Indonesia: Road to the App Economy

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Indonesia's growth rate has been slowing in recent years. In the second quarter, GDP grew 4.7% over the same quarter of the previous year, the smallest gain since 2009. Part of that slowdown is due to global economic weakness that has hurt commodity exports. However, that only points out the need to find another, more sustainable engine for growth for the Indonesian economy.

President Joko Widodo, in office since October 2014, seeks to transform Indonesia from an economy that imports manufacturing products such as telecommunications equipment into one that produces them. Indeed, his administration's emphasis on production has included domestic content rules for smartphones using advanced networks, as a way of allowing Indonesia to participate in the global mobile revolution as producer rather than a consumer.

App development is one route to economic success for a country such as Indonesia.

In this paper we take another perspective on Indonesia's economy. Rather than focusing on hardware, we examine the potential of the production of mobile applications ("apps") as a source of growth and jobs for Indonesia. The App Economy, as it is sometimes called, is the whole ecosystem of jobs, companies, and income connected with the production and distribution of mobile apps.

Many people mistakenly think of mobile apps as simply games or chat programs or social media. Games and social media are important—but in reality, they are only a small part of the App Economy. Apps are 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.[1]

App development is one route to economic success for a country such as Indonesia that has a large internal market. Today, many countries try to develop their manufacturing sector as a means to growth, emulating China and Korea. However, such a strategy necessarily requires a large investment in physical capital, not just for the factories but for the transportation infrastructure and power grid as well. Building and improving highways, rail lines, and ports is expensive and time consuming.

By comparison, mobile app development requires far less physical capital, and has the potential for paying off much more quickly. Moreover, going forward, mobile apps could be a major source of value-added and growth. What's required is a skilled workforce and good telecom connections, both domestically and internationally. But once these are in place, a country such as Indonesia can become part of the global App Economy, creating good jobs and growth at home.

Up to this point, Indonesia has not been focused on app development. Nevertheless, the country has a rapidly growing number of app developers—these are the people who design and create the apps distributed domestically and internationally. Moreover, Indonesian companies that do app development also have to hire sales people, project managers, database programmers, and other types of workers. Finally, each app developer supports a certain number of local jobs.

In this paper, we estimate that Indonesia has roughly 22,000 App Economy jobs across the entire country. That's based on our analysis of online job posting data, as collected by the job search engine Indeed. (Note: Only public data was used in this analysis. No personal data of individuals or businesses was used.)

In addition, we show that Indonesia comes in third in our App Economy ranking of major Southeast Asia countries, behind Vietnam and just behind Singapore. The result is based on our analysis of multi-country job posting data from job search engine Indeed, which enables us to estimate the Southeast Asia App Economy Index.

Indonesia's App Economy Strong, But Trails Vietnam and Singapore

Country	SE Asia App Economy Index, adjusted for omitted job postings*
Vietnam	1.83
Singapore	1.37
Indonesia	1.37
Philippines	0.90
Malaysia	0.75
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**SE Asia App Economy index = number of job postings containing terms 'iOS' or 'Android' for that country divided by the average number of job postings containing terms 'IOS' or 'Android' for all six SE Asia countries. Indonesia and Malaysia data adjusted to eliminate spurious results from one job board. Index except for Vietnam adjusted for omitted job postings.*

Data: Indeed summary job postings, collected as of August 5, 2015, analyzed by the Progressive Policy Institute. Based only on publicly available data—no personal individual or business data used.

Why is this important? The App Economy is less than a decade old, having only started after the introduction of the iPhone in 2007. Since then, the App Economy has grown from nothing to a powerful economic force that rivals existing industries.[2] The App Economy started in California's Silicon Valley, home to Apple and Google. Since then the App Economy has spread globally, helping turn New York and London into global tech hubs.

Apps are the essential front door to the Internet. In the United States, most people use apps to access the Internet on their smartphones.[3] They 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.

The demand for mobile apps is only going to skyrocket in the future.

Moreover, 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, which is the use of the Internet to help control physical devices and our physical environment.[4] 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.[5]

The implication is that production of mobile apps—both for the domestic and global economies—could become an increasing source of growth in coming years for Indonesia.

Jobs in the App Economy

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 3 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.[6] Tiny app developers and 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 Indonesian App Economy, we have found these types of companies who hire App Economy workers:

1. **Large, medium, and small Indonesian app developers, who may be creating apps for themselves or for clients.** These companies are the leading edge of the App Economy. The list of Indonesian app developers looking for workers includes Beetlebox, 7Langit, Mahoni.com, Garuda Games, Altermyth, Agate Studio, Suit Media, GIT (Gongsin Internasional Transindo), Alegrium, and Foreverapps. For example, Qeon

Interactive, an Indonesian mobile gaming company located in Jakarta, has an opening for a Senior Mobile Engineer as of August 2015.

Another company in the Indonesian app market is Sebangsa, a mobile application company developing communication, social networking and business products. In August 2015, they were looking to bring on both an iOS Front-End Developer and an Android Front-End Developer in Yogyakarta.

2. **Multinational Corporations using Indonesian workers for app development.** Wirecard provides an example of this. It is a multinational payment-processing corporation that is headquartered in Germany, but with divisions around the world. As of August 2015, they were looking to bring on five Software Engineers in Jakarta. SenseLabs, which has a technology platform connecting smartphones and other wearables to sensors, has developers in both Rotterdam, Netherlands, and Bandung, Indonesia.

3. **Media and software companies that engage in app development for consumer use under their own name.** These days, mobile applications are essential for media and software companies. One example is that of HighEnd, a luxury lifestyle magazine, operated under integrated media group MNC Media, advertising for an IT Programmer with the ability to create iOS and Android applications in Jakarta in August 2015.

4. **Finance and retail companies that use apps to reach customers.** Apps are a natural fit for retail and finance companies. For example, Senayan City, a mixed-use development comprising a shopping mall, an office tower, an apartment tower and a hotel, was advertising for a Programming Junior Officer with Android programming experience in Jakarta as of August 2015.

   Another example is Tokopedia, one of Indonesia's largest online marketplaces, which enables customer to customer retail by providing a platform for individuals and small business to open online stores. In August 2015, they were advertising openings for both iOS and Android Software Engineers as well as a UI Designer in Jakarta. HappyFresh, a grocery delivery startup, is also looking for mobile app developers.

   Another example is Astra Insurance, an Indonesian general insurance company that was looking to fill a position for an IT Development Mobile Project in Jakarta in August 2015.

5. **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, as of August 2015,

Eco Properti Internasional, an online property portal that matches environmentally conscious apartment seekers with rental properties was looking to hire Junior and Senior Web/Mobile Application Programmers in Surabaya.

Another example is that of GrabTaxi, a mobile-based booking and dispatch platform for the taxi industry. They operate in six countries, including Indonesia and were advertising for an IT Support Manager with iOS and Android experience in August 2015 for their Jakarta office.

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

Measuring the Indonesian App Economy

According to data from Statistics Indonesia, the information and communications sector grew by 10% in 2014, compared to 5% growth for the gross domestic product of the whole country. Indeed, information and communications was the fastest growing sector of the economy.

Figure 1: Indonesia Becomes More Connected

Year	Households with mobile phones	Households who used the Internet in the last 3 months
2010	72%	22%
2011	79%	26%
2012	84%	31%
2013	86%	32%

Data: BPS-Statistics Indonesia.

According to the association of Indonesian Internet service providers (APJII) in the Internet penetration rate increased to 35% in 2014. Smartphone adoption use is still relatively low, but increasing quickly. The largest use is social networking, with 85% using a mobile phone to access the Internet.

Indonesia had roughly 22,000 App Economy jobs as of August 2015, up from nothing in 2007.

Clearly we see tremendous changes underway in the Indonesian App Economy, on both the consumption and production side. Users will have much more access to smartphones, so they will become even greater downloaders of mobile apps of all sorts. On the other side, the domestic market for mobile apps will become one of the largest in the world, creating an enormous incentive for mobile app developers to expand.

This virtuous circle could quickly make the App Economy an enormous creator of jobs and income for Indonesia. Moreover, as Indonesian app developers gain skills and experience, they could become a source of export revenue.

How large is the Indonesian app economy today? Conventional economic statistics—whether in the United States or in Indonesia—are not designed to track the very new kinds of jobs being created by the App Economy.

However, we can address the size of Indonesia's App Economy using a methodology originally developed in 2012 to estimate the number of App Economy workers in the United States.[7] This methodology was later applied to other countries, such as Australia.

This methodology uses online help-wanted ads or job postings to assess the strength of the App Economy. Note that job postings typically include an accurate description of the skills and knowledge the employer is looking for. For example, 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 using Android we can be reasonably sure that job is part of the App Economy.

Especially in the tech field, the use of online job postings is quite common. Companies post their openings on their website, or use job boards to place job postings for software developers or engineers. In Indonesia, the ads may either be in English or Indonesian.

Online job postings are collected and indexed in real-time by job search engines such as Indeed (which for Indonesia is located at the URL id.indeed.com) or by Monster (which for Indonesia is located at the URL www.monster.co.id). 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.

Job search engines are a wonderful source of data about the current labor market in a country. The main positive is that job postings (or want ads) typically contain detailed information about the skills that the employers want. What's more, the results are continually updated. And especially in tech fields, the expectation is the potential employees will search for jobs using the Internet, so many companies are usually 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 Indonesia many jobs will not be listed on online job postings, especially since most people still don't have smartphones. Moreover, unlike the United States and Vietnam, many listed job postings on the websites of Indonesia tech firms are not picked up by Indeed, Monster, or other job search engines, likely for legal reasons. This requires us to do an adjustment to account for the missing data. Still, analyzing the results of job search engines gives us information about the tech labor market that can't be gotten any other way.

As of August 15, 2015, the Indonesian job search website id.indeed.com returned a total of 28,000 job postings nationally, ranging from software developers to accountants to lab technicians. Out of these, 11,000 were in the Jakarta region, 3,000 were in the Denpasar region, and about 2,000 were in the Surabaya region.

App Economy Workers

In order to assess the relative size of the App Economy in Indonesia, we will look for job postings that require App Economy skills. The main App Economy skills are the ability to build apps that run on the iOS and Android mobile operating systems. So we search for jobs that include either the term 'iOS' or the term 'Android' as part of the job posting.

The key to growth is to be a creator of mobile apps, not simply a user.

The reason why we use iOS and Android is that these are the two major platforms for mobile apps. (Windows, Blackberry, and Facebook have a much smaller share). Also, they will be the same no matter what language a country is using.

Our procedure was to run a search for App Economy job postings on id.indeed.com on August 5, looking for job postings that contain either the term 'iOS' or 'Android'. Then we adjust for the missing observations. Then, based on past research in other countries, we estimate the number of app-related jobs at firms that do app development. Finally, we account for the number of non-tech local jobs supported by app developers.[8]

The result: We find that Indonesia had roughly 22,000 App Economy jobs as of August 2015. That's up from nothing as of 2007, before the iPhone was introduced.

Regional Comparisons

Obviously, Indonesia 's App Economy lags behind industrialized countries such as the United States, Japan and the United Kingdom. Equally clearly, Indonesia cannot compare today to India and China in terms of app development.

It's much more useful to compare Indonesia's App Economy to other major countries in Southeast Asia—Vietnam, the Philippines, Thailand, Singapore, and Malaysia. In order to do this, we searched for job postings contained the terms 'iOS' or 'Android' in Vietnam, Indonesia, Malaysia, Philippines, Singapore, and Thailand, using the Indeed sites for those countries.

By executing this search on each of these websites the same day, we were able to identify the number of App Economy postings for each country.[9] Note that for two countries, Indonesia and Malaysia, we also removed a number of spurious App Economy job postings that are caused by a particular job board.

Figure 2: Job Search By Country	
Country	**Website Used**
Vietnam	Vn.indeed.com
Indonesia	Id.indeed.com
Malaysia	www.indeed.com.my
Philippines	www.indeed.com.ph
Singapore	www.indeed.com.sg
Thailand	Th.indeed.com

Data: Indeed.

In addition, we note that in all the countries except for Vietnam, job search engines refrain from indexing some company websites. We therefore do an adjustment to account for the missing data.

We then translate our results into a "Southeast Asia App Economy Index" for each country, which divides the results of the search for that country by the average number of job postings for all six countries (see Figure 3). In other words, the higher the index number, the more job postings for App Economy jobs.

Figure 3: Indonesia's App Economy Strong, But Trails Vietnam and Singapore	
Country	**SE Asia App Economy Index, adjusted for omitted job postings***
Vietnam	1.83
Singapore	1.37
Indonesia	1.37
Philippines	0.90
Malaysia	0.75
Thailand	0.35

**SE Asia App Economy index = number of job postings containing terms 'iOS' or 'Android' for that country divided by the average number of job postings containing terms 'IOS' or 'Android' for all six SE Asia countries. Indonesia and Malaysia data adjusted to eliminate spurious results from one job board. Index except for Vietnam adjusted for omitted job postings.*

Data: Indeed summary job postings, collected as of August 5, 2015, analyzed by the Progressive Policy Institute. Based only on publicly available data—no personal individual or business data used.

We can see that Vietnam has the highest Southeast Asia App Economy Index, followed by Singapore and Indonesia (where Singapore is slightly but not significantly ahead of Indonesia). Note that we have not ranked these countries against countries such as India and China, which are clearly much stronger App Economies.

The Southeast Asia App Economy Index measures the demand for App Economy workers in a country. In some sense, it reflects the desirability and growth of the country for app development. Companies have many choices globally about where to look for workers, and if they are looking in Vietnam, Singapore, and Indonesia, that suggests they find the environment enticing.

It's worth saying a word about Singapore, which comes out lower than Vietnam on the ranking and slightly ahead of Indonesia. Obviously Singapore has a much more highly educated workforce. But many Singapore app developers actually outsource their production to other countries, including Vietnam. Moreover, Vietnam and Indonesia have much larger populations. Therefore, if we adjust for population size, the Singapore App Economy looks much stronger.

Finally, for completeness, we show the SE Asia App Economy Index, without the adjustment for omitted data. We see that Indonesia looks much weaker, which clearly does not reflect the reality.

Figure 4: Without Adjustment for Omitted Data, Indonesia's App Economy Looks Weak

Country	SE Asia App Economy Index*
Vietnam	1.83
Singapore	1.65
Philippines	0.93
Indonesia	0.65
Thailand	0.52
Malaysia	0.42

**SE Asia App Economy index = number of job postings containing terms 'iOS' or 'Android' for that country divided by the average number of job postings containing terms 'IOS' or 'Android' for all six SE Asia countries.*
Data: Indeed summary job postings, collected as of August 5, 2015, analyzed by the Progressive Policy Institute. Based only on publicly available data—no personal data used.

Long-term Potential and Obstacles

Mobile apps—the essential software of smartphones—have a lot more growth potential than the hardware.

The Indonesian government is facing an important economic policy decision. One component of the government's plan to boost the economy and tilt the trade imbalance is to impose local content regulations on the manufacturing of smartphones. There are about $3 billion (USD) in phone imports into Indonesia yearly and the country is hoping to capture a portion of this.[10]

Still, the country has logistics challenges, including the need for more transportation infrastructure investment. The net result can be up to a 50% increase in manufacturing costs compared to production in nearby China, a figure quoted by Indonesian smart phone producer Polytron.[11] This will undoubtedly raise the costs of producing smartphones in Indonesia, and slow down the rate of adoption.

But even leaving aside the domestic content issues, the question is whether Indonesia could benefit from emphasizing the App Economy—the production of mobile apps. Increasingly the hardware side of the smartphone market is a commodity business, where companies invest enormous sums for thin profit margins.

By contrast, mobile apps—the essential software of smartphones—have a lot more growth potential than the hardware. Smartphone penetration has a limit, but as the history of information technology shows, the demand for software and services keeps growing. Indeed, in the United States, companies invest roughly $320 billion per year in software, compared to roughly $180 billon on computer and communication hardware.

The implication: Countries are better off nurturing a strong position in mobile app development. The key to growth is to be a creator of mobile apps, not simply a user. That strategy creates a workforce with the right skills and training to prosper in the global economy going forward.

Endnotes

[1] Statista, "Number of apps available in leading app stores as of July 2015," http://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/.

[2] Philip Elmer-DeWitt, "Apple's apps economy: Bigger than Hollywood," *Fortune,* January 22, 2015.

[3] Sarah Perez, "Majority Of Digital Media Consumption Now Takes Place In Mobile Apps," August 21, 2014, http://techcrunch.com/2014/08/21/majority-of-digital-media-consumption-now-takes-place-in-mobile-apps/.

[4] Michael Mandel, "Can the Internet of Everything bring back the High-Growth Economy?" Progressive Policy Institute, September 2013, http://www.progressivepolicy.org/issues/economy/can-the-internet-of-everything-bring-back-the-high-growth-economy/.

[5] For example, India is pioneering the use of smartphone apps to help farmers make decisions about the use of fertilizer. See also http://www.businessinsider.in/3-Apps-that-can-revolutionize-Indias-Agriculture-sector-very-easily/articleshow/47802227.cms

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[8] Among all six Southeast Asian countries, Vietnam seems to have the most complete results from the Indeed job search engine. It also has the highest number of App Economy job postings as a share of total job postings. We therefore used the Vietnamese data as a benchmark to interpolate the missing observations. Second, we used data from other countries to develop a ratio between the number of App Economy job postings and the total workforce of the employer. Finally, we assumed that each job at an app developer generated 0.5 local jobs, the same conservative ratio that we have used in all previous work.

[9] Our experience with job posting data from the United States and the United Kingdom is that while the exact number of job postings from a search changes from day to day or even minute to minute, the rank ordering basically stays the same over time.

[10] CNBC Asia Mobile, "Indonesia plays hardball with smartphone manufacturers," April 2, 2015, http://www.cnbc.com/2015/04/02/indonesia-plays-hardball-with-smartphone-manufacturers.html.

[11] Ibid.

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The Progressive Policy Institute (PPI) is an independent research institution that seeks to define and promote a new progressive politics in the 21st century.