employment.⁸

Figure 1: Japan's App Economy	
	Estimated App Jobs, April 2016, thousands
Total Japanese App Employment	579

Data: Indeed, Progressive Policy Institute estimate

Given our estimate of 579,000 App Economy jobs, Japan has an app intensity rate of 0.9 percent, defined as App Economy jobs as a percentage of all jobs. By comparison, the United States has an app intensity of 1.2 percent, while Europe has an app intensity of 0.7 percent.⁹

THE LOCATION OF APP ECONOMY JOBS

Our methodology allows us to assess the location of App Economy jobs. We find nearly 70 percent of App Economy Jobs are centered in Tokyo prefecture. Other prefectures that show a substantial App Economy presence include Osaka, Kanagawa, and Aichi.

Estimated App Jobs Thousands	
Japan Total	579
Tokyo	399
Osaka	38
Kanagawa	25
Aichi	17
Fukuoka	12
Miyagi	8
Kyoto	8
Hokkaido	6

Data: Indeed, Progressive Policy Institute estimates

APP JOBS BY OPERATING SYSTEM

We can also break down Japanese App Economy employment by operating system.

As of April 2016, we estimate that just over 89 percent of App Economy workers in Japan (roughly 516,000 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 nearly 77 percent of Japanese App Economy workers (approximately 445,000 jobs). This figure similarly includes iOS specific jobs as well as jobs supporting both iOS and other platforms.

The Windows Phone/Windows Mobile ecosystem in Japan has somewhat more than 3000 App Economy workers and the Blackberry ecosystem has somewhat less than 3000. The percentages sum to more than 100% because some jobs specify iOS and/or Android skills.

Figure 2: Japan's App Economy Jobs by Major Operating System

	App Economy Jobs Thousands	Share of Total App Economy Jobs*
Android Ecosystem	516	89.3%
iOS Ecosystem	445	77.0%
Windows Phone/Mobile Ecosystem	3	0.6%
Blackberry Ecosystem	3	0.4%

Data: Progressive Policy Institute, Indeed

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

However, from a policy perspective, the iOS ecosystem is likely to have a larger impact on entrepreneurship and the economy in Japan. That's because iPhone owners in Japan typically have higher incomes, and iOS apps tend to generate higher revenues for developers.

WHO IS HIRING APP ECONOMY WORKERS

When we look at the job postings for App Economy skills, we see a healthy mix of small and large firms, spanning both local companies and multinationals. All the examples in this section are current as of November 2016.

At one end of the size spectrum, in November 2016 Japanese tech leaders such as Sony, Rakuten, and DeNA were looking for many workers with App Economy skills, such as knowledge of iOS or Android.

But Japan also has start-ups who are also searching for iOS or Android app developers. For example, Dely, an app-based food delivery service founded

in 2014, was looking to hire engineers/programmers in for its Tokyo operation. There is also the popular personal financial management app, Money Forward, which was recruiting iOS and Android engineers. The Tokyo-based company launched in late-2012 and had amassed four million users by October 2016.¹⁰

Mobile game programming is a big source of App Economy jobs in Japan. For example, Level 5, a game company founded in 1998, was looking for a programmer able to write game applications for Android/iPhone. Translimit, a game development studio based in Tokyo, was looking for a smartphone application engineer. The company is a young start-up, launched in 2014. Yet, by the end of the year the company had 14 employees and produced two of the most popular mobile games from Japan.¹¹

Education is another driving force for App Economy hiring, with a variety of e-learning platforms available in Japan. For example, Quipper, a London-based provider of e-learning apps, was looking for an iOS engineer at its Tokyo offices. Also in Tokyo, Smart Education was recruiting application engineers for work on its children's educational apps.

The rise of the Internet of Things is putting pressure on non-tech industrial companies in Japan to hire app developers. For example, Osaka-based multinational Panasonic has job posting for a car infotainment product developer with App Economy skills in Yokohama. Automotive giant Nissan is looking for an iOS app engineer and an Android app engineer in Tokyo.

CONCLUSION

The introduction of the iPhone and other smartphones has served as a catalyst for both small company entrepreneurship and large company expansion that can serve as a potent source of growth for both Japan internal consumption and exports.

Using our methodology, we estimate that Japan has been able to generate over half of a million App Economy jobs since 2008, when the App Store was introduced. Japan's ability to take advantage of the rapidly-growing App Economy shows the positive role of innovation in producing new jobs and new opportunities around the world.

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Founded in 1989, PPI started as the intellectual home of the New Democrats and earned a reputation as President Bill Clinton's "idea mill." Many of its mold-breaking ideas have been translated into public policy and law and have influenced international efforts to modernize progressive politics.

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⁸ We assume that for every core App Economy job, there is one additional job generated in the same company, and one additional job generated in the local economy. This is a very conservative estimate of the spillover effect.

⁹ Michael Mandel, "App Economy Jobs In Europe (Part 1)," Progressive Policy Institute, January 21, 2016, <http://www.progressivepolicy.org/blog/app-economy-jobs-in-europe-part-1/>.

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