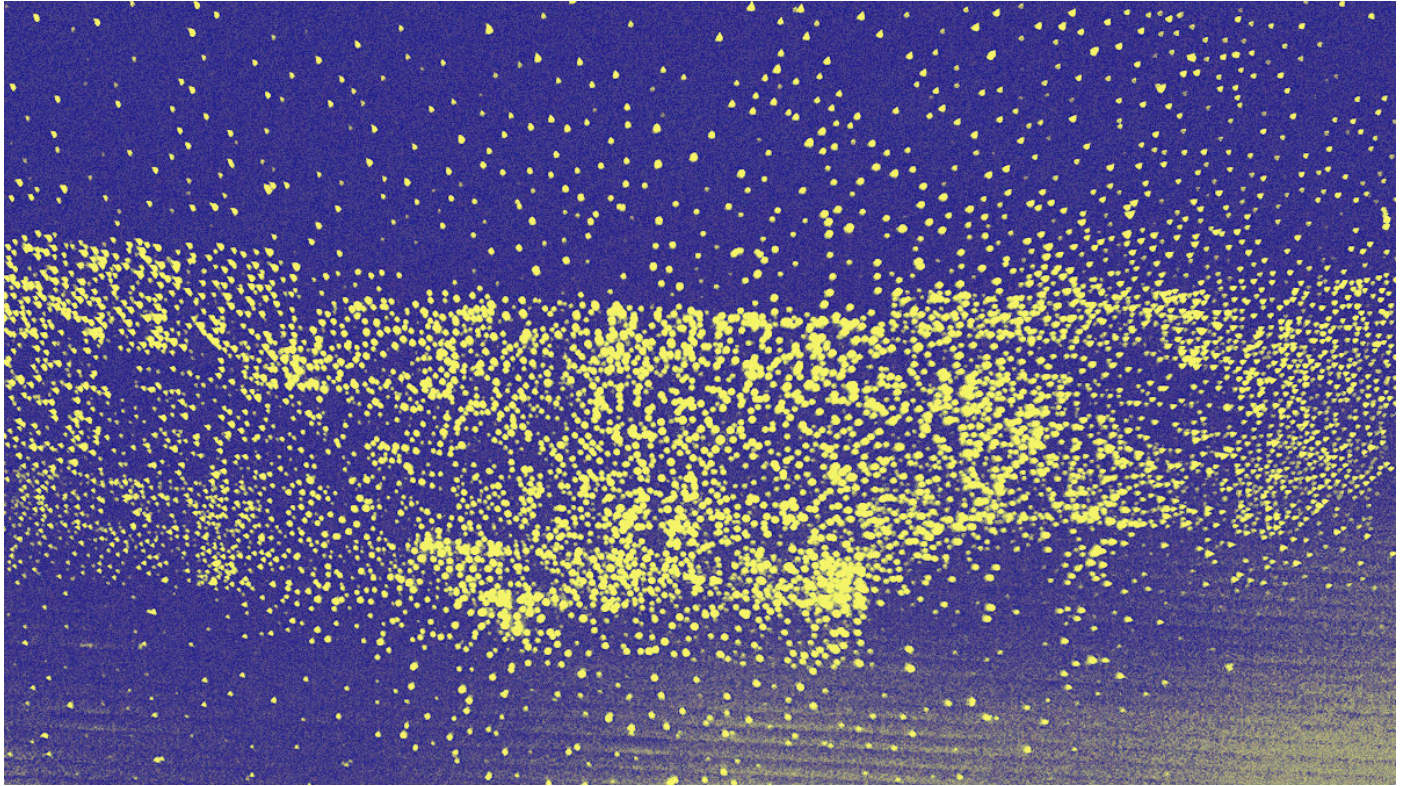


How India Is Moving Toward a Digital-First Economy



On November 8, 2016, India's government did something that no other government had attempted before at the same scale: It decided to remove 86% of the country's currency notes by value from circulation. Over the months that followed, more than 1 billion people participated in a "reboot" of the country's financial and monetary system.

An active debate has since ensued as to how the transition unfolded. Some have seen calamity for the economy, [while others](#), like us, see something quite different: a threshold moment in India's digital transformation. Consider, for example, a government payment system created in 2016 that was processing 100,000 transactions per month in October of that year, prior to the sudden demonetization. A year later, after demonetization, the

same system is processing 76 million transactions per month. Meanwhile, [according to India's Ministry of Finance](#), the country's economy is operating with \$45 billion less cash than it did prior to demonization. India's digital infrastructure is coming to life, with [a combination of policy](#) and technological innovation having played an important role. The country is moving rapidly toward a digital-first economy.

One of us, Arvind, is head of technology for Indian Prime Minister Narendra Modi's BJP party, and has been for the past seven years. His views on digital transformations include his experience as a member of the research team that developed the first web browser (Mosaic, the predecessor to Netscape) in the early 1990s and as a technology entrepreneur. The other, Philip, is an economist whose most recent book traces processes of digital disruption over the long arc of human history. We collaborated here to describe what we see as a truly unique story of government-led digital disruption.

Demonetization isn't the only high-profile economic act India's government has undertaken recently. It has also implemented what was arguably the largest-scale tax reform ever implemented at a single time: the replacement of a complex web of 17 different taxes with a single Goods and Services Tax (GST). Once again, predictions of dire consequences preceded the move, and critiques of the implementation of the policy have followed since. Yet the fact remains that, in the first month after the introduction of the GST, [over 1 million businesses registered with the system](#). In only the first few weeks after implementation, the increased transparency and digital data availability that are integral to the GST began to open up new sources of lending to small and medium-size enterprises (SMEs). However haltingly, and with whatever inevitable difficulties occurring along the way, the bottom line is that a process of rationalization of the tax code is, after decades of delay, under way at last.

Digital Transformation in Government Does Not Happen Quickly

The benefits of digital transformation in the provision of government services do not occur overnight. In fact they are always greatest over the long-term, while the [costs are concentrated](#) in the near-term. That is exactly why technology-led disruption is generally resisted by *status quo* interests: at least some of them lose out as a consequence of change. For this reason, the debate over short-term consequences of disruption largely misses the point of this, or any, technology-led disruption.

This general point holds very specifically for demonetization and GST implementation; these were policies designed to have long-term and dynamic effects. While the accelerated uptake of digital financial services following demonetization and the increased lending to small businesses following tax code reform came as a surprise to many outside observers, neither was an unintended consequence of the policy; they were consciously intended to activate India's digital infrastructure.

The name for this digital infrastructure reflects its roots in the world of software development rather than public policy: It is referred to as [the "India Stack."](#) In the software world, a "stack" refers to multiple, interdependent layers of software services that are built on top of one another. The India Stack comprises multiple layers, but the layers in this case are defined by different categories of government services. At the base of the stack — and thus at the beginning of India's story of digital transformation — is a nationwide system of digital identity, generically termed the UID (Unique Identification) system, but more often in India referred to by its project name, Aadhaar.

Aadhaar: The Base of the India Stack

In broad terms, digital disruption by government has not kept pace with digital disruption in business. Of the [systems that have broken the 1-billion-user mark](#), many originated in the U.S. and are private-sector efforts — Facebook and Google being among the prominent examples. An exception is Aadhaar, which means “foundation” or “base” in a number of Indian languages, including Hindi.

To state the fact directly: Aadhaar is both the only non-U.S. technical system globally to have broken the 1-billion-user threshold and the only such system to have been developed by the public sector. Due in part to its unique public-sector origins, Aadhaar has the distinction of having reached 1 billion users the fastest; the services built on Aadhaar, through the interoperability that defines the India Stack have, in turn, built their own record of scale and scope.

India launched Aadhaar in 2009 with the then-improbable goal of giving every Indian a single digital identity in the form of a biometric authenticated 12-digit number. This National Unique Digital Identity system combined the best of open technologies to build a system that generates a unique number based upon de-duplication of the applicants’ biometric information, their submitted iris scans and fingerprints. Within five years of the first registration the Aadhaar system, over 600 million people had voluntarily registered with Aadhaar and obtained UID numbers. However, during this initial period, the search for a “killer app” to prove the value of Aadhaar was elusive. While the ability to authenticate identity was now digital, bank accounts and payment systems were still paper-based — requiring separate and laborious Know Your Customer validation procedures that had the result of continuing to exclude a majority of people in India from accessing the benefits of banking.

When Prime Minister Modi assumed power in 2014, he put digital

transformation at the center of his plans. For this reason, [to the surprise of some](#), Modi not only backed the system developed by the previous government but also dramatically increased its funding, broadened its scope, and — most important — amplified its impact.

Using Technology to Go from Identity to Financial Inclusion

Among the first actions the Modi government undertook was to launch the Pradhan Mantri Jan–Dhan Yojana (PMJDY, or Jan Dhan) financial inclusion program on August 28, 2014. On the very first day that Jan Dhan was implemented, the government created 10 million bank accounts using existing Aadhaar IDs in a paperless manner, at a fraction of the minimum previous customer acquisition costs. Since then, the government has created more than 300 million new, no-frills bank accounts. In addition to a free, zero-balance account, the Jan Dhan provides accident insurance coverage of 100,000 rupees (about US\$1,500), along with an overdraft facility of 5,000 rupees (US\$80) available for account holders — the point being to incentivize people to participate in the formal banking system.

Having a biometrically-verifiable identity number and a bank account created the potential for adding another layer to the service stack: mobile payments. With an identity to create a bank account, and a bank account to receive funds, the hundreds of millions of people eligible for the receipt of government services in India suddenly had a way to access those services digitally, from beginning to end. In India this digital infrastructure is nicknamed the “JAM” trinity, referring to innovative interlinking of Jan Dhan (low-cost bank accounts), Aadhaar (identity), and mobile numbers. The India Stack could now have four layers: an identity layer, a documents layer, a payments layer, and a transactions layer.

To understand the human impact of these changes, consider the plight of a

mother in an Indian village who is eligible for a government subsidy to send her two daughters to school. Until less than two years ago, in order to avail herself of those funds she would have needed to fill out a form verifying her daughters' attendance, get that form validated by the school, and bring that form to a government office. Assuming there were no impediments in the processing of the form — a big assumption — she would then have waited as the form traveled up the system to the point when a check would be issued to her in the amount of her benefits. To collect the check she would have needed to travel to a government office. If there turned out to be [corruption in the office](#), she would have needed to produce a sum in cash equal to 15%–20% of the total amount before finally receiving the check. Then, of course, she would have needed to travel to a bank to cash the check. In the end, of the 2,000 rupees to which she was entitled, she would (in a good outcome) have received about 1,400 rupees, with the balance having gone to travel and corruption money.

If we consider this same situation using India Stack, the mother can use a tablet or smartphone to validate her identity using her Aadhaar number in the office of her daughters' school. Her eligibility for the program is already in the system, and her Aadhaar number is now linked to the zero-balance bank account created for her under the Jan Dhan financial inclusion program. The workflow approves her request in a batch process. Within 24 to 48 hours she gets an alert on her phone that the full 2,000-rupee amount has been transferred to her bank account.

The India Stack has had a similarly transformative impact on the provision of government services through a number of other programs, notably including pensions and the provision of cooking gas, with comparable gains in both the quality of the citizen experience and government efficiency. In the cooking gas program alone, more than 20 million people have voluntarily given up a benefit they had previously claimed, but for which they were not

rightly entitled, and over 25 million households now get their cooking gas subsidy directly into their bank accounts, simply as a consequence of having government services linked to their Aadhaar number. As with the case of the school fees, the subsidy is going to the intended beneficiaries directly — not to intermediaries.

The Shock Therapy of Demonetization

As of our writing, 1.18 billion users have registered with the Aadhaar system. (For the record, these registrations are voluntary. However, the fact that an Aadhaar ID is required to link bank accounts, SIM connections, and income tax returns, among other services, has made the possession of an Aadhaar ID number a functional requirement in Indian society today, much as a driver's license or other government-issued ID is a functional requirement in the United States.) But the government of India did not — and does not — conceive of the deployment of the India Stack as a purely technical undertaking, designed exclusively to improve the delivery of government services. Rather, the India Stack is envisioned as new social infrastructure with the capacity to increase the resilience of Indian society to change, and thus to help propel India into the 21st-century digital economy. The deployment of the India Stack was one significant precondition for major structural reforms undertaken by the Modi government. This brings us back to demonetization and implementation of tax reforms.

The idea of accomplishing a dramatic shift in the nature of the economy with a set of suddenly implemented policies is not new. The “shock therapy” programs of the early 1990s, intended to accomplish the shift from socialist to market economies in Eastern Europe and the former Soviet Union, were based on a similar premise. However, where those programs created an environment in which a few powerful individuals were able to appropriate vast quantities of formerly government-held assets, India's digital shock

therapy has — measurably and verifiably — accomplished the opposite: It has eliminated vast concentrations of “off-the-books” wealth, resetting the clock of development at a more equitable starting point.

When India underwent demonetization, the India Stack was suddenly and dramatically thrown into action. India’s own payments corporation launched the BHIM application, a digital payments platform using the Universal Payments Interface underlying the JAM trinity. BHIM became one of fastest-downloaded financial payments applications in recent history. The Universal Payments Interface system is very inclusive, such that it serves both smartphone and non-smartphone users, so every Indian can access banking and make payments digitally.

The result? To begin with quantitative outcomes, the Indian economy is operating with about \$45 billion less cash than if demonetization had not taken place. Banks have far greater liquidity, SME lending is at an all-time high, and digital transactions have multiplied 760 times over in some cases.

When it comes to the tax system, too, the India Stack plays a big role. To appreciate the magnitude of change involved in this policy change, it is important to note that the government of India is structured as a federal system, with states having powers and responsibilities at least as great as those of states in the federal system in the United States. Prior to the introduction of the GST, companies of any size in India had to keep track of no fewer than 17 different categories of taxes on sales and transactions, including state-level value-added taxes and levies on the interstate transportation of goods. On July 1, 2017, all 17 of those taxes were subsumed into one tax: the GST.

The implication of this policy change meant an opaque and irrational system that had developed over decades, and that varied across states, was

replaced by a simple, transparent system applicable nationwide. For this reason, the slogan that the government of India adopted for the introduction of GST was "One nation, one tax."

But as with other types of disruptive change, GST can be understood as the beginning of a long-term process. State governments must do their part to simplify and harmonize the tax code, rather than protecting treasured exceptions and localized benefits. The central government must continually use feedback to ensure its online payment system is as easy to use as possible. And, yes, businesses will need to adjust to a new reality, which will be costly in the short term. The reward will come when India truly sheds the antiquated and inefficient tax systems that built up during the first 70 years after independence, and replaces it with the 21st-century, digitally-enabled digital alternative to which the country is currently adapting.

Building a Digitally Empowered Society

India is adding almost 110 million smartphone users every year, and is on the verge of launching Aadhaar-compliant devices with biometric authentication built into phones and tablets. The power of the JAM trinity will come into full force when transactions are enabled using Aadhaar and biometric authentication, creating a system that is not only cashless but cardless. Already, a new entrant into telecommunications service in India has succeeded in using the India Stack to enroll 108 million consumers in 170 days with a totally paperless, mobile-centric manner — in the process achieving customer acquisition costs of less than \$1 (USD) per customer, compared with the prior industry standard of \$25.

The process of digital disruption — whether led by government or not — creates numerous significant social challenges. Rather than seeking to slow that process to reduce those challenges, India has taken the opposite

approach: to not only embrace but accelerate digital disruption, to ensure its full potential for economic and social inclusion is realized.

India's development was inequitable and inconsistent for far too long; the country still has a long way to go. The societal challenges created by digital disruption, challenges both expected and unintended, are real. They will be addressed only with a combination of administrative humility and entrepreneurial determination. But the long-term benefits are real.

The reality is that India is moving into the future at an unprecedented rate. And the path it is taking to get there is digital.