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DR. MICHAEL MANDEL
PROGRESSIVE POLICY INSTITUTE

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INTRODUCTION

The global App Economy was born 16 years ago, in July 2008, when Apple unveiled the first App Store. Soon after, Google opened the Android Market, which later became Google Play. In this way, Apple and Google created a whole new global market for mobile applications, leading to an unprecedented wave of mobile apps in gaming, entertainment, social media, finance, e-commerce, productivity, health, and other areas.

In addition to benefiting smartphone users, the App Economy has become a potent source of job growth worldwide and in Argentina. Starting from zero 16 years ago, the Progressive Policy Institute (PPI) estimates that Argentina's App Economy includes 28,000 workers as of September 2024. These include workers who help develop, maintain, and support mobile applications and keep them safe and secure.

One of the hottest new areas of the App Economy has been the application of artificial intelligence (AI) to mobile apps. We will see a wide variety of AI-enabled mobile applications developed to improve efficiency and user-friendliness in areas such as health care, manufacturing, agriculture, mining, and government. Such applications of AI to mobile apps may be easier and quicker to develop than more massive "foundational" systems, such as ChatGPT and its competitors.

From the perspective of Argentina — which is fighting a serious economic downturn as of the date of this paper — this trend offers new opportunities for the country to participate in the global tech boom. President Javier Milei, who took office in December 2023, has been encouraging investment and hiring by global tech firms and positioning Argentina as a

potential global AI hub.[1] One way Milei's effort could succeed is by using the combination of AI and the App Economy to help boost the IT sector.

This paper takes an initial look at the potential convergence of AI and the App Economy in Argentina. First, the paper estimates the number of workers employed in Argentina's App Economy, using a methodology we have applied globally. We estimate the size of the iOS and Android ecosystems and give examples of App Economy jobs in Argentina. Second, the paper estimates the number of workers employed in AI-related jobs in Argentina using the same methodology and gives examples of AI-related jobs. Third, the paper discusses how AI can help grow Argentina's App Economy.

METHODOLOGY AND FRAMEWORK

For the past decade, PPI has done a series of reports on the App Economy in countries around the world.[2] For this report, a worker is in the Argentine 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 the 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 either by the goods and services purchased by the enterprise or by the income flowing to core and indirect app economy 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.

To estimate the number of core App Economy jobs in Argentina, we use the same methodology we have applied in other countries, combining multiple sources of information in a systematic process. The first step is to do a search of current public job postings for jobs that use App Economy skills.[3] Next, we validate the output of the search, making sure that the selected job postings correspond to active App Economy hiring in Argentina. Then we translate the data on App Economy job postings to an estimate of core App Economy jobs, using International Labour Organization's estimates of the number of information and communications technology (ICT) professionals in Argentina. Finally, we use a conservative multiplier of indirect and spillover jobs to estimate overall App Economy jobs.[4] (A more detailed description of the basic methodology is found in "The App Economy in Europe: Leading Countries and Cities, 2017" and "The App Economy in India.")[5]

APP ECONOMY RESULTS

Table 1 summarizes the results of this analysis. We find an estimated 28,000 App Economy jobs in Argentina as of September 2024, including a conservative estimate of spillover effects. That's up from a revised 20,000 App Economy in February 2018, the last time we analyzed the Argentine App Economy.

Please note that these 2018 estimates have been revised downward from estimates previously published by PPI.[6] Specifically, PPI's original 2018 estimates of App Economy jobs were based in part on 2014 data on ICT professionals in Argentina — the latest available from the ILO at the time — with a very conservative extrapolation to 2018. This extrapolation was reasonable given the growth of the overall Argentine labor market.

However, when the ILO finally released the actual 2018 data on ICT professionals, the numbers were much lower. This is the data that was used to produce the revised estimates for 2018 found in Table 1.[7]

Our methodology also allows us to break down the App Economy by mobile operating system. We find an estimated 14,000 jobs in the iOS ecosystem as of September 2024 and an estimated 21,000 jobs in the Android ecosystem. (The two add to more than the total because many posted jobs are in both ecosystems).

TABLE 1: THE APP ECONOMY IN ARGENTINA (THOUSANDS OF JOBS)

	SEPTEMBER 2024	FEBRUARY 2018*
TOTAL	28	20
IOS ECOSYSTEM	14	13
ANDROID ECOSYSTEM	21	17

**Revised from previously published estimates*

Data: PPI, Indeed, ILO

We can also compare the Argentinian App Economy with selected other countries. Our preferred metric is "app intensity," which is the number of App Economy jobs as a share of total employment.

Table 2 compares app intensity for selected countries, drawn from recent PPI reports. Argentina's app intensity of 0.2% is higher than South Africa's app intensity of 0.1%, but lower than Brazil's app intensity of 0.4%. We expect Argentina's app intensity to rise over time, in line with the trends in other countries.

TABLE 2: APP INTENSITY FOR SELECTED COUNTRIES (THOUSANDS OF JOBS)

	TOTAL APP ECONOMY	APP INTENSITY*
ARGENTINA (2024)	28	0.2%
SOUTH AFRICA (2024)	15	0.1%
TURKEY (2023)	112	0.4%
ITALY (2023)	144	0.6%
BRAZIL (2023)	428	0.4%

Data: PPI, Indeed, ILO

**App Intensity is the number of App Economy jobs divided by total employment*

APP ECONOMY EXAMPLES

As of September 2024, Argentina was showing some early indications of slowly emerging from a brief but sharp economic slowdown. The weakness in the labor market temporarily dampened hiring by local app companies. Nevertheless, the continued strong demand for Argentine app developers by global companies supported Argentina's App Economy, and by extension, the rest of Argentina's economy, through the tough months of 2023 and 2024.

For example, as of September 2024, Buenos Aires-based food and restaurant management company Fudo was seeking a senior mobile developer to support their in-house app development that enables restaurants to track orders and handle payments. Buenos Aires-based fintech Ualá, which focuses on mobile finance and banking, was seeking an iOS Developer to support the development and implementation of new features on their mobile platforms.

MercadoLibre, an e-commerce platform based in Montevideo, Uruguay with offices in Buenos Aires, was seeking a mobile software engineer to support and implement new features for their mobile app. Sezzle, a U.S.-based fintech firm with offices in Buenos Aires, was seeking a Senior Mobile Engineer to support its mobile app development process. Capgemini Engineering, a global consulting company, was seeking a Buenos Aires-based Android Software Developer to support and add features to an Android Automotive app. The developer will focus on designing and implementing accessibility features that improve the user experience for people with disabilities.

AI-RELATED JOBS

In this paper, we make an initial estimate of AI-related jobs in Argentina. The estimate is based on our analysis of the number of current and recent job postings that contain AI-relevant terms such as "artificial intelligence"

and "machine learning."[8] Our AI job estimation procedure then follows along the basically same lines used to produce the estimate of App Economy jobs, as described in the methodology appendix to the 2019 paper "The App Economy in India."[9]

We find that Argentina has an estimated 12,000 AI-related jobs, including a very conservative estimate of spillover effects.[10] We do not have a baseline of prior research to compare this number, except to note that it's a sizeable number for Argentina's tech sector.

As of September 2024, several homegrown AI companies are bringing innovation and growth to the Argentine economy. BotMaker, a company that creates generative, large language model (LLM)-based solutions for customer service and support automation, began in Buenos Aires, and their solutions are popular across Latin America. Buenos Aires-based Keepcon leverages AI for content moderation, social media management, and support. Cognitive Latam, also based in Buenos Aires, focuses on AI for use in user interface design, marketing, and software development to improve productivity across a variety of industries. Etermax, an Argentine tech company founded in 2009, helped develop a smartphone application to diagnose and assess the severity of psoriasis using AI.[11]

Global companies were also hiring workers with AI skills in Argentina, given both Argentina's already existing reputation as a source of IT expertise and the lower relative cost of salaries in Argentina for workers in IT. For example, as of September 2024, Irisity, based in Gothenburg, Sweden, was seeking a Buenos Aires-based developer focusing on computer vision and deep neural network technologies. Xometry, an on-demand manufacturing marketplace company based in Bethesda, Maryland, was advertising in Argentina for a senior machine learning engineer in Buenos Aires. Bunker db, a marketing technology firm headquartered in Montevideo, Uruguay, was seeking a data scientist in Buenos Aires. San Francisco-based Braintrust, a company that creates AI-powered recruiting and hiring products, was seeking a Data and AI Engineer in Argentina.

AI AND THE APP ECONOMY

Unfortunately, our current methodology does not allow us to reliably estimate the overlap between AI jobs and the App economy. However, here's what we do know. First, the idea of jobs related to "artificial intelligence" covers everything from the experts who design and train massive foundational models to users who have learned how to build chatbot prompts (otherwise known as "prompt engineering").[12] Some of these areas may be too capital-intensive for Argentina's current economic situation.

More relevant to Argentina's stage of tech growth, AI technologies are being found in more and more mobile applications. These are becoming easier to develop, especially as AI models are retooled to run on smartphones.[13] This creates opportunities for a whole new generation of apps, especially in areas such as health, manufacturing, construction, and agriculture. These are activities that deal with the physical world, which is inherently complicated and requires AI to achieve useful results.

Consider agriculture, for example. The use of AI in agtech apps is booming. Farmers have access to all sorts of data, from weather, to soil sensors, to satellite imagery. As one 2024 article wrote:

"With AI, the number of different data points that can be connected and analyzed at the same time is much larger. This allows for new and novel mobile apps to be developed with features that cannot be created without AI."[14]

The global market for apps that use AI to solve important real-world problems in agriculture and other industries is likely to expand rapidly, creating the potential for apps that generate export earnings. Apps also already have a global sales and distribution system in place, through app stores. That means Argentine companies that develop apps which use AI will find it easier to serve customers around the world.

As the use of AI in mobile apps advances, more and more skilled workers will be required by industries and companies. Argentina has a higher share of the adult population with a tertiary education than Mexico, Brazil, and even Italy, according to OECD data.[15] That makes Argentina well-positioned to take advantage of the opportunities offered by the combination of AI and the App Economy.

CONCLUSION AND POLICY IMPLICATIONS

The Milei administration has the goal of boosting the IT sector. We are not in a position to offer Argentina's government direct policy advice. We note, however, that Milei's administration has taken actions to help the IT sector, including reducing the "PAIS" tax from 17.5% to 7.5% on most imported products and eliminating price controls on telecommunications services. He also worked with Argentina's Congress to pass legislation that included a large investment incentive regime (RIGI, for its Spanish language acronyms) including tax, customs, and foreign exchange benefits.

We close this paper with a word about policy and tech regulation. Today, there is a global debate about how best to regulate tech innovation, including AI. The European Union has chosen an aggressive model of "ex-ante" regulation — embodied most notably in the Digital Markets Act (DMA) and the EU AI Act — has served as a template for other countries, including Australia, India, Japan, and South Korea.[16]

At the same time, we also note that the EU's push to impose a new ex-ante regulatory framework on the information sector, starting with the 2016 General Data Protection Regulation (GDPR) and continuing through to the DMA, seems to have done little to accelerate European tech growth.

Meanwhile, the United States has maintained extremely strong gains in the information sector without passing a DMA-like law or specific AI regulation. Instead, competition issues are being handled within the framework of existing antitrust law.

The data is clear. The strong performance of the US economy is being substantially driven by the information sector, which has accounted for roughly one-third of US GDP growth since 2019. Indeed, labor productivity in the US information sector has risen at an annual rate of 5.2% since 2019, while labor productivity in the EU information sector has risen at an annual rate of only 1.3% since 2019.[17]

What's new is that EU policymakers and economists are finally acknowledging that the region suffers from a huge innovation problem that the DMA and tech regulation won't fix. In September 2024, Mario Draghi, former president of the European Central Bank and former prime

minister of Italy, issued a report on "The future of European competitiveness."[18] The report says, in no uncertain terms, that "the EU's regulatory stance towards tech companies hampers innovation." In particular, Europe's focus on "ex-ante" tech regulation shows no sign of closing the innovation gap, especially in cutting-edge areas such as artificial intelligence.

Should Argentina follow Europe's example? The results of the EU regulatory experiment will unfold over the next several years. Taking account of the lessons — and downsides — of the DMA and related legislation could greatly improve Argentina's digital regulatory efforts.

ABOUT THE AUTHOR

Dr. Michael Mandel is Vice President and Chief Economist of the Progressive Policy Institute.

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2 Countries include the United States, the countries of the European Union, the United Kingdom, Canada, Mexico, Brazil, Chile, Japan, Korea, Australia, Turkey, South Africa, Egypt, Nigeria, Morocco, Vietnam, Thailand, Indonesia, and India. We have analyzed China's App Economy but not published it because of data issues.

3 We use ar.indeed.com as our database. Indeed, which bills itself as "the #1 job site in the world," offers a searchable continually updated database of job postings for more than 60 countries. Because of its global scope, it makes it easier to compare countries.

4 Based on government data, we make the reasonable assumption that each core App Economy job corresponds to one indirect App Economy job in the same organization. Next, we make the very conservative assumption that each core or indirect App Economy job generates 0.5 spillover jobs in the relevant geographic area.

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PROGRESSIVE POLICY INSTITUTE
1919 M Street NW,
Suite 300,
Washington, DC 20036

Tel 202.525.3926
Fax 202.525.3941

info@ppionline.org
progressivepolicy.org