



# THE MARCH TOWARDS DIGITAL MONEY: BRINGING THE UNDERBANKED IN FROM THE COLD

With the benefits of digital money well documented, can we afford to ignore the collective economic cost to countries of not driving adoption, or the personal price paid by those left behind?

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## Foreword

For economies and societies, the march of digital technology is at once spectacular and frightening. It offers unprecedented opportunities for improvement and discovery, but it also challenges long established ways of doing things.

This tension is manifestly evident in the world's transition to digital money. The efficiencies and cost savings to economies are potentially staggering, and the social benefits from wider financial inclusion enormous. But cash has been with us for over two millennia; weaning people off it is no trivial matter.

This is why Citi and Imperial College London created the Digital Money Index back in 2014. Recognizing the challenges involved in making the shift, the Index assesses how 90 countries are building the enablers of a digital money economy.

In 2017, its fourth year of updating, the Index reflects this continuing tension, offering both hopeful and troubling news. We are pleased that the world as a whole (as represented by Index countries) continues its slow but steady march toward digital money. There is reason for concern, however, with signs of backsliding in both the lower and upper tiers of the Index. Aggregate improvement in the former is well below that of the latter, highlighting the risk that some low-income countries will fall irretrievably behind in the digital economy. At the top, meanwhile, countries still struggle to bring their unbanked and underbanked into the digital fold.

Because of this, we find it prudent in this year's report to reiterate one of the key messages made in our inaugural one in 2014. Building a strong digital money environment requires a holistic approach, with attention paid in a balanced manner to the four Index pillars. All are equally important.

One country that has done so is India, and the report scrutinises some of the key digital money initiatives its government, with the help of the private sector, has pushed through in recent years. Developing countries, it seems, have salutary lessons to offer even the world's digital money leaders.

In this as in any national endeavour, countries that excel invariably learn from the experiences of others. We hope the Digital Money Index will continue to facilitate this in the years to come.

**Greg Baxter**  
Global Head of Digital, Citi

## Shuffling at the Top, Churning at the Bottom

Digital money adoption can transform economies. It can make payments faster, cheaper, safer and more transparent. Digital Money<sup>1</sup> can create opportunities for greater economic participation and more efficient commerce. It matters in principle, and it matters in practice. A ten percent increase in digital money adoption would allow 220 million people to enter the formal financial sector<sup>2</sup>. It can combat corruption and make flows of money more transparent – including \$1 trillion of new flows in the formal economy. And it can increase tax revenues, potentially by as much as \$100 billion<sup>3</sup>.

Around the world, the shift from cash to the use of digital money continues to progress steadily, slowly, and unevenly from country to country. Governments and commercial firms recognize the benefits to be gained, and in large part are seeking to sustain the momentum behind the

transition. This helps explain the 2% upward shift in the Digital Money Index between 2014 and 2017.

However, the gap between those at the top of the Index and those at the bottom is widening. This is concerning given the social and economic

### About the Index

Our Digital Money Readiness Index segments the 90 countries we survey into four quartiles:

#### Incipient

Lacks appropriate infrastructure and financial services.

#### Emerging

Basic regulation and infrastructure exists in these countries, but they often have a large informal economy underpinned and perpetuated by preference for cash.

#### In-Transition

Digital money is starting to make its presence felt in these countries, often in the form of government disbursements. But In-Transition countries still require significant investment in digital initiatives, or the relaxation of regulations to encourage private enterprise.

#### Materially Ready

People in this group of countries are familiar with digital solutions, and live in a regulatory environment that encourages digital innovation.

These are assessed according to four “pillars” that underpin readiness:



**Government and Market Environment**  
the presence of institutional conditions that enable digital money adoption



**Financial and Technological Infrastructure**  
the availability of critical financial and ICT infrastructure



**Digital Money Solutions**  
the availability of government and private sector solutions that exploit digital money



**Propensity to Adopt**  
the extent to which consumers and businesses adopt digital solutions

benefits of shifting away from cash. At the same time, all is not perfect at the top. Index leaders and laggards alike are struggling to bring the ‘unbanked’ (without any type of account) and ‘underbanked’ (with an account of some sort but also using alternative financial services, such as payday loans or check cashing) into the digital fold. Two billion people worldwide do not have any kind of a bank account, although this figure has been on the decline<sup>4</sup>. One recent study suggests that using digital money to reach this group would add \$3.7 trillion dollars to developing country economies by 2025, equivalent to 6% of their GDP<sup>5</sup>. Such figures highlight the collective economic cost to countries of not driving adoption, in addition to the personal price paid by those left behind.

Creative attempts to extend banking services to the unbanked and underbanked through digital channels are being pursued. This report explores

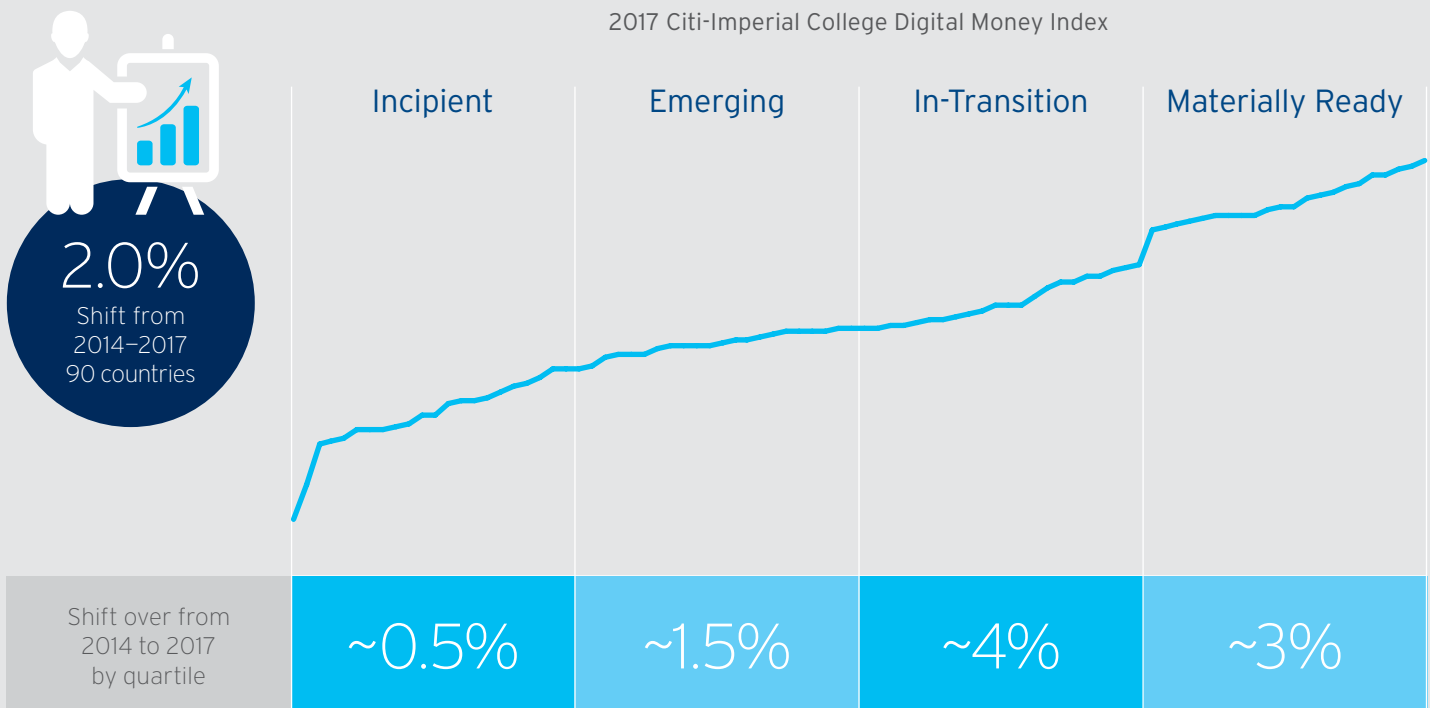
a series of such initiatives and the lessons they provide for other countries in the index.

### Key 2017 findings

The 2017 Index represents more of a shuffling than shifting of countries in their comparative readiness to embrace digital money. Overall, there has not been significant movement across categories. Rather, it’s been a story of small movement within the higher clusters and significant fluctuation within the lower ones.

Consistent with last year’s findings, the research suggests that countries at the top are making more progress in improving their digital money environment than those at the lower end. The Index shows that the average improvement in score over the past three years was highest for countries at the top – at 3% in the Materially Ready cluster and 4% among those in the In-Transition cluster – and just 0.5% at the bottom (Incipient cluster) (see figure 1).

Figure 1. The gap widens



**Weaknesses exist even in the best-performing countries. This underscores the fact that digital money is a journey**

If Materially Ready and In-Transition countries made steady but slow progress - few deviated significantly from the average cluster movement - development at the lower rung of the table was much more uneven, with the vast majority of Incipient countries deviating considerably from the average movement, in both directions (see figure 2).

Even where progress has been made, it has tended to be opportunistic rather than structural or holistic (few countries have progressed against all the four key pillars we defined in the Digital Money Index). Weaknesses exist even in the best-performing countries. This underscores the fact that digital money is a journey that can be sustained only with concerted action across the pillars. There are no shortcuts. True adoption only comes when government, regulators and private enterprise enable and put in place services that are compelling for people to engage.

Happily, the Index is populated with some good individual examples of such action. They include:

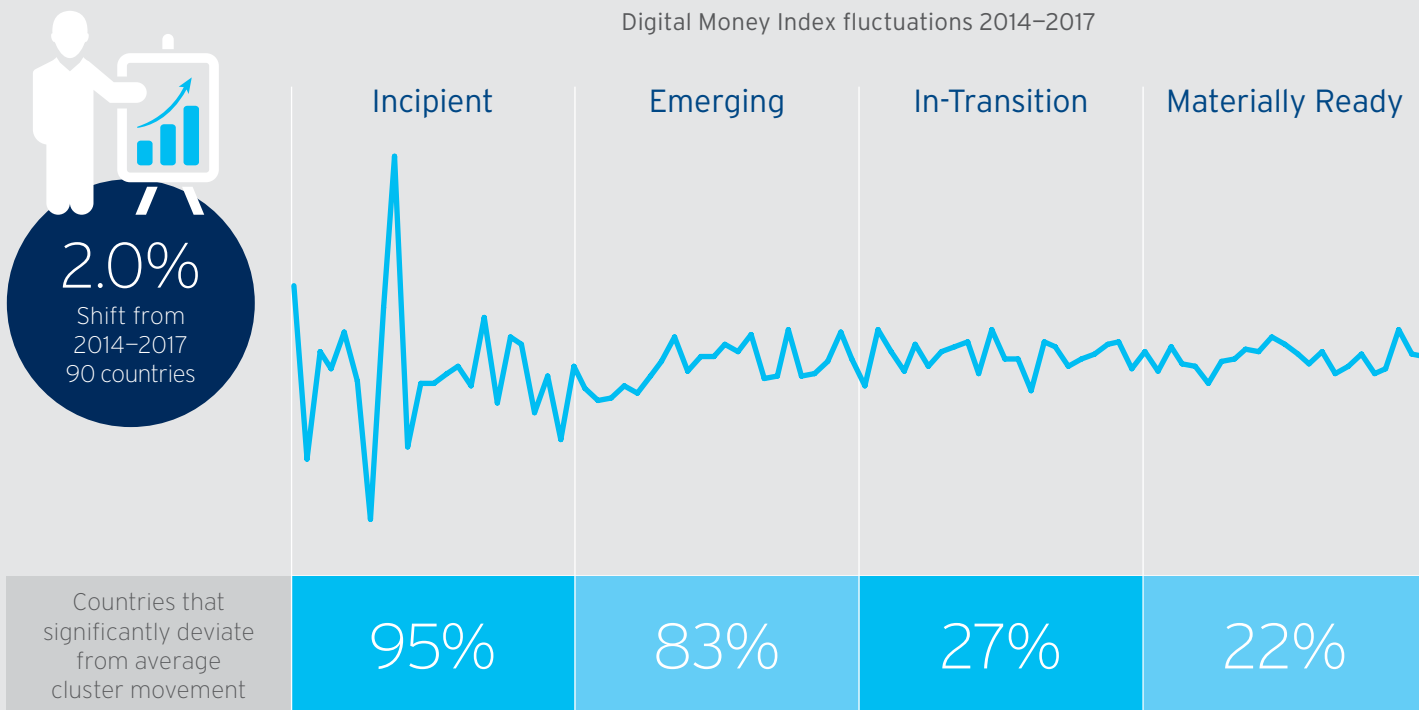
**Bangladesh (Index score up 8.0%<sup>6</sup>)**

Bangladesh is overwhelmingly a cash country, but 90% of government-to-business (G2B) payments have transitioned to digital channels. Meanwhile 69% of the value of payments made by the government are digital. The value of financial transactions via mobile grew 37% in 2016 to reach a yearly total of \$24 billion (an average of \$67 million per day), according to Bangladesh Bank<sup>7</sup>.

**Tanzania (Index score up 4.8%)**

Outside Kenya, Tanzania is arguably the world's most advanced peer-to-peer (P2P) mobile money country. One-third of adults there held a mobile-money account at the end of 2015, and mobile banking activity is clearly gaining pace. In 2016, the Tanzanian market achieved a first when all four mobile operators – Tigo, Airtel, Vodacom and Zantel – agreed to make their discrete wallets fully interoperable. The value of interoperable P2P transfers tripled between July 2015 to July 2016 for three of the country's four mobile operators<sup>8</sup>.

Figure 2. Fluctuations at the bottom



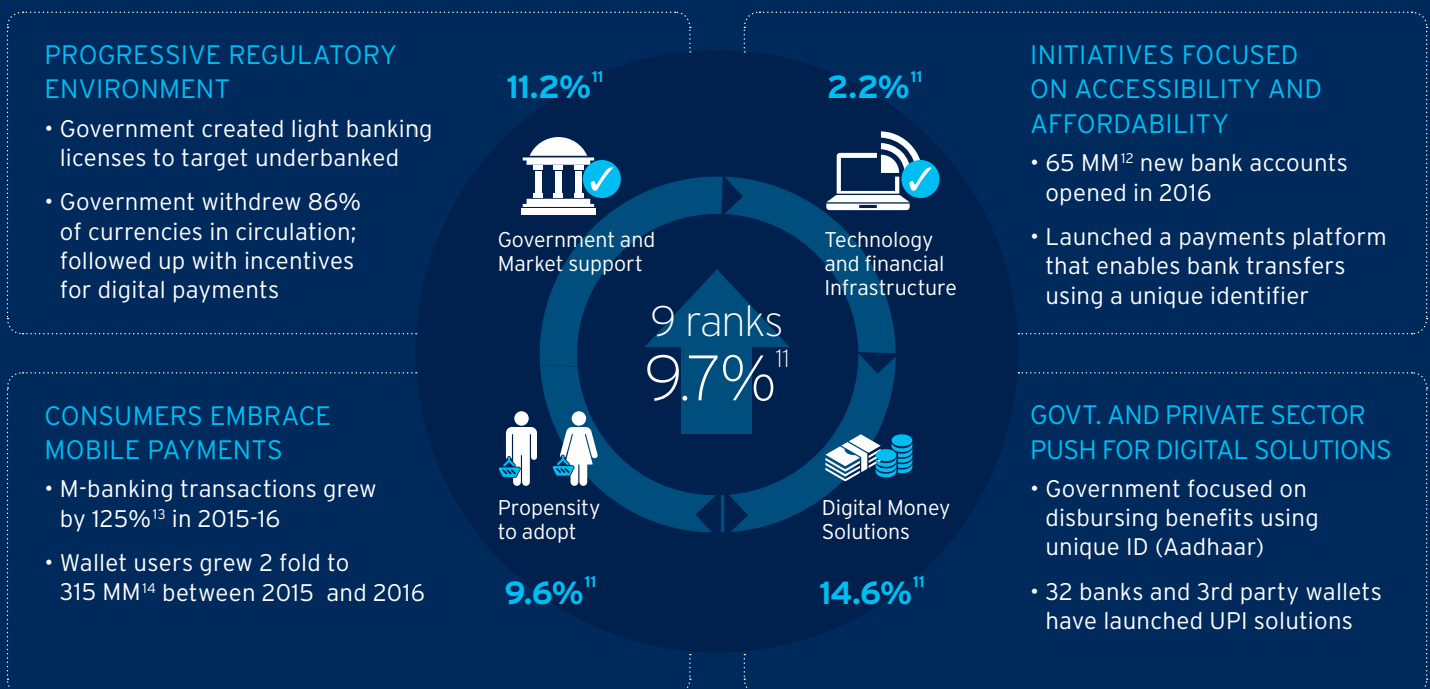
### Vietnam (Index score up 4.5%)

Merchants' digital payment infrastructure has been improving markedly in Vietnam. The number of Point of Sale (POS) terminals has grown at double-digit rates in recent years (33% in 2014 and 30% in 2015), reaching a total of 250,000 by September 2016.<sup>9</sup> This growth in POS terminals, along with the popularity of ecommerce, has resulted in 28% growth of digital payments to a value of \$5.7 billion in 2016.<sup>10</sup>

### India (Index score up 9.7%)

India is one of the stellar performers in the 2017 Index, improving its year-on-year score by almost 10%. More importantly, a holistic approach to building a positive digital money environment has helped India advance in all four pillars; regulation, infrastructure, solutions and adoption (see figure 3). As we will discuss, the country offers lessons to others in progressing their digital money journey.

Figure 3: India stands out, with a holistic approach targeting unbanked and underbanked





Limited overall shift, but a few countries have made material progress in the last year.



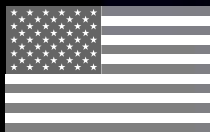
Increase in score (2016-2017)<sup>15</sup>

India	9.7%
Bangladesh	8.0%
Tanzania	4.8%
China	4.6%
Vietnam	4.5%



Digitally serving unbanked/underbanked remains a key challenge/opportunity even for materially ready countries.

LARGE UNDER AND UNBANKED POPULATION IN DEVELOPED WORLD...

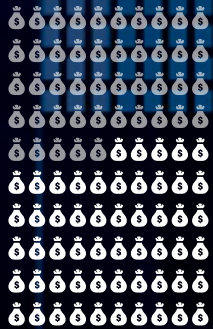


65 million<sup>16</sup>  
USA



93 million<sup>17</sup>  
Western Europe

WITH A HIGH PREFERENCE FOR CASH...



55%  
Cash preference for lower income US households (income of less than \$25K)<sup>18</sup>

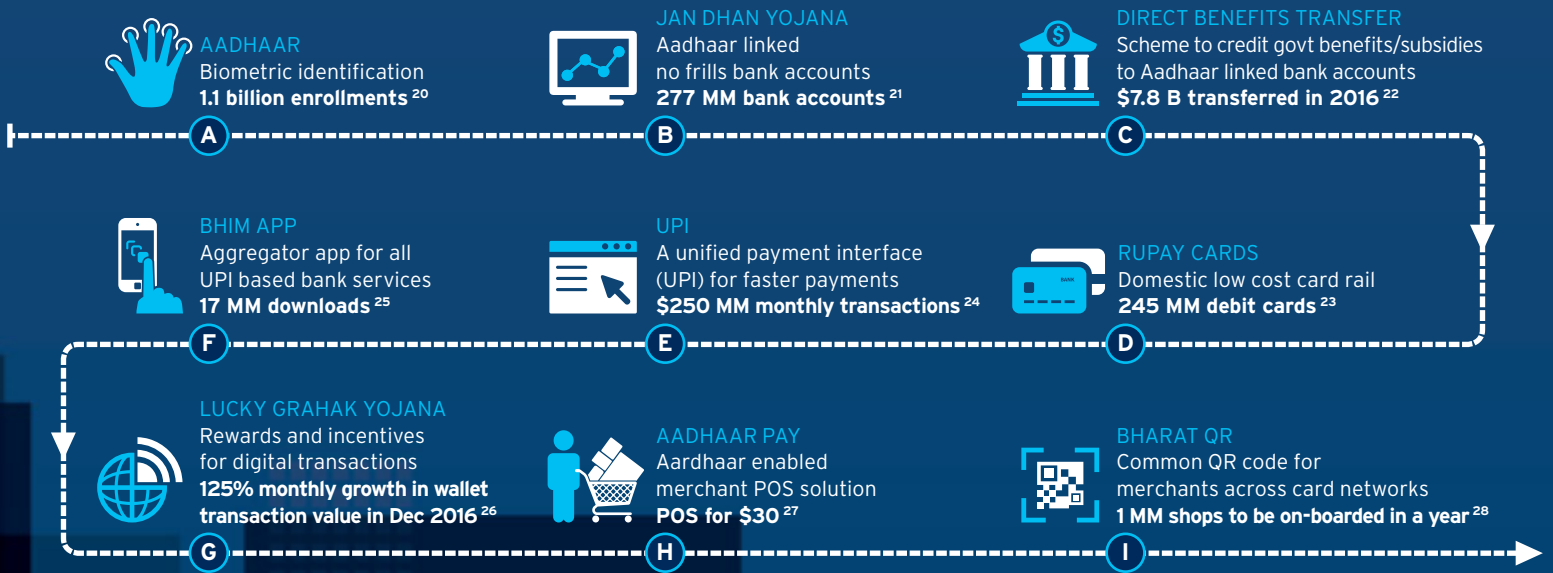
RESULTING IN SIGNIFICANT COSTS TO THEIR ECONOMIES.

1% – 2%  
of the GDP for the developed world

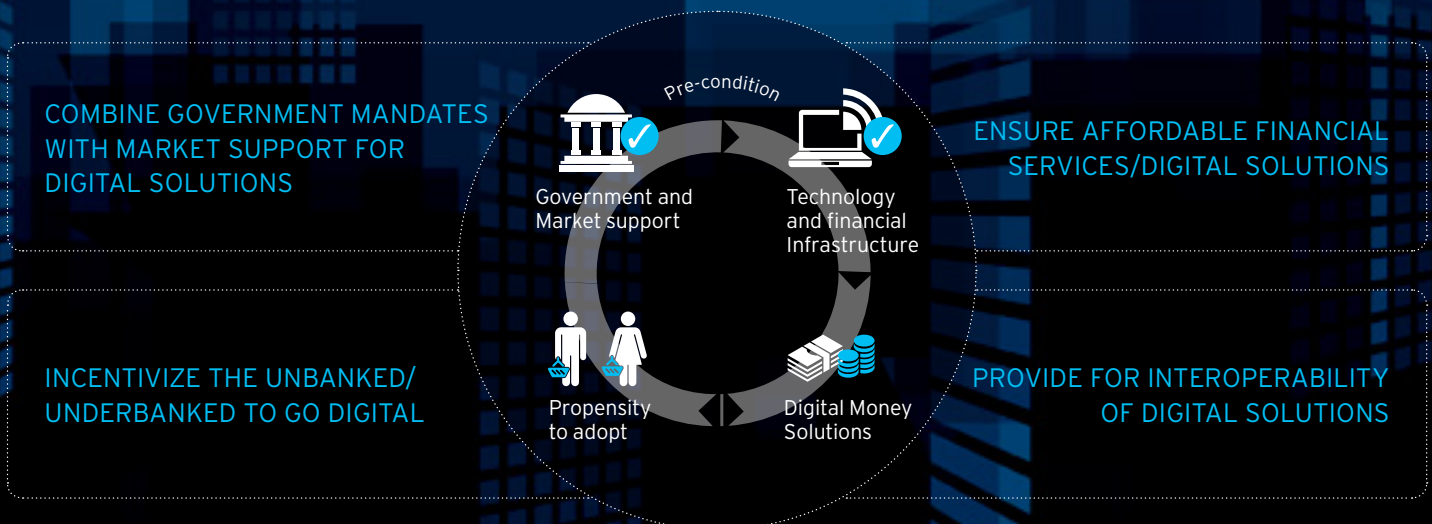
~\$200 billion  
for the US<sup>19</sup>

~\$600 billion  
across developed countries

# India's progress offers some lessons to the West in serving unbanked/underbanked.



# There is a need to go back to basics in order to effectively serve the unbanked/underbanked.



**\$30 billion** POTENTIAL SAVINGS <sup>29</sup> BY REDUCING CASH USAGE OF THE UNBANKED/UNDERBANKED BY HALF IN DEVELOPED ECONOMIES

## Better Serving the Underbanked

A particular weakness of high-performing countries is that many still struggle to serve their underbanked with relevant digital money solutions. Here, their scores reflect unfavourably against Emerging countries. For example, the Index reveals that the affordability of financial services fell by 3.2% in Materially Ready countries, but improved by 2.3% in Emerging ones (see figure 4).

The unbanked and underbanked remain crucial segments in a country's march towards digital money readiness.

The cash economy is costly to support. It is sustained by expensive infrastructure, involving money processing and distribution operations as well as the cash delivery network, which includes ATMs, tellers and dispensers. The 'cost of cash' in the US alone is estimated at \$200 billion a year (equivalent to 1.1% of US GDP)<sup>30</sup>. Significantly, 80% of these costs are fixed (non-transaction driven)<sup>31</sup>.

Hence, while moving segments of the banked population to digital channels has significant benefits, the bigger prize will be won when economies manage to bring the unbanked and underbanked into the digital fold.

In the developed world, the struggle appears more difficult in the United States than in its peers. In 2015, 7% of US households were unbanked and another 20% were underbanked<sup>32</sup>, figures which are higher than in other wealthy countries. Cash usage by this segment can be as high as 50%.

Figure 4. Materially Ready countries struggle with underbanked

Poor performance on dimensions relevant for underbanked



Technology and financial Infrastructure

	Materially Ready	Emerging
Financial services affordability	-3.2%	2.3%
ICT affordability	-0.1%	0.2%

The high cash usage can be explained primarily by two factors. One is a lack of access to the formal banking system. The other is a lack of solutions targeted at satisfying the segment's needs. Materially Ready countries have largely solved the first problem, but solutions targeted at, and affordable to, the unbanked and underbanked population is still a challenge.

In this context, a few fast-improving countries in the lower reaches of the 2017 Index may offer some pointers to the US and other developed countries in serving their unbanked and underbanked. African countries such as Kenya and Tanzania, for example, thanks to mobile operator initiatives, have aggressively pushed mobile money solutions to drive financial inclusion and digitize transactions. These countries benefited from a significantly higher mobile penetration than bank account penetration. In the US, the unbanked and underbanked's access to smartphones similarly exceeds their access to credit and other banking services<sup>33</sup>.

India arguably offers more relevant lessons in that, similar to the US and other developed countries, it has a reasonably well-developed banking infrastructure in both urban and rural areas, and smartphone use is widespread. While India has many more unbanked, the government, in concert with commercial firms, is actively pushing digital payment solutions that seek not only to advance the shift away from cash but also to make financial services more accessible to low-income people once ignored by the traditional banks.

### Learning from India

The drive towards migrating a country from cash to digital generally starts at the top. This is certainly true in India, where the Prime Minister Narendra Modi is personally committed to digital transformation. In November 2016, he said: "I want to tell my small merchant brothers and sisters: this is the chance for you to enter the digital world... Why don't we make a beginning for a less-cash society in India? We can gradually move from a less-cash society to a cashless society."

Mr Modi made this statement shortly after the government ban on 500-rupee and 1,000-rupee notes. This controversial 'demonetisation' policy was primarily conceived to combat corruption and counterfeiting. However, it also played into

a policy of monetary digitization that India has pursued for several years.

Key features of the strategy include:

- A digital identity scheme
- A unified payments system and app
- A merchant app for digital payments

Of course, it helps that India already has broader pre-conditions for making digital transformation possible. It is the world's second largest mobile market, with over one billion subscriptions. 240 million of these subscribers use smartphones, and this base is projected to increase to over 520 million by 2020.<sup>34</sup> The country also hosts a thriving digital entrepreneurial class. This has produced influential companies such as FlipKart (e-commerce), OLA (ride sharing) and Paytm (mobile wallets), which have done much to popularize digital services across the country, by focusing on building "experience" solutions.

As a consequence, change is under way. The Index reveals that India's score for digital money solutions grew 14.6% on last year. Its consumers' and businesses' propensity to adopt rose 9.6%, and government and market support grew 11.2% (the second highest of the 90 countries).

It is evident that India is driving hard towards digital payments. In its 2017 budget, the government set a target of 25 billion transactions to be made over the next year via digital payment platforms. This explains why analysts are bullish about the country's digital money future. The Boston Consulting Group and Google, for example, estimate that the total payments conducted via digital could hit \$500 billion by 2020<sup>35</sup>. That's ten times current levels.

The private sector's role is significant, but the Indian government is clearly leading the way in extending digital money solutions to the nation's unbanked and underbanked. Below are some of its recent initiatives to bring that about.

#### The Aadhaar digital identity scheme

Introduced to Indian citizens as far back as 2010, Aadhaar is the world's largest biometric identity system, with 1.1 billion citizens enrolled in early 2017<sup>36</sup>. Aadhaar now enables consumers to access their bank accounts and make basic



intra or inter-bank transactions using biometric (fingerprint) authentication. With a reliable means of customer identification, the 119 participating banks<sup>37</sup> can open zero-balance accounts for customers, and the latter can be provided with cheap RuPay (domestic low cost card rail) debit cards. Additionally, the government transfers welfare benefits directly to these accounts. The Aadhaar scheme is integral to other digital money initiatives being pursued by the government.

#### **A unified payments system and app**

One of the biggest hurdles to mobile payments around the world is interoperability. Even the most advanced service in the world, Kenya's M-Pesa, demands that users subscribe to the same mobile operator, Safaricom. In India, the National Payments Corp (NCPI) tackled this head on with the creation of the Unified Payments Interface (UPI) system, which launched in April 2016.

UPI lets people transfer funds across different banks using a single identifier. This means people can send money to friends and merchants from their phones. All they need is the recipient's UPI identifier. Thus, there is no need to disclose bank account numbers, one-time passwords or even phone numbers during a transaction.

By the end of 2016, UPI was live for customers of 21 banks. Though the system was interoperable across all these banks, it suffered from a brand identity problem: each of the supporting banks offered their own UPI apps (and in some isolated cases blocked access to others).

To address this, the government launched a national UPI app called Bharat Interface for Money (BHIM), an aggregator app for UPI transactions. The app enables users to choose a primary bank account from the list of bank accounts linked to his / her mobile number. Users can pay another party by using a virtual identifier or by scanning a QR code. BHIM launched on Android, with the iOS version available two months later. As of February 2017, it had recorded 17 million downloads in a span of two months.

#### **A merchant app for digital payments**

Of course, consumers are only one side of any digital transaction. To attract retailers to the UPI/ BHIM ecosystem, the government unveiled Aadhaar Pay, a merchant app for Aadhaar-based payments. Merchants can pay Rs. 2000 (~\$30) for a biometric

reader so that a customer can make a payment using just their fingerprint. The fingerprint, linked to an Aadhaar number, enables merchants to pull money from the customer's default bank account.

An important incentive for merchants is the lower upfront costs for POS setup and reduced interchange fees associated with card networks. The government has also provided other 'sweeteners' in its budget, such as scrapping duties on POS card readers and iris scanners.

To further ease the payment processes for merchants, the government recently launched the Bharat QR code in partnership with card networks. This enables each shop owner to have a single QR code identifier, which customers can scan to initiate payment from a variety of cards linked to the BHIM mobile app.

While providing affordable POS solutions to merchants, the government has also sought to incentivize customers to use these through cashback and discount offers as well as lottery schemes.

The government has launched the above initiatives on fairly fertile soil. Much of the groundwork for India's switch to digital money has been laid in part by the success of proprietary mobile wallets, launched by companies such as Paytm, FreeCharge and MobiKwik. These wallets have become extremely popular in India; in addition to making retail payments, they can be used to top up phone credit, pay bills and recharge metro cards. The government clearly sees such e-wallets as integral to its digitization program. Indeed, shortly after withdrawing certain bank notes from circulation, it approved an increase on the spending limit for mobile wallets to Rs20,000 for users and to Rs50,000 for merchant bank transfers, which resulted in a spike in usage.

## Back to Basics

India's performance highlights what's possible when government and enterprise join forces to make the digitization of money happen. However, the transformation isn't easy. There has been unrest at the speed and magnitude of change (not least withdrawing high-denomination bank notes) and questions about the security of the solutions. This reminds us that gains are hard won, and they depend on action across all four Index pillars, meaning a supportive institutional environment, financial and ICT infrastructure, digital money solutions from government and private sector, and enthusiasm from consumers and businesses.

Notwithstanding their considerable advantages in making the shift to digital money, high- and middle-income countries face stiff challenges in each of these pillars. The Index, as well as the developing world examples discussed above, highlights some of the areas developed countries' governments and commercial sectors would do well to focus attention on. Failure to do so could perpetuate a trend of faster digital money adoption by higher income groups while lower income citizens are left further behind. The rewards, by contrast, could be sizeable: while the overall cost savings in shifting away from cash is pegged at \$600 billion<sup>38</sup> for the developed world, our estimates suggest that reducing cash usage by half among the unbanked and underbanked in the developed world could yield immediate savings of \$30 billion to governments and businesses just from transaction costs alone.

**Focus on all four Index pillars.** The regulatory environment, enabling infrastructure, solution provisioning, and consumer and business adoption are all equally important to building a strong digital money environment. In Materially Ready countries, affordability of financial services and ICT has declined slightly of late; this trend must be reversed to advance the cause of digital money with underbanked.

**Ensure interoperability.** The recent success of India and Tanzania, among other countries, demonstrates the benefits when payment systems, mobile wallets and other solutions are made interoperable. Proprietary, closed payment systems are all too common in the developed world.

### **Incentivize the unbanked and underbanked.**

Consumers in middle- and high-income groups in the developed world have largely made the shift to digital money, and need few incentives to complete the journey. Incentives are needed to wean lower income groups off cash, however; India's use of tools such as cashbacks hold promise for developing and developed countries.

**... But use mandates, too.** The 2016 Digital Money report discussed the merit of mandating the use of digital channels to pay for certain types of public services. Governments of developing countries may find this difficult to apply widely to citizens but have more scope for requiring it of businesses. Developed countries have scope to apply it widely across all groups where several digital options exist.

Lastly, governments and commercial organizations everywhere should never forget the power of evangelism. As we have highlighted in previous reports, ingrained cultural attitudes need to change to overcome the remaining hurdles to digital money. Providing incentives to move away from cash are of course important. So is building awareness of the possibilities offered by digital money, as well as engendering people's trust in such channels. Together these form the surest route to winning over the holdouts.

Failure could perpetuate a trend of faster digital money adoption by higher income groups while lower income citizens are left further behind

## Appendix: 2017 Index Results

Figure 5. Digital Money Index

Rank	Country	Change in rank from 2016	Government and Market Support	Technology and Financial Infrastructure	Digital Money Solutions	Propensity to adopt	
1	Singapore	0	1	2	7	7	Materially Ready
2	United States	1	4	3	6	1	Materially Ready
3	Finland	-1	11	6	1	10	Materially Ready
4	United Kingdom	0	7	13	2	3	Materially Ready
5	Hong Kong	0	5	1	20	12	Materially Ready
6	Sweden	1	9	8	8	2	Materially Ready
7	Norway	-1	12	10	4	5	Materially Ready
8	Switzerland	0	2	4	22	4	Materially Ready
9	Netherlands	1	3	14	13	9	Materially Ready
10	Denmark	1	18	12	3	14	Materially Ready
11	Japan	-2	10	27	9	8	Materially Ready
12	Germany	0	6	7	17	17	Materially Ready
13	New Zealand	0	13	18	11	15	Materially Ready
14	United Arab Emirates	4	20	25	12	6	Materially Ready
15	Austria	0	16	9	14	22	Materially Ready
16	Canada	-2	21	11	16	21	Materially Ready
17	Australia	-1	22	19	10	19	Materially Ready
18	Qatar	-1	17	30	21	11	Materially Ready
19	Israel	4	23	16	15	13	Materially Ready
20	Ireland	-1	8	39	18	20	Materially Ready
21	Belgium	0	14	17	24	18	Materially Ready
22	Korea, Republic of	-2	26	41	5	16	Materially Ready
23	France	1	19	33	19	23	Materially Ready
24	Malaysia	-2	15	15	27	24	In - Transition
25	Portugal	0	30	28	23	28	In - Transition
26	Czech Republic	4	25	23	40	25	In - Transition
27	Spain	-1	29	24	25	30	In - Transition
28	Panama	0	31	5	41	33	In - Transition
29	Saudi Arabia	-2	35	38	26	27	In - Transition
30	South Africa	1	27	31	49	26	In - Transition
31	Chile	-2	34	20	34	29	In - Transition
32	Slovenia	0	28	57	28	32	In - Transition
33	Poland	1	33	26	36	42	In - Transition
34	Italy	2	36	51	32	35	In - Transition
35	China	2	24	58	39	43	In - Transition
36	Thailand	2	43	35	54	31	In - Transition
37	Costa Rica	-2	50	42	45	34	In - Transition
38	Turkey	-5	49	50	30	40	In - Transition
39	Indonesia	0	39	45	56	37	In - Transition
40	Mexico	4	47	29	48	52	In - Transition
41	Colombia	0	44	40	42	54	In - Transition
42	Kuwait	7	63	69	29	36	In - Transition
43	Jamaica	9	40	43	57	46	In - Transition
44	Hungary	-2	38	53	47	48	In - Transition
45	Kazakhstan	-5	48	68	31	44	In - Transition

Note: In this year's index, we have made some progressive improvements with the quality of the underlying data sources and underlying methodology, which results in slight adjustments to the relative rankings of countries in the index. We have carried forward the changes to the previous year's index as well to enable a true comparison

■ Materially ready  
 ■ In-Transition  
 ■ Emerging  
 ■ Incipient

Rank	Country	Change in rank from 2016	Government and Market Support	Technology and Financial Infrastructure	Digital Money Solutions	Propensity to adopt	
46	Morocco	7	45	22	58	64	Emerging
47	Kenya	8	46	48	51	45	Emerging
48	Russian Federation	2	62	66	35	38	Emerging
49	Guatemala	7	51	34	65	47	Emerging
50	Philippines	-7	71	37	60	39	Emerging
51	Croatia	-6	60	52	37	51	Emerging
52	Brazil	-5	84	47	38	41	Emerging
53	Trinidad and Tobago	-2	56	54	43	50	Emerging
54	Mongolia	-6	61	65	33	55	Emerging
55	India	9	37	49	46	68	Emerging
56	Botswana	6	32	59	59	65	Emerging
57	Romania	-11	57	62	50	49	Emerging
58	Namibia	5	41	55	70	60	Emerging
59	Sri Lanka	-2	42	56	68	61	Emerging
60	Honduras	-2	80	21	76	56	Emerging
61	Dominican Republic	-2	68	44	64	57	Emerging
62	Peru	-2	64	32	72	63	Emerging
63	El Salvador	-9	74	36	62	66	Emerging
64	Ukraine	1	73	70	44	59	Emerging
65	Viet Nam	1	59	61	61	62	Emerging
66	Greece	-5	55	77	55	53	Emerging
67	Senegal	0	53	67	74	67	Emerging
68	Egypt	1	65	46	77	73	Emerging
69	Ghana	-1	52	63	71	72	Incipient
70	Nigeria	0	81	64	53	69	Incipient
71	Tunisia	0	69	71	63	71	Incipient
72	Cote d'Ivoire	0	58	72	69	76	Incipient
73	Argentina	0	87	79	52	58	Incipient
74	Uganda	1	66	74	73	77	Incipient
75	Zambia	1	54	85	78	74	Incipient
76	Bangladesh	1	83	73	66	80	Incipient
77	Pakistan	-3	78	60	82	81	Incipient
78	Cameroon	0	67	82	83	75	Incipient
79	Tanzania, United Republic of	4	72	81	80	84	Incipient
80	Iran, Islamic Republic of	1	86	84	79	78	Incipient
81	Nepal	1	79	76	88	83	Incipient
82	Gabon	-3	82	88	67	79	Incipient
83	Mozambique	-3	76	83	89	82	Incipient
84	Algeria	2	85	78	86	85	Incipient
85	Mali	0	70	86	81	87	Incipient
86	Venezuela, Bolivarian Republic of	-2	90	75	75	70	Incipient
87	Ethiopia	1	77	87	85	86	Incipient
88	Burkina Faso	-1	75	80	87	89	Incipient
89	Angola	0	88	89	84	88	Incipient
90	Chad	0	89	90	90	90	Incipient



## Endnotes

- <sup>1</sup> Throughout this report, the term “digital money” refers to the digitization of cash and checks to credit/debit cards, stored value instruments and other non-paper based mechanisms.
- <sup>2</sup> Based on regression of the Citi-Imperial College Digital Money Index against GNI across 90 countries; estimate based on a 10% increase in digital money readiness score and commensurate increase in adoption.
- <sup>3</sup> Assuming average tax rate of 10%.
- <sup>4</sup> World Bank, *Global Findex* 2014.
- <sup>5</sup> McKinsey Global Institute, *Digital Finance for All: Powering Inclusive Growth in Emerging Economies*, September 2016.
- <sup>6</sup> The raw score changes shown for these and other individual countries are over one year, from 2016 to 2017.
- <sup>7</sup> Bangladesh Bank cited in “Mobile banking transactions Jump by 37pc”, Financial Express 12 Sept 2016 [<http://www.thefinancialexpress-bd.com/2016/09/12/45608/Mobile-banking-transactions-Jump-by-37pc>].
- <sup>8</sup> GSMA, *The impact of mobile money interoperability in Tanzania: Early data and market perspectives on account-to-account interoperability*, September 2016.
- <sup>9</sup> State Bank of Vietnam cited in “Card payments still limited”, Vietnam Breaking News, November 2016 [<https://www.vietnambreakingnews.com/2016/11/card-payments-still-limited/>].
- <sup>10</sup> Statista, Digital Payments Market Outlook, Vietnam.
- <sup>11</sup> Citi-Imperial College Digital Money Index, % increase in raw scores between 2016-2017.
- <sup>12</sup> Calculated from progress reports published by Indian Government dated 04.01.2017 and 06.01.2016 [<https://pmjdy.gov.in/ArchiveFile/2017/1/04.01.2017.pdf>] and [<https://pmjdy.gov.in/ArchiveFile/2016/1/06.01.2016.pdf>].
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- <sup>14</sup> Juniper Research, Mobile Wallets 2017 - 2021, February 2017.
- <sup>15</sup> Citi-Imperial College Digital Money Index % increase in raw scores between 2016–2017.
- <sup>16</sup> Calculated from unbanked and underbanked adults reported by Federal Deposit Insurance Corporation in “FDIC National Survey of Unbanked and Underbanked Households, 2015”.
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- <sup>21</sup> Pradhan Mantri Jan Dhan Yojana progress report as on date 28 Feb 2017 [<https://www.pmjdy.gov.in/account>].
- <sup>22</sup> DBT [<https://dbtbharat.gov.in/>].
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- <sup>28</sup> Lets Talk Payments [<https://letstalkpayments.com/interoperable-qr-code-system-bharatqr-launch/>].
- <sup>29</sup> Citi estimates.
- <sup>30</sup> Bhaskar Chakravorti & Benjamin Mazzotta, The Cost of Cash in the United States, September 2013.
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- <sup>37</sup> The Hindu Business Line, “119 banks connected with Aadhaar enabled payment system: Minister”, January 27 2017.
- <sup>38</sup> Cost of cash is estimated at 1-2% for developed economies, while it is much higher for emerging economies, with some estimated to be as high as 5%.



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