INTRODUCTION

Financial inclusion has featured prominently in India’s public policy agenda for a long time and is recognized as one of the most critical aspects of inclusive growth and development. Financial access allows firms to invest and households to smooth their consumption and build capital over time, fostering the creation of businesses and helping to improve people’s livelihoods. It also helps households and firms protect themselves against shocks and better manage risk.

As such, universal financial inclusion has always been a national commitment and public policy priority in India (Chakrabarty 2011). It has been defined as “the process of ensuring access to financial services, timely and adequate credit for vulnerable groups such as weaker sections and low-income groups at an affordable cost” (Reserve Bank of India [RBI] 2008).

India has much to gain from broadening access to finance while maintaining financial stability. In addition to enhancing individual opportunities, it has positive macroeconomic effects: International Monetary Fund (IMF) research shows that financial inclusion supports growth and lowers inequality, and provided the financial sector is well regulated, it does not hurt financial stability (Sahay, Čihák, N’Diaye, Barajas, Bi, and others 2015; Sahay, Čihák, N’Diaye, Barajas, Mitra, and others 2015; Sahay and Čihák 2020). It also improves the effectiveness of macroeconomic policies, further supporting growth and stability (Loukoianova and Yang 2018). However, financial inclusion of less-productive agents can also hurt growth (Dabla-Norris and others 2015). Financial stability risks increase when access to credit expands without proper regulation and supervision.

Technological developments are changing the way people access financial services. Digital financial services are faster, more efficient, and typically cheaper than traditional financial services and therefore increasingly reach lower-income households and micro, small, and medium enterprises (MSMEs).1 Although digital financial services are still small relative to traditional services, they are growing rapidly and at varying speeds across regions and countries (Khera and others

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1 Digital financial services are financial services accessed and delivered through digital channels, including mobile devices.
Moreover, the COVID-19 pandemic and its need for social distancing have put a spotlight on digital financial services, which helped improve social distancing and allowed governments to disburse funds to those in need quickly and effectively, and enabled many households and firms to rapidly access online payments and financing.

Beyond promoting financial inclusion, digital financial services can also provide impetus to growth and employment (Philippon 2017; Sahay and others 2020). Empirical work based on survey data at the household and firm level points to the economic benefits of digital financial inclusion (primarily mobile money) arising from improved risk sharing, consumption smoothing, and saving (Jack and Suri 2014; Mbiti and Weil 2016; Riley 2016). Based on a cross-country empirical study consisting of data for 52 developing and emerging economies, one IMF study (Khera and others 2021b) found that in recent years, digital financial inclusion in payments has had a positive impact on economic growth.

This chapter focuses on two leading factors in financial inclusion in India—access to payments and credit—with a special focus on digitalization. This reflects that payments, followed by credit, are often the first step and the gateway to gaining access to financial services. While the other dimensions of financial inclusion—saving, insurance, and wealth management—are equally important, they are still nascent, and adequate data are lacking.

In this chapter, the first section reviews developments and trends in financial inclusion in India in the past decade, focusing on the role of digitalization in closing India’s financing gaps. The second section quantifies the impact of digital financial services on financial inclusion through a new digital financial inclusion index. The third section summarizes the empirical evidence of the economic impact of digital financial inclusion, and the fourth section provides a cross-country comparison and analyzes the remaining financial inclusion gaps in India. The final section concludes with related policy implications.

**INDIA’S FINANCIAL INCLUSION JOURNEY OVER THE PAST DECADE**

**Improving Financial Inclusion of Households**

Financial inclusion in India was very low as recently as 2011, when only 35 percent of adults possessed a bank account, well below the average of other emerging market economies (Demirgüç-Kunt and others 2018). Even fewer adults saved with (12 percent) or borrowed from (8 percent) a financial institution (Figure 7.1). Cash was used extensively, with currency in circulation at about 12 percent of gross domestic product (GDP), even though holding cash carried high opportunity cost and availability of ATMs was just 21 per 100,000 adults (IMF Financial Access Survey).

Since then, several government initiatives have focused on laying a digital foundation for improvements in financial inclusion. The first major step was the launch of Aadhaar, the biometric digital ID system, in 2010. This has been a game changer because it facilitated access to bank accounts by reducing the time and the cost of the “know your customer” (KYC) process. Within three years of
its launch, about 600 million Aadhaar digital ID numbers had been issued, equivalent to roughly half the Indian population. By 2017, over 90 percent of the population possessed an Aadhaar and half of the identity holders had linked their bank accounts to their Aadhaar number (Figure 7.2).

Notably, India is neither the only nor the first country to adopt a digitally verifiable unique identity system; similar digital ID schemes exist in countries such as Estonia and Uruguay (OECD 2019). According to the 2017 World Bank

Figure 7.2. Biometric Digital ID System Improved Access to Bank Accounts

1. Rapid Enrollment in Aadhaar Digital ID (Number of Aadhaars issued and linked to bank accounts, cumulative in billions)

2. Share of Population without a National ID, 2018 (Age 15+; percent of total population)

Sources: Unique Identification Authority of India; and World Bank, ID4D Findex Survey data.
ID4D Global Dataset, 83 countries collect fingerprints or biometrics for issuing digitized ID. What sets India apart is the large scale and low unit costs of operating the program, which enabled its billion-plus population to enroll in the program and quickly acquire a national ID that could be used in all aspects of economic life, including swift access to financial services.

The biggest structural shift in access to finance came with the rollout of the Pradhan Mantri Jan Dhan Yojana (PMJDY) scheme in August 2014.

- This was an ambitious financial development policy to provide bank accounts to all households in India and convenient access to saving accounts through a debit card (called RuPay) and mobile banking. A variety of features distinguished this financial inclusion program from previous and similar programs. These include a no-frills, zero-balance account with a debit card, access to mobile banking for funds transfer, overdraft facilities, and built-in basic life insurance coverage (about $440) for all account holders (Agarwal and others 2019). Bank accounts under this scheme could be opened using the Aadhaar ID and subsequently linked to it for the transfer of government benefits.

- In just one year after its launch, 180 million Indians, about 15 percent of the population, had opened accounts as part of the program, and 404 million had accounts by 2020 (30 percent), with 86 percent of the accounts still operative and 73 percent of the account holders using the RuPay debit card (Figure 7.3). Moreover, about 13 percent of PMJDY account holders receive direct benefit transfers from the Indian government under various schemes.

2 As per RBI guidelines, a PMJDY account is treated as inoperative if there are no customer-induced transactions in the account for over a period of two years.
This facilitated a rapid increase in financial inclusion while also narrowing gaps across different dimensions (Figure 7.4). Even though up to a third of PMJDY accounts appear to have been opened for customers who already had a bank account, the scheme does seem to have effectively lifted the accessibility constraint for a large section of the population who were financially excluded in 2014.\(^3\) Between 2014 and 2017, the percentage of the Indian population with an account at a financial institution increased from 53 to 80 percent; that is, more than 300 million people were brought into the formal financial sector.\(^4\) This is considerably above the world average (68.5 percent), South Asia (70 percent), and lower-middle-income countries (58 percent). Based on cross-country comparison, D’Silva and others (2019) underscored that this represented an impressive leapfrogging of traditional financial development, as similar expansions in financial access elsewhere have taken almost half a century. Moreover, the gap in financial access between the rich and poor narrowed, and the gender gap in financial access also improved—55 percent of PMJDY account holders are women and 67 percent of accounts are in rural and semiurban areas.

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\(^3\) See MicroSave PMJDY Wave III Assessment for more information. More details can be found here: https://www.microsave.net/files/pdf/PMJDY_Wave_III_Assessment_MicroSave.pdf.

\(^4\) Improvement since then has been slow, as this percentage remains close to 80 percent even in 2021 according to the recent release of the Global Findex database.
Digital financial services have played a major role in achieving this progress, supported by unique digital infrastructure and an enabling regulatory environment:

- The linking of PMJDY bank accounts with Aadhaar and mobile phone numbers—the so-called J-A-M trinity—provides the foundational digital infrastructure for increasing digital financial inclusion.

- Affordability and access to smartphones have improved significantly in recent years. This reflects increased competition among mobile service providers and affordable smartphones from Chinese manufacturers (available for $20–$30). The number of mobile money accounts in India has grown rapidly, and these now serve more than half the population (GSMA 2018).

Demonetization led to the first surge in use of digital payments, particularly mobile money (Figure 7.5). On November 8, 2016, the Government of India unexpectedly announced the demonetization of major banknotes from circulation, effectively withdrawing 86 percent of currency from circulation and constraining the use of cash. While the effectiveness of demonetization in meeting its other stated objectives of addressing corruption and counterfeit bills and increasing the formal tax base is not clear, it did lead to a spike in the use of digital payments instruments.

India’s largest mobile money payments provider since 2010, Paytm, witnessed a large spike in transaction volumes immediately following the policy announcement, which contrasts with the relatively lower level of transaction activity in the days right before. Chodorow-Reich and others (2020) also document a large increase in mobile money use following demonetization, which was persistent in the increase in the growth rate of the user base (Crouzet, Gupta, and Mezzanotti 2019). This is comparable to international data sets, with the IMF Financial Access Survey reporting growth of 83 percent in the number of mobile money transactions per 1,000 adults between 2016 and 2018 and World Bank Global Findex reporting a 50 percent increase in the share of adults who made or received digital payments between 2014 and 2017. Relatedly, the growth of debit cards transactions around this period (October–December 2016) was 129 percent (RBI 2017).

The launch of interoperable payments, through the Unified Payments Interface (UPI) in 2016, played a major role in sustaining use of digital financial services (Figure 7.6). The UPI allows instant and real-time interbank transactions through various payments platforms, and enabled banks and nonbanks to operate with each other. While demonetization contributed as an immediate trigger to growth in digital payments, the longer-term growth seen since the start of 2016 appears to be explained much more by the growth of UPI—which coincided with increased business formalization and digital acceptance since the launch of the goods and services tax in 2017.

1 Smartphone users numbered an estimated 450 million, allowing them to leapfrog computers as a way to access the internet.

6 In India, Paytm has been the largest mobile money payments firm since 2010, serving more than 400 million users and 14 million businesses as of 2019.
Figure 7.5. Impact of Demonetization and GST on Digital Payments

1. Growth in Digital Transactions
   (Monthly value of transactions, billions of Indian rupees)

2. Paytm Use around the Demonetization Policy Period
   (Daily transaction volume)

Sources: Patnam and Yao (2020); Paytm; and Reserve Bank of India.
Note: Panel 2 shows daily transaction volume from Paytm in blue (as an index with May 1, 2016 as base). The vertical dotted line corresponds to the date of demonetization. The counterfactual prediction calculated based on a Bayesian structural time-series model is shown in red, using proxies for economic/financial market activity growth in the post-demonetization period (based on daily industrial production index, stock market index, and consumption index). GST = goods and services tax; POS = point of service; UPI = Unified Payments Interface.
These different layers of digital infrastructure introduced gradually over the last decade together constitute the “India Stack,” which has helped widen access to digital financial services. Carriere-Swalloy, Haksar, and Patnam (2021) analyze India Stack’s four layers of digital infrastructure. The first is the “presence-less layer” featuring the Aadhaar digital ID system that allows identity verification and mapping of information across data sets. The second is the “cashless layer” built on the UPI’s interoperable payments system. The third is the “paperless layer,” which allows verification of digital documents that can replace traditional paper analogs (e-know your customer, e-signature). The fourth is the “consent layer”—which is yet to become fully operational—that will involve the operation of data fiduciaries who act as intermediaries between individuals and financial companies. These fiduciaries will be charged with facilitating aggregation of individuals’ financial data across their accounts at multiple financial institutions and sharing that data with interested third parties subject to the individual’s consent.

Differentiated types of financial institutions leveraging technology were also licensed to deepen access to financial services. India’s financial sector landscape is dominated by the public sector, with more than 70 percent of banking assets held by public sector banks in 2010, down to 60 percent in 2021. To deepen access to formal banking to the unserved and underserved population through high-technology and low-cost operations, payments banks and small finance banks were set up. In 2014–15, new payments banks were licensed and set up to deepen access to digital savings account, payments, and remittance services by leveraging technology, but they are
not allowed to undertake lending activities (this includes Paytm as discussed above).\(^7\)

Starting in 2015–16, existing nonbank financial institutions and microfinance institutions could apply to become small finance banks with the aim to supply small savings and credit products to disadvantaged sectors.\(^8\)

In 2020, the RBI released its National Strategy for Financial Inclusion 2019–24, which lays out its objectives for financial inclusion policies in India. The strategy aims to provide universal access to financial services—savings, credit, insurance, and pension products—to every eligible adult. It highlights the use of technology and adoption of a multistakeholder approach for achieving its financial inclusion goals and notes that the bank-led model of financial inclusion adopted by the RBI through issuance of differentiated banking licenses (small finance banks and payments banks) is helping bridge the gap in last-mile connectivity.

The COVID-19 pandemic increased momentum in the uptake of digital payments, including through fintech platforms (Figure 7.7). Lockdowns and social distancing accelerated use of digital financial services (Agur and others 2020; Sahay and others 2020). While fintech firms initially suspended operations during the lockdown due to the uncertain impact of COVID-19 on their risk and business models, stresses diminished later in the year and considerable optimism remains about the sector. Data from Tracxn show that despite the global economic slowdown in 2020–21, nearly $3 billion was invested in Indian fintech (compared to about $4.5 billion in 2019), indicating a tempering of investor sentiment due to the economic slowdown. Nevertheless, monthly trends indicate a revival of sentiment as the economic shock of the pandemic wears off.\(^9\)

**Improving credit availability**

In terms of expanding access to credit for businesses, the following initiatives have been undertaken to expand access to credit for businesses.\(^10\) The Pradhan Mantri MUDRA Yojana scheme was launched in April 2015 to enable access to formal finance for MSME businesses by providing collateral-free loans. Close to 1 percent of GDP in loans has been disbursed under the scheme, over one-third to new entrepreneurs. Moreover, the Pradhan Mantri MUDRA Yojana has enabled women-led businesses to access finance—they accounted for about

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\(^7\) They were initially mandated to accept only demand deposits with a maximum daily balance of Indian rupee (Rs) 0.1 million ($1,300), which was increased to Rs0.2 million ($2,600) in April 2021.

\(^8\) Small finance banks are required to (1) extend 75 percent of adjusted net bank credit to the sectors eligible for classification as priority sector lending by the RBI, and (2) ensure that 50 percent of its loan portfolio should constitute loans and advances of up to Rs2.5 million.

\(^9\) During 2020–21 (April–March), $56.1 billion was invested in the fintech sector globally, compared with $84.8 billion in 2019 and $77.8 billion in 2018.

\(^10\) Under Priority Sector Lending, first introduced in 1972, the RBI mandates that 40 percent of banks’ net bank credit must be lent to the priority sectors, including agriculture and small industries.
one-half of the total amount lent under the scheme and about four-fifths of the number of loans. Small finance banks, mandated to extend 75 percent of adjusted net bank credit to the sectors eligible for classification as priority sector lending by the RBI, are also growing. However, their share in the total banking system remains small at less than 1 percent of total banking assets so far.

At the same time, digital lending, facilitated by fintech, is helping fill the gap in MSME financing. Fintech firms are also finding niches in the huge untapped

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market across diverse regions in India for credit to MSMEs and individuals that are new to credit (Figure 7.8). The banking sector is dominated by public sector banks with balance sheet challenges and legacy technology, leaving a huge untapped market for fintech firms. Some nonbank financial companies are adopting technology and using alternative data sets (e.g., transaction data from supply chains) to overcome the lack of credit history and to improve credit assessments.11 Fintech firms in the payments area are also expanding into lending and insurance, leveraging their networks and transaction data. These products are typically developed in partnership with regulated entities (i.e., banks, nonbank financial companies, and insurance companies) and offered on fintech companies’ platforms. Banks and fintech firms are moving toward a “co-creation” model, in which banks take advantage of data available at fintech firms for better credit assessment and monitoring. Fintech firms see benefit in partnering with banks, allowing them access to credit and insurance products without becoming regulated entities themselves. However, a growing number of fintech firms are also offering credit products on their own balance sheets. Activities are less advanced in savings and wealth management areas, although some fintech firms are offering investment platforms with innovative approaches.

11 All peer-to-peer lending platforms are required to be registered with the RBI as nonbank financial institutions, and the central bank regulates them.
Digital lending remains small but is growing at a rapid pace. Total digital loans in India have grown tenfold from 0.07 percent of GDP in fiscal year 2017 to 0.7 percent in fiscal year 2020.

- According to the data collected by the RBI (2021a), even though the share of digital lending by commercial banks is small at 2 percent of their total loan amounts disbursed, it entails more than 10 percent of the loan portfolio of nonbank financial institutions as of the end of 2020 (Figure 7.9, left chart). Digital loans by private sector banks have the largest share, at 55 percent. The share of nonbank financial companies, which includes fintech firms, in digital lending has increased from 6.3 percent in 2017 to 30.3 percent in 2020, indicating their increasing adoption of technological innovations (Figure 7.9, right chart). During the same period, public sector banks have also increased their share significantly, from 0.3 percent to 13.1 percent. The majority of the digital loans extended by nonbank financial companies are found to be short-term, small-sized personal loans and business loans to MSME clients largely for operational use, such as working capital loans.

- Based on cross-country data collected by the Cambridge Centre for Alternative Finance (2021), India is considered a major alternative finance

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**Figure 7.9. Digital Loans Are Being Adopted by Various Types of Lenders**

1. Digital Loans by Banks and Nonbanks (Percent of total loans)

<table>
<thead>
<tr>
<th></th>
<th>FY2017</th>
<th>FY2018</th>
<th>FY2019</th>
<th>FY2020</th>
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<tbody>
<tr>
<td>Commercial banks</td>
<td>% total amount disbursed</td>
<td>% total number of loans</td>
<td>% total amount disbursed</td>
<td>% total number of loans</td>
</tr>
<tr>
<td>FY2017</td>
<td>0.3</td>
<td>14.6</td>
<td>11.9</td>
<td>4.1</td>
</tr>
<tr>
<td>FY2018</td>
<td>89.2</td>
<td>65.7</td>
<td>65.7</td>
<td>55.1</td>
</tr>
<tr>
<td>FY2019</td>
<td>2.3</td>
<td>18.4</td>
<td>14.6</td>
<td>13.1</td>
</tr>
<tr>
<td>FY2020</td>
<td>30.3</td>
<td>30.3</td>
<td>30.3</td>
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</tbody>
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2. Share of Different Lenders in Digital Loans (Percent)

<table>
<thead>
<tr>
<th></th>
<th>FY2017</th>
<th>FY2018</th>
<th>FY2019</th>
<th>FY2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector banks</td>
<td>% total amount disbursed</td>
<td>% total number of loans</td>
<td>% total amount disbursed</td>
<td>% total number of loans</td>
</tr>
<tr>
<td>FY2017</td>
<td>0.3</td>
<td>0.7</td>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td>FY2018</td>
<td>89.2</td>
<td>85.1</td>
<td>65.7</td>
<td>55.1</td>
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<tr>
<td>FY2019</td>
<td>2.3</td>
<td>18.4</td>
<td>14.6</td>
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<td>FY2020</td>
<td>30.3</td>
<td>30.3</td>
<td>30.3</td>
<td>30.3</td>
</tr>
</tbody>
</table>

Sources: Report of the Working Group on Digital Lending including Lending through Online Platforms and Mobile Apps; and Reserve Bank of India.

Note: FY = fiscal year; NBFCs = nonbank financial companies; pvt = private.

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market (i.e., credit through fintechs and bigtechs) in the South and Central Asia regions, contributing 89 percent of recorded digital loan volumes for 2020. In 2019 and 2020, India has ranked among the highest by volume of peer-to-peer and balance sheet consumer/business lending (Figure 7.10).

- This is also comparable to the data set put together by the Bank for International Settlements (Figure 7.11), which shows that while China, the UK, and the US had the highest total global alternative credit in 2019, fintech and bigtech lenders in India and other emerging and developing economies are attaining economic significance in specific segments such as small and medium enterprises (Cornelli and others 2020).

**Central bank digital currency and crypto assets**

Interest is also growing in new crypto assets. No official estimates exist of the size of the Indian crypto market, but informal data collated by the central bank indicate concentrated holdings by a few people, mainly as speculative investments to make high returns and tax incentives. Crypto assets are also being used as collateral/security to obtain loans from emerging so-called “crypto financial institutions.” The rapid growth of the crypto ecosystem and the increasing adoption of crypto assets also pose challenges to financial stability. Moreover, the RBI has stated that it does not consider cryptocurrency a valid payment method (RBI 2022).

This growing interest has motivated the authorities to issue its own central bank digital currency (CBDC). Along with stated benefits such as improving the efficiency of payments by reducing transaction costs and fostering financial inclusion, another key motivation of the RBI has been to offer a risk-free virtual currency, i.e., an alternative to private crypto assets. This is because the central bank
is concerned about the latter’s potential risks to the banking system, financial market stability, monetary policy transmission, implications for the capital account, and monetary sovereignty. The RBI issued a concept note on CBDC in October 2022 and has launched pilots of CBDC in both wholesale and retail segments.12

MEASURING THE IMPACT OF DIGITALIZATION ON FINANCIAL INCLUSION

To quantitatively assess the impact of digitalization in payments on financial inclusion, this chapter uses a new comprehensive measure of digital financial inclusion introduced in Khera and others (2021a). Their sample covers 14 indicators across 52 emerging and developing economies from 2014 to 2017. Instead of relying on a single indicator, they combine data from a variety of sources, which presents a comprehensive picture of financial inclusion combining multiple aspects. The “digital” financial inclusion index aggregates financial inclusion facilitated by digital payments services provided through mobile phone and the internet, combining indicators of both access and usage. On the other hand, they also compute a “traditional” financial inclusion index, which captures financial inclusion driven by access to and usage of traditional financial services provided by banks (including debit cards). These two indices are then combined into a comprehensive financial inclusion index using three-stage principal component analysis. The value of the indices ranges between 0 and 1, with 1 being the highest level of digital financial inclusion. They further calculate male and female financial inclusion indices using the same method, based on gender disaggregated underlying indicators. Gender gaps in financial inclusion are measured as the percentage difference of the respective female-to-male indices.

Results confirm that digital financial payments services have led to an increase in India’s financial inclusion: the improvement between 2014 and 2017 (the difference between the traditional/digital financial inclusion index in 2017 vs. 2014) is driven by both digital and traditional financial services (Figure 7.12). The access and usage subcomponents of the digital financial inclusion index indicate that the increase in digital financial access has played a key role: rapid growth in access to digital financial service agents, high mobile subscriptions, and improvements in internet penetration are the main factors driving digital financial inclusion.

Evidence also suggests that digital financial services can help close gender gaps faster in India. Digital financial services are helping address constraints that affect women in particular—such as mobility and time constraints—by allowing them to access mobile banking accounts from home and having minimum balance requirements that may be more binding for women, among others. Although gender gaps in fintech in 2017 are higher than in traditional financial inclusion, gender gaps have been narrowing and have declined more in fintech-based financial inclusion in comparison with traditional financial inclusion between 2014 and 2017 (Figure 7.13). This is not the case everywhere—the gender gap in fintech instead has widened in some other countries (Bangladesh, Kenya, Ghana, Sri Lanka, and others).

The data sources include IMF Financial Access Survey, the World Bank Global Findex database, the International Telecommunication Union, and GSMA data.
These findings are consistent with the RBI’s computed measure of India’s overall and digital financial inclusion, which covers more recent data from 2017 to 2021:

- RBI computes a multidimensional composite annual Financial Inclusion Index based on 97 indicators representing access, usage, and quality dimensions of financial inclusion. A unique feature of this index, in comparison to the one in Khera and others (2021a), is the quality parameter, which captures quality aspects of financial inclusion, such as financial literacy, consumer protection, and inequalities in services. Moreover, it covers other
financial services beyond payments, such as credit, insurance, and pensions. However, the index is only computed for India and does not provide a cross-country perspective. Ranging from a scale of 0 (complete financial exclusion) to 100 (full financial inclusion), the index increased from 43.4 in 2017 to 53.9 in 2021. This improvement is largely driven by the access subindex, which stood at 73.3, reflecting substantial progress so far in scaling up financial infrastructure (Figure 7.14).
India’s Financial System: Building the Foundation for Strong and Sustainable Growth

RBI also recently released its biannual Digital Payments Index, covering 2018–21, which measures the extent of digitization in payments in India (with March 2018 as the base year). It is composed of five broad parameters including (1) payment enablers (access to mobile, internet, Aadhar, and so on), (2) payments infrastructure—demand-side factors (debit and credit cards, prepaid payments instruments), (3) payments infrastructure—supply-side factors (bank branches, ATMs, business correspondents, and so on), (4) payment performance (volume and value of digital payments, currency in circulation), and (5) consumer centricity (literacy, complaints, frauds). The index shows that adoption of digital payments during 2018–21 grew a significant 40 percent, on average, year-over-year (Figure 7.15).

**ECONOMIC IMPACT OF DIGITAL FINANCIAL INCLUSION**

The positive macroeconomic impact of traditional financial inclusion is well documented, both theoretically and empirically. A number of studies have found that greater financial inclusion boosts growth and reduces poverty and inequality. Financial inclusion impacts macroeconomic performance through various channels: for instance, access to savings instruments helps households smooth consumption during unforeseen shocks, and access to credit enables corporates to improve productivity and competitiveness and promotes entrepreneurship for individuals. Demirgüç-Kunt, Klapper, and Singer (2017) discuss the benefits of financial

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inclusion in reducing poverty and inequality. Sahay and Čihák (2020) find that higher financial inclusion in payments is associated with a reduction in inequality, particularly for those at the low end of the income distribution and when female financial inclusion is high. On growth, Sahay, Čihák, N’Diaye, Barajas, Mitra, and others (2015) find that, for a country with low levels of financial inclusion (25th percentile), improving financial inclusion to the 75th percentile would lead to a 2- to 3-percentage point increase in GDP growth on average. Loukoianova and others (2018) find that a 1 percent increase in their financial inclusion index (equivalent to an increase from the fourth to the third quartile) is associated with a 0.2 percent cumulative increase in per capita income growth over a five-year period for low-income developing countries (and Asia and the Pacific).

This chapter instead focuses on the empirical evidence regarding the economic impact of digital financial inclusion, which although growing is still nascent as a subject in the literature. The bulk of recent empirical work that assesses the economic impact of digital financial inclusion was based on survey data at the household or firm level for specific countries (mainly in Africa). They focused on the economic benefits of digital financial inclusion (primarily mobile money), including from improved risk sharing, consumption smoothing, and saving.

Jack and Suri (2014) found that consumption of households in Kenya that use mobile money is unaffected by shocks, while households that do not use mobile money saw a 7 percent decline in consumption.

Riley (2016) also found similar results on consumption smoothing by mobile money users after rainfall shocks in Tanzania, while the consumption of nonusers from the same village was hurt.

Demombyne and Thegeya (2012) documented the widespread use of mobile money systems for savings in Kenya, and they found that mobile money users are 32 percent more likely to have some savings.

Mbiti and Weil (2016) found a positive relationship among the adoption of mobile money and frequency of sending and receiving transfers, as well as with bank use, formal savings, and employment.

Even fewer papers examine the impact of digital financial services using macro-data. To the best of our knowledge, only one study measured the macroeconomic growth impact of digital financial inclusion. Based on a general equilibrium macroeconomic model, McKinsey (2016) predicted that digital finance (includes both mobile money and mobile banking) could boost the GDP of emerging economies by 6 percent by 2025, informed by field research in seven large countries.

Both macro- and micro-empirical studies by the IMF pointed to significant economic gains from greater digital financial inclusion in India:

- Expansion of digital payments has helped stabilize incomes in India’s rural areas. Patnam and Yao (2020) used district-level data combined with large-scale data on monthly mobile money transactions of about half a billion users in India, and found evidence that access to mobile money increased resilience to rainfall shocks by improving the efficiency of risk-sharing arrangements and dampening the impact on economic activity (the latter proxied by
night lights). A 10 percent increase in mobile money use in districts hit by a rainfall shock reduces the negative effect of the shock by 3 percent. The risk-sharing effects vary by the intensity of mobile money use. For instance, a district in the lower 10th percentile value of transactions can reduce the negative effects of rainfall shock from 18 percent to 16 percent. A district with the median value of transactions, on the other hand, can reduce the negative effects of rainfall shock from 18 percent to 1 percent (Figure 7.16).

- Digital payments have also helped boost sales for Indian firms in the informal sector. Patnam and Yao (2020) also analyzed the impact of mobile-based payments technology on firm sales by taking advantage of a phased targeting intervention that incentivized firms to adopt the technology. Results showed that firms adopting the novel payments technology improve their sales by about 26 percent relative to nonadopting firms.\(^{15}\)

- An increase in the adoption of digital payments in India is associated with higher economic growth. Analysis conducted using data prior to the COVID-19 crisis, in Khera and others (2021b), indicated that an increase in India’s adoption of digital financial payments to the level in China could raise India’s real GDP growth rate by 3–4 percentage points (Figure 7.17).\(^{16}\)

\(^{15}\) Results are overall robust to different methods of identification and placebo tests for validating assumptions.

\(^{16}\) There is significant uncertainty around these estimates as data constraints limit the sample period. The impact on growth may be underestimated as the analysis only captures payments and does not cover several other components of digital finance (savings, credit, and insurance) that may have more direct impact on consumption smoothing and investment.
This is based on a cross-country regression that related the growth rate of the real per-capita GDP against usage of digital financial services (measured by the digital financial usage index in Khera and others 2021a), along with a broad set of variables that serve as conditioning information, including the measure of traditional financial inclusion. Economic activity is assumed to be more directly affected by the actual usage of financial services, which allows consumption smoothing and saving rather than the availability of access. The sample includes 52 emerging and developing economies covering data from 2011 to 2019. To establish causality, an instrumental variable approach is used in which access to mobile money agents and to the internet are used as instrument variables to control for the simultaneity bias and to extract the exogenous components of the digital financial usage index.

Digital payments have helped improve the ability to target government support to households during COVID-19, particularly to women. According to a survey conducted by the National Payments Corporation of India, the Direct Benefit Transfers delivery system worked exceedingly well during the pandemic-related lockdown, as about 90 percent of low-income households eligible for direct benefit transfers received government support post lockdown. Moreover, under the Pradhan Mantri Garib Kalyan Yojana scheme, more than about 200 million PMJDY accounts of women were credited with a total of Rs0.3 trillion.

17 Control variables include level of economic development, government consumption, foreign direct investment, private-credit-to-GDP ratio, population growth rate, and regional dummies.

REMAINING GAPS: A CROSS-COUNTRY COMPARISON

Notwithstanding the recent progress and economic benefits, considerable gaps remain. In absolute terms, India has a large unbanked population; indeed, close to 17 percent of global unbanked adults reside there, according to the 2021 World Bank Findex (Figure 7.18). Significant inequality and regional disparities exist in the distribution of financial infrastructure, and a large proportion of the Indian unbanked belong to the poorer and rural populations, including women. This section delves deeper into identifying the existing gaps in India’s financial inclusion journey, including by comparing its progress to other emerging and developing economies. This can guide further measures that need to be undertaken.

In comparison to other economies, India’s financial inclusion in payments—both traditional and fintech based—is lower than the average for Asian and the Pacific countries (Figure 7.19). The 2017 financial inclusion index compiled by Khera and others (2021a) shows that although India has made a lot of progress in traditional financial inclusion over time—thanks to PMJDY—the progress in fintech-driven financial inclusion is lower than the Asia and Pacific average, thus leaving ample scope for improvement. More recent disaggregated data available until 2021 from the IMF’s Financial Access showed that although there have been further improvements in digital access in recent years, reflected in greater access to mobile money accounts, gaps persist in use of financial services compared with peer countries.

Facilitating the use of financial services remains the biggest challenge. Although access to financial services and number of new accounts has surged, use of financial services has not (Figure 7.20). For instance, the level and increase in savings and borrowing remain very low even as access to financial services has widened. According to the World Bank Global Findex database, the share of adults in India who save with a financial institution increased only from 12 percent in 2011 to 20 percent in 2017 and then decreased to 13 percent in 2021.

![Figure 7.18. Share of Global Unbanked Adults, 2021](source: World Bank, Findex.)
Adults who borrow actually decreased from 8 percent in 2011 to 7 percent in 2017, but has increased to 12 percent more recently in 2021. Even among the population with a bank account, nearly half (48.5 percent) of the accounts remained inactive in 2017, making India the country with the highest inactivity rate in the world. More recent data from the IMF Financial Access Survey also shows that in 2021 India had among the lowest usage of debit cards and mobile and internet banking transactions among peer countries in the Asia and Pacific region, despite having high numbers of mobile money accounts. One of the reasons for the low activity/usage could be the low level of financial and digital literacy. For instance, Sahay and others (2020) found that use of digital financial services is low in countries with lower digital and financial literacy. Shen and others (2019) and Hasan and others (2020) also find that financial literacy increased the likelihood of using digital financial products and services in China. These findings are also comparable with the RBI’s more comprehensive measure of financial services usage subindex, which shows that use remains low, with minimal improvement over 2017–21.

A digital divide is also emerging within the country (Figure 7.21). Only one-third of Indian households use digital payments, and a gap exists between the rich and the poor—a report by the National Payments Corporation of India (2021) showed that whereas one in two of India’s richest 20 percent of households use digital payments, as many as one in four households in the poorest 40 percent use them. This is driven by lower financial literacy, awareness, and access among the poor to digital infrastructure. Digital penetration is limited largely to urban areas (RBI 2021b). For instance, whereas smartphone use is near universal, at 90 percent

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19 An inactive account is defined as one in which no deposits or withdrawals were made within a year.
Figure 7.20. Usage of Financial Services Remains Low

1. Usage of Financial Services (Percent)
   - 2011
   - 2014
   - 2017
   - 2021

   (0–1, higher value indicates higher financial inclusion)

3. Number of Mobile and Internet Banking Transactions
   (Per 1,000 adults)

4. Number of Debit Cards
   (Per 1,000 adults)

Sources: IMF, Financial Access Survey (panels 3 and 4); Sahay and others (2020) (panel 2); and World Bank Global Findex Database (panel 1).

Note: FI = financial institution.
Figure 7.21. India’s Digital Divide

1. Rural-Urban Divide in Access to Digital Infrastructure (Percent)

2. Percent of Adults with Access to a Mobile Phone (Percent, 2017)

3. Internet Users, 2019–20 (Percent of population)

4. Digital Connectivity Index (0–100; higher score indicates higher digital access)

Sources: International Telecommunication Union; Telecom Regulatory Authority of India, Annual Report; and IMF staff estimates.
among the richest 20 percent of Indian households, just 57 percent in the poorest households have a smartphone. According to the Telecoms Regulatory Authority of India, only 36 of 100 rural dwellers use the internet—compared to 107 in urban areas—and only 60 mobile subscribers per 100 people as opposed to 137 in urban areas.\textsuperscript{20} Moreover, gender gaps in digital financial inclusion are high in India: for instance, men are 20 percentage points more likely than women to own a mobile phone. Moreover, RBI’s “quality” financial inclusion subindex suggests that inequality and regional disparity in access to credit and deposits, measured using the Gini coefficient, is significantly high.

Access to finance remains a key constraint to entrepreneurship, especially for women (IFC 2018). MSMEs are considered engines of growth in the Indian economy, with about 62 million in the country contributing nearly 30 percent to GDP, 50 percent to exports, and providing employment opportunities to more than 110 million workers. Despite their economic importance, close to 35 percent of MSMEs are credit constrained (compared to 38 percent average in South Asia). The total addressable demand for formal credit is estimated at $37 million and overall supply of finance from formal sources at $14 million. The overall credit gap in the MSME sector is thus estimated at about $23 million, or 11 percent of GDP (compared to 13 percent in South Asia). Among Asia and Pacific countries, India has one of the lowest levels of small and medium enterprise loans as a share of GDP (Figure 7.22; IMF Financial Access Survey). This is despite several years of government-mandated lending programs (e.g., priority sector lending).

THE WAY FORWARD: POLICY PRIORITIES

This section lays out the key policy recommendations that could help expand and close India’s remaining gaps in financial inclusion, particularly in the usage of financial services, while maintaining financial stability.

Ensuring equal access to digital infrastructure for all segments of the population, particularly in rural areas and for women, is key to closing the existing digital divide. For instance, the government can incentivize telecom operators to establish stable network connectivity in rural areas and private mobile manufacturers to offer smartphones at subsidized prices targeting the underserved and vulnerable. This would help build trust and regular usage of digital financial services, and it would increase women’s financial inclusion because it lowers constraints such as the need for physical travel to a bank branch. In this regard, the Payments Infrastructure Development Fund scheme launched by the RBI in January 2021, which subsidizes both physical and digital Point of Sale infrastructure (e.g., QR code-based payments such as UPI) in underdeveloped areas, is a welcome initiative. Other such incentives for promoting usage of digital financial services could also be considered—for example in the Republic of Korea, wage earners are allowed to claim tax deductions for purchases made using digital payments when they file their year-end income taxes (Klapper and others 2019). At the same time, strengthening the implementation of policies that equalize socio-cultural norms, and legally backing them up, would help narrow gender gaps in digital financial inclusion (e.g., household mobile phones are disproportionately owned or controlled by men).

Strengthening and developing the regulatory framework for digital finance will help expand safe digital financial inclusion. It is important to adapt regulatory approaches to balance support for financial innovation with addressing challenges and risks to financial stability. Although India’s current share of digital lending in overall credit remains small and is not significant enough to affect financial stability, it is growing rapidly. Eliminating the current state of regulatory arbitrage in India’s digital lending space is needed to ensure financial stability. For instance, even though digital lending by and in collaboration with banks and nonbank financial institutions is regulated, a large and growing number of entities and platforms in the digital lending space are not currently regulated (i.e., not registered or layered under regulated entities) and/or operating illegally (i.e., shadow digital lenders). Data compiled by the RBI suggest that 60 out of 100 lending apps in India operated illegally in 2021.

Need is also urgent for stronger data and consumer protection and cybersecurity to bolster people’s confidence to make digital transactions. Even though the mandated two-factor authentication for digital payments and the 2019 Ombudsman Scheme for Digital Transactions21 are positive steps, more needs to

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21 The scheme is designed for resolution of complaints relating to deficiency in customer services in digital transactions undertaken by customers. For information, see https://rbidocs.rbi.org.in/rdocs/Content/PDFs/OSDT31012019.pdf.
be done to safeguard consumer confidentiality and avoid unauthorized transactions and cyberattacks. For instance, concerns related to unfair lending practices are rising as demand for quick digital loans rose during the pandemic. Many digital lenders charge exorbitant interest rates; have additional hidden charges; use data without customer permission, capitalizing on borrowers’ lack of financial literacy; and have used improper or aggressive loan recovery mechanisms. More than 2,500 registered complaints were lodged against such digital lending platforms over 15 months during the pandemic from January 2020 to March 2021. Measures are needed to reduce the risk of “excessive” financial inclusion—which is when access to credit grows under insufficient regulation and supervision—such as the US subprime lending crisis, the more recent rise in default rates to nearly 20 percent on mobile bank loans in Kenya, or the 2010 microfinance crisis in Andhra Pradesh.

Moreover, as digitalization increases, cybersecurity is becoming a key concern. According to the data by Statista, India was among the top-five countries with the most cybersecurity incidents in 2020. More than 1.1 million cyberattacks were reported across India in 2020, up sharply from 0.4 million in 2019 (Figure 7.23). Even though India implemented a National Cyber Security Policy in 2013, which laid down several strategies to counter cybersecurity threats, its implementation has been limited.

Focusing on improving overall literacy rates, which remain considerably low in comparison to peers, including financial and digital literacy, will help India

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22 Some other safeguards include facilities to switch on/off as well as set limits on various types of digital transactions.

achieve its financial inclusion goals and fully utilize its economic benefits. Citizens should be made financially aware of the technological regulations put in place to protect them and must be taught about the safe practices in digital payments and lending. People should be educated on existing and new government schemes providing low interest lending, and regulators must ensure related services are delivered successfully. Recognizing the importance of inculcating financial literacy, the National Strategy for Financial Education 2020–25 was launched. The primary objective is to develop adequate financial knowledge and skills among the Indian population, including through integrating financial literacy curriculum in schools and through collaboration across various stakeholders. Such efforts should continue, including through a robust mechanism of monitoring its implementation and effectiveness.

CONCLUSIONS

This chapter has looked at India’s growth in financial inclusion over the last decade, identifying key drivers and economic impact, focusing on digital financial services as a tool for expanding financial inclusion. Facilitated by unique digital infrastructure and enabling regulatory environment, digitalization is helping close India’s financial inclusion gap. It is also improving targeting of government support to households, as witnessed during COVID-19.

The expansion of digital payments is also an important driver of economic development and has helped stabilize incomes in rural areas and boost sales for firms in the informal sector. Using data prior to the pandemic shows that wider adoption of digital payments could increase India’s GDP per capita by 3 to 4 percentage points.

Even though the country has made immense progress in widening accessibility for the majority of the excluded population, including through a strong supply-side push for digital financial services, policies should focus more on addressing demand-side constraints to promote use of financial services, which remains low. Improving financial and digital literacy, internet and smartphone access, and expanding digital government payments to households (government to person) will help close the emerging digital divide. At the same time, strengthening consumer protection, data privacy, and cybersecurity remain crucial to promoting safe financial inclusion.

REFERENCES


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Chuang’s contributions to our understanding of financial inclusion and digital financial services are multifaceted. Her research has highlighted the role of technologies such as mobile banking and digital payments in enhancing financial inclusion. For instance, in her work with the Reserve Bank of India, she emphasized the critical role of fintech in driving inclusive financial growth and development. Her analysis of the potential of cryptocurrencies also offers a forward-looking perspective on the future of financial services.

In summary, Chuang’s research and advocacy have significantly advanced the discourse on financial inclusion, demonstrating the transformative power of digital technologies in achieving inclusive financial services.
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