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India's Unified Payments Interface (UPI) system and its transformative impact

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Abstract
India's Unified Payment Interface (UPI) is an example of how an innovative payments and settlement system can initiate an economy wide transformation. In its structure and operations, it also demonstrates the extraordinary potential of technology, even as it adopts and adapts existing processes rather than inventing new ones. Its powerful contribution perhaps also lies in an underlying philosophy on how it should be used and for what purpose. Flanking policies and supportive administrative measures can in turn amplify its impact, as India's experience of the past twenty years or so have shown.
The nature of this transformation is extraordinary, even as it has yet to gain the traction, range and depth needed for any definitive judgement on whether it represents a true and consolidated structural transformation.
Although the UPI system is associated in the public mind with what people are witnessing, and in many ways is the key to a process that has induced a wave of other developments, questions remain about the extent to which the UPI system is responsible. Indeed, as this paper will show, it is difficult to disentangle the exact channels through which this process is unfolding, or indeed where its origins lie.

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India’s Unified Payments Interface (UPI) system and its transformative impact on the economy

(Draft for comments)

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Foreword

Elements of this paper were presented on October 14th, 2024, at the event organised by the Systemic Risk Centre/Financial Markets Group on Payment Systems. Some adjustments to the organisation, content and structure of this paper have been incorporated into the earlier draft, based on feedback and comments from colleagues. I have also tried to include references that help strengthen some of the factual assertions in the document. Though some unsubstantiated claims still remain I have tried to correlate sources to justify their inclusion. This process will certainly undergo further revision as facts become clearer over time.

When researching this paper, my initial idea was to link the transformations that it identifies with the way financial markets can contribute to development and efficiency at the same time. On evaluating the evidence, it is of course clear to see that though indeed possible, the transformation process has some additional stages to pass through before it becomes a complete reality.

And why is this important? The state, though leading on many initiatives, does not have enough resources to do this on its own and needs outside financing to contribute to both processes. While this is happening to an extent, investment and credit resources are still excessively concentrated on the organised sector, and within this, heavily skewed towards the larger-scale sector, even as start-ups are indeed beginning to attract serious investment. Balanced development across India's vast and varied population therefore

still remains a somewhat distant dream even as the means and pathways to achieve it are gradually emerging, and other systemic issues apparently falling into place.

Figures relating to the formalization of the labour market together with those relating to the credit gap for the small and medium enterprise sector in particular, illustrate this point further. And if we map regional differences on to this, it becomes clear that geographic variations have to be added to social and economic considerations.

The reference date for this paper remains as October 14th 2024 even as developments since then have added a few extra elements to the mix of issues that should probably have been covered.

At the same time, policy developments in these and other related areas are moving at a bewildering pace and it is hard to capture a sense of the whole as there are so many moving parts moving at varying speeds.

The paper itself is really meant for an international audience, or for people unfamiliar with the Indian system, and the objective is to explore through a deeper understanding of what is happening in India, the possible relevance of any of these policies to the requirements of other countries. The Indian system is complicated, to put it mildly, and sometimes difficult to explain, hence the fairly extensive use of footnotes and annexes. Context matters, and understanding the specifics of India's challenges are important.

Julius Sen
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December 19th 2024.

1. Introduction

India's Unified Payment Interface (UPI) is an example of how an innovative payments and settlement system can initiate an economy wide transformation. In its structure and operations, it also demonstrates the extraordinary potential of technology, even as it adopts and adapts existing processes rather than inventing new ones. Its powerful contribution perhaps also lies in an underlying philosophy on how it should be used and for what purpose.[1] Flanking policies and supportive administrative measures can in turn amplify its impact, as India's experience of the past twenty years or so have shown.

The nature of this transformation is extraordinary, even as it has yet to gain the traction, range and depth needed for any definitive judgement on whether it represents a true and consolidated structural transformation.

Although the UPI system is associated in the public mind with what people are witnessing, and in many ways is the key to a process that has induced a wave of other developments, questions remain about the extent to which the UPI system[2] is responsible. Indeed, as this paper will show, it is difficult to disentangle the exact channels through which this process is unfolding, or indeed where its origins lie.[3]

Furthermore, there are elements of policy development and continuity that date back to before independence in 1947, especially those relating to the banking system and other attempts at structural reform of the rural and agricultural economy.[4]

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[1] See section below on 'The Thinking behind the India Stack'

[2] Or more properly the India Stack

[3] it may actually be the bio-metric system of unique identification (known as *Aadhaar)* that is the driving force behind much of this overall process as it seems to be present in all the relevant processes

[4] The problems of rural credit needs and their connection to development were well understood, and were indeed discussed at Bretton Woods in 1944 by C.D Deshmukh, as part of the Indian delegation. Other

However, of more direct relevance, it would seem that many of the laws and institutional reforms were discussed and developed in the period between 1986 and 2009, including the Goods and Services Tax (GST),[5] the need for a unique identification system (which became *Aadhaar*),[6] and the requirements for the direct transfer of benefits to the accounts of individuals.[7]

There was also a moment - particularly in 2016 - when history seemed to accelerate[8] - and when the speed of action and implementation surged across a number of fronts.

Existing institutions, and most particularly the Reserve Bank of India (RBI) have also evolved and clarified their role. In general terms, it seems that the RBI now concentrates more on assessing and mitigating systemic risks and addressing issues relating to financial inclusion, while other institutions and agencies, like the Securities and Exchange Bureau of India (SEBI), the National Financial Reporting Authority (NFRA), the Competition Commission of India (CCI) and the National Payment Corporation of India (NPCI) concentrate more on protecting consumers and investor interests and ensuring that markets are open and competitive.[9] This role 'clarification' perhaps helps deepen our understanding of the general responsibilities of these players, which for a while seemed to have overlapping and sometimes contradictory objectives and cultures.

The transformation itself is really of five principal and interconnected types, with cascading and secondary effects spreading across the wider economy.

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measures included insurance nationalisation and branch expansion, land and tenancy reforms, etc. which came after independence.

[5] Serious policy deliberations on introducing a VAT system began really in 1986 when V.P. Singh was Finance Minister and introduced a modified version of VAT, known as MODVAT. But it did not solve the problem of multiple and varied local sales, excise and octroi tax systems.

[6] The process for which, in its present form, began in 2009

[7] Which was initiated formally in 2013

[8] Jaques Delors once described, in a speech in Bruges in October 1989, the rapid political and economic change that took place after the creation of the EEC (later the EU) as an 'acceleration of history'. Hence I have borrowed this idea. The full speech is referenced in the attached bibliography.

[9] Together of course with other regulatory agencies covering telecoms, insurance, etc

Transactions through UPI

In the first place, the UPI system has vastly simplified all forms of transactions between individuals, vendors, merchants and businesses.

The numbers reflect the scale of this transition. A system of 7.3 million merchant terminals[10] and some 40 million internet and card users, has been supplemented by a system of 50 million merchants and 300 million customers, with prospects of these numbers increasing further by threefold within a few years.[11] Connected by mobile phones, and in real time, through an interoperable UPI system that connects over 580 registered banks,[12] more than 535 million transactions take place every day, with an estimated annual value of about US $280 bn (equivalent).[13] Moreover the number of payments in volume terms is increasing at over 45% a year but by a smaller amount (about 37%) in terms of value.[14] This suggests that UTI usage is widening rather than deepening its levels of penetration at this stage.

There are obviously other deeper structural changes that have contributed to this overall process, which need to be understood and evaluated for the roles they have played. The India Stack, which includes the UPI payment system, has three layers. The foundation layer is identity, for which a biometric ID system was developed (known as *Aadhaar* – literally foundation). The second layer relates to payment systems, to which the UPI belongs. And the third layer relates to data governance which in turn is intended to help leverage data in various ways.

[10] Corresponding to the Point of Sale devices provided to merchants and shopkeepers

[11] Dilip Abse, the CEO of the NPCI expects that UPI systems will need to cope with this scale of activity, and are planning in the shorter term to handle 1bn transactions a day.

[12] There are over 670 registered banks in India, but this figure covers all the larger banks. Remaining banks tend to be in the cooperative sector, within states, which have only recently been brought under the oversight of the RBI. These will probably be covered in time as well.

[13] Figures from the National Payments Corporation of India (NPCI) upto November 2024, which oversees the UPI system

[14] Figures from the NPCI which tracks daily transaction volumes and values

Legislative enactments like the Right to Information Act (RTI), 2005, the Payment and Settlement Systems Act (PSS) of 2007, the *Aadhaar* Act of 2016,[15] and the recent Digital Personal Protection of Data Act (DPDP) of 2023 , together with various supreme court judgements relating to data, privacy and data security have created a legal framework to facilitate the workings of the India Stack and its various component parts. In addition, a number of new administrative and regulatory agencies have been established over the years (and often preceding the India Stack), that have significant authority over different parts of the system.[16] Taken together, we are perhaps witnessing another transition towards greater role clarification within the structures of governance. There are many others as well that are relevant and important, and all contributing in various ways to the overall direction of travel. Mapping their influence on the wider processes is challenging at many levels, and is best left to another study.

At the same time disentangling the various interconnections and laying bare the exact causes and effects of this mix of issues is perhaps a somewhat sterile pursuit, and it is more important to look at the wider impact on the economy first and then try to explain in broad terms why this appears to be the case. But this too is very difficult simply because of the way in which the system is so complex and interconnected. Cause and effect are difficult to ascertain.

To be sure, there are still a number of unresolved issues – some relating to data security and privacy with reference to the Aadhaar system, and some relating to legal clarifications needed to make the GST system more effective – but these are being worked through.

[15] The Aadhaar (Targeted delivery of financial and other subsidies, benefits and services) Act of 2016, to give it its full title,

[16] Indeed, five regulatory agencies had to approve various aspects of the UPI system, including the RBI (the central bank), SEBI (the securities and financial markets regulator, the UIDAI (in charge of developing the Aadhaar ID system, the TRAI (telecoms regulator), and the IRDAI (the insurance regulator).

In simple terms, a payment and settlements system that was built on the use of cash, cheques, credit and debit cards - augmented through internet banking, - has been overtaken in a few short years by a system that doesn't require any of these, and uses mobile networks, digital systems, and UPI apps that could be installed on any mobile phone with data handling capacity. The UPI system, moreover, is free to use, interoperable, and at population scale, with the government underwriting most of the important costs. There are no charges or costs for users and the process is instantaneous.[17]

Cash handling requirements and debit card activity has dropped substantially as a consequence, even though credit card activity has remained fairly stable. But for the UPI system to work outside the framework of online or conventional banking, a country-wide mobile network was needed, together with a payment and settlement system that linked everything together.

The former requirement was provided by a private telecom operator – Reliance Jio, while latter requirement was provided by the National Payments Corporation of India (NPCI), which designed and implemented the various principles and protocols that support the UPI system as a whole.[18]

Two events appear to have contributed significantly and perhaps decisively to this process. In late 2016 the government demonetized 85% of notes in circulation. To survive, businesses, vendors, merchants and customers needed to keep buying and selling, which was facilitated by using the UPI system rather than cash, especially in the micro and small enterprise sectors.

Then in 2020 the economy was virtually shut down to deal with Covid. In this context as well people needed to buy supplies and

[17] The government meets all the Merchant Discount Rate (MDR) and other costs, estimated at about US $130 million a year.
[18] Known as the API – Application Programming Interface.

groceries and wanted to avoid cash handling, and made widespread use of UPI transaction processes.

So, while these two events were enormously disruptive they did precipitate an acceleration in the shift away from cash at a critical moment.

In this sense, a structural transformation thus seems to be occurring as the use of UPI continues to expand, with this simplified process also acting as an accelerant to general economic activity.[19] Moreover, all these transactions now take place through the banking system, thus simultaneously reducing the size of the informal or cash economy and widening the tax base.

Tax collection and revenue growth

The second major transformation is linked in turn to some of the points mentioned above, but in a variety of different ways. Transactions and payments facilitated by UPI, and requiring bank accounts, meant that many transactions could no longer be conducted in cash. Individual and corporate tax filings surged, though intially more for individuals than for corporates.

At about the same time, the constitution was amended in 2016 and a new Goods and Services Tax (GST) system[20] was introduced that replaced and consolidated 17 types of tax. Though there was considerable initial confusion, the system required online filings of returns and rebate claims, together with invoice copies and bank account details, which in turn required supply chain and commercial disclosures that then mapped further transactions into the tax system.

An additional commercial incentive lay in the way in which the GST system operated. Transactions had to be disclosed to qualify for

[19] One estimated measure of its impact is the rate at which the grocery sector is growing – now estimated at about 7% a year compared to GDP growth of about 5-6% a year. But the effect on the wider economy is more difficult to assess.
[20] Similar to the VAT system in the EU.

tax refunds and rebates to avoid the cascading effect of the GST. Very few companies were ready to forego the losses this would entail and preferred instead to make a virtue of necessity by filing tax returns and claims,[21] thus bringing a significant section of economic activity in from the cold.

While the informal economy shrank significantly[22], tax revenues now more accurately reflect the actual amounts collectable by the state.[23] Direct and indirect tax collection is now growing faster than GDP estimates[24], with some figures suggesting these may be almost double current growth rates.[25] For a country with a very high government debt to GDP ratio[26], in effect this means that more money is now available for social and infrastructure investment, while public finances remain reasonably resilient.[27]

The digitisation of tax records and the subsequent requirement for all tax returns to be filed online thus seems to have initiated a transformation in tax compliance and tax payments, both for individuals and for commercial entities. Digitization processes also helped income tax authorities effectively map, consolidate and connect returns and information relating to tax matters and tax payers across both direct and indirect tax categories.[28]

Direct Benefit Transfers (DBTs)

The third major area where a transformation is evident relates to Direct Benefits Transfers (DBTs). In effect, these cover many types of welfare and subsidy payment, and clubs dozens of programmes at both central and state level. The problem in the past was that

[21] A very interesting process. Typically, compliance and enforcement were often heavy handed and ineffective. By introducing this method, the government created incentives within the business community to comply.
[22] With a drop from 50% to between 25-30% suggested by the SBI and the Centre for Monitoring the Indian Economy (CMIE)
[23] Though obviously this will require more time to become comprehensive.
[24] Itself seemingly boosted by UPI processes
[25] In reality, measures of GDP and tax revenues take some years to be finalised. But in broad terms the fact that revenues are growing faster than budget estimates seem to be a consistent feature of the system as it is emerging.
[26] About 6% in FY 23
[27] Which is now a worldwide policy challenge following heavy expenditure on Covid related measures.
[28] The system was paper-based, fragmented and notoriously easy to game and circumvent.

actually delivering these benefits to individuals, communities, organisations and families was complex, time consuming, expensive and corrupt, with upwards of 85% of the amounts payable lost to various problems.[29] With the introduction of the unique and biometric ID system (*Aadhaar*) and with the government supporting new bank accounts for over 530 million people (please see next section), it became possible to make direct transfers into beneficiary accounts. Between 2016 and 2024, an amount in excess of Rs 2.31 trillion (about US$ 27 billion) has been so transferred by the central government alone, with state governments increasingly using the same system.[30] For beneficiaries themselves this has suddenly and effectively given many of them an income, while for banks this of course represents a huge and continuing infusion of new deposits.

Bank account expansion

The astonishing expansion in new bank accounts, referred to above, was initiated through the government's plan for financial inclusion, known as *Jan Dhan Yojana,* launched in 2016. Banks were compelled to eliminate charges and minimum balance requirements, while the government underwrote the cost and certification procedures relating to identity – which was hitherto expensive and time consuming - through the *Aadhaar* system of biometric IDs.[31] This system was further meshed (over time) with online Know Your Customer (e-KYC) requirements of the Reserve Bank of India (RBI).

With more than 530 million new accounts, banks further benefited from the network effects of an interoperable and open access digital public infrastructure created by the UPI and other systems developed by the NPCI, to introduce debit cards, wallets and other apps offering other services in addition.[32] Moreover 55% of these

[29] Rajiv Gandhi as Prime Minister was the first major political figure to suggest this figure. It originally came from the Planning Commission which reviewed implementation problems relating to DBTs.
[30] Information taken from government of India sources
[31] The cost for the bank to certify ID was an additional charge and amounted to about $200/- per person. This dropped to about $2/- per person through the use of Aadhaar.
[32] Estimates suggest that over US$50 billion equivalent has been invested in overy 145,000 start-ups, many of which are in this sector. This represents a massive increase of over 300% over a two year period.

accounts were for women, and 67% were in rural areas, which in the Indian context is hugely significant. Taken together, this reflects a further transformation in the speed at which financial inclusion has started to embrace rural and isolated areas and communities, and to address the needs of the bottom half of the socio-economic pyramid.

Telecommunications and mobile data

The fifth major transformation was in telecommunications with a single private company – in this case Reliance Jio – bidding for and winning the 4G contract for all of India's 22 telecoms circles[33]. With this country-wide presence and capacity, Reliance Jio, starting in 2014, provided data services at rates that were 95% below comparable rates elsewhere[34], and thus provided incentives to use the system and the means through which the UPI system worked. At the same time, they aggressively marketed cheap SIM cards[35] and sold over 600 million within 6 months, giving them an unparalleled reach and network. Their business model was evidently to collect small margins on vast numbers, supplemented by other offerings including their own grocery delivery app (known as JioMart), and network access fees for other apps.

In addition to developments in the telecoms, a programme for *Digital India* was launched in 2015 to universalize and vastly upgrade internet access and quality across the whole country. Measuring the impact of this programme is difficult because it will be indirect, but also because financial literacy and digital skills remain so low and the rate of take-up is uncertain. Nevertheless the idea was to create an additional feature of India's digital public infrastructure.

In their cumulative effect, these measures have initiated the transformation that this paper talks about and has created further platforms and channels for further transformative measures to take

[33] Not of course without controversy and more than a hint of scandal

[34] As asserted by Nandan Nilekani at various times and with particular reference to rates prevailing in the US at the time.

[35] Using *Aadhaar* ID numbers to save time and money and to ensure regulatory compliance.

hold and take effect.

The role and relevance of the unique ID system developed at the time and known as *Aadhaar* (or platform in Sanskrit) was, as we shall see, essential and indeed central to the transformations described above. In that sense the *Aadhaar* system, together with the digital public infrastructure, have enabled and supported the transformative process.

Questions to be addressed in this paper

All these achievements however beg the question of how a system that has historically been unable to make a significant breakthrough in the financial inclusion or indeed the broader development agenda, or in addressing the problems of a huge and persistent informal economy, has found the methods and means to do this in a short period of time, that is between 2009-2024?

Has policy making in India been substantially transformed, and if so how and why did this happen? Furthermore, there are questions about its origins, and its nature. Is it a result of state led interventions or has the private sector played a substantive and catalytic role? Furthermore, has it been incubating for a long time only to show results in the past few years, and if so why?

And then there are the debates surrounding the two great disruptions during this period. Demonetisation in 2016 and the Covid shutdown in 2020 caused huge social and economic dislocation, and GDP (especially during the Covid period) plunged dramatically. Rescuing the economy from these twin blows also involved massive government expenditure, which of course worsened public finances considerably. Business models also had to adapt, radically in some cases, which increased unemployment in the short term, so how and why has the resurgence of recent years not only coped with these blows but has also supported the transformation described above and (to some extent) detailed further below.

Then there are of course questions about the future direction of events. Will this transformation deepen and extend the formal economy to the extent that major structural challenges, at least in the area of financial inclusion, have been met? And what indeed is the size and scale of this gap beween where we are and comprehensive financial inclusion? Are we talking about a process that is just at its initial stage, in which case how much further do we need to go for complete financial inclusion.

And in terms of the relevance of this policy approach and experience to the requirements of other countries, developing, emerging or developed, what could these be and how would they be relevant? Of Particular interest in this debate will perhaps be the relative roles of the state and private sector, and India's experience with creating a meaningful digital public infrastructure.

And finally (at least for this paper) the possible downsides to this process. Will GDP, tax and banking figures plateau and cease to defy gravity, and if that happens will we see a reversion to the old order. Furthermore, the system depends heavily (as further described in this paper) on the unique ID *Aadhaar* system, and other interlinked systems of ID certification.[36] What if this underlying structure is compromised or distorted, then what happens to the systems that depend on them?

While none of these can really be answered with any definitive certainty, given that the process is ongoing, this paper will attempt to give a sense of how it all developed, where we stand now, what is likely to follow, and will additionally attempt to identify systemic vulnerabilities and weaknesses that could impede or undermine what has been achieved.

As there are many interconnected issues involved, a useful point of departure for considering how this transformation seems to be taking place, is to look at the India Stack.

[36] E-KYC, Personal Account Number (PAN) for taxes, and now C-KYC.

2. Understanding the India Stack and the objectives of this paper

This term is used to describe the combination of systems, protocols, ideas and concepts that have been incorporated into a sort of structure, known as a stack. At the base is the system for authenticating identity (*Aadhaar*), and on that is built the payment applications that support UPI, and the earlier IMPS[37], with the possibility of others as well. And at the apex of this stack is the data governance system, which in some ways is the hardest to understand. Essentially it is meant to empower individuals to leverage their data, particularly in accessing credit and attracting investment.[38]

In designing a system that sought to harness technology to dramatically accelerate the development agenda it had to be digital, publicly owned, open access, interoperable and free to use, but most importantly, at population scale. The model was the internet and GPS systems developed by the US department of defense. To make it inclusive, costs had to be kept down to enable access and use by the poor. All these challenges had to be addressed as a package, and many of the ideas that fed the process were a blend of private and public experience and expertise, drawn mainly from the IT sector.[39]

It was also understood that this digital infrastructure had to be provided by the state for two main reasons. It was recognised that the private sector would not have the capacity, interest or resources to do this on its own, and certainly not at population scale. Furthermore, the size and ambition of this endeavour could only be cost effective if funded by the state over the long term. But of course, the private sector had the technology, ideas and experience to make it work efficiently.

[37] IMPS – Immediate Payment Service. This was an earlier iteration of the UPI idea, but was complicated to use. It is now considered an alternative or supplement to UTI, thus serving a redundancy purpose.
[38] A process taking place through Account Aggregators (AAs), regulated by the RBI.
[39] ISpirit – Indian Software Products Industry Roundtable, NASSCOM, and Nandan Nilekani's book on Reimagining India all playing a major and ongoing role in defining the broad approach.

The state would thus create a digital platform, which anyone – public or private - would be able to build upon to offer their products and services.

The overall design described above also fitted with India's long-standing approach to financial inclusion and development and connected to earlier initiatives to create a national banking infrastructure (mainly between the 1970s-90s) and to create a national telecoms infrastructure (from the late 1980s) through the initiative of the Centre for Development of Telematics (C-DOT).[40]

The hope from within the government is that this digital public infrastructure (DPI)[41] will expand regionally and then globally, and thus become a Global Public Good.[42] This is a measure of current levels of confidence about the potential of UPI.

We are fortunate that an IMF team consisting of Yan Carrière-Swallow, Vikram Haksar and Manasa Patnam put together a Working Paper in 2021 - *India's Approach to Open Banking: Some Implications for Financial Inclusion* - in which they explain how the UPI system actually works and how the various component parts of the India Stack fit and work together to support this process.[43] Their paper not only demonstrates just how complex the whole arrangement is at one level,[44] but more importantly, how simple it is to use. And this is the key to the approach followed in India.

Their paper also makes clear that there are a wide array of issues and challenges that still needed (in 2021) to be resolved, and in that sense helps us understand just how open ended and ambitious the entire approach was. As we shall see, this approach is now the guiding framework for thinking that goes behind the

[40] While hardly discussed, this initiative helped support the IT sector, including global giants like Infosys, Wipro, TCS and others. Their estimated market value is currently US$43bn.
[41] A term used by the UNDP
[42] Contained within the G20 agenda as: 'Technological Transformation & Digital Public Infrastructure'
[43] IMF Working Paper (WP/21/52)
[44] and a mind-boggling array of acronyms and abbreviations

Open Network Digital Commerce (ONDC), Open Credit Enablement Network (OCEN) and the Unified Lending Interface (ULI) processes, each of which hopes to transform credit and commerce.

What happens on the surface looks and feels relatively easy, but the vastly complex arrangements, protocols and technology that underpin it really have delivered measurable results and are a triumph of technological design and conceptual thinking. For every single UPI transaction, there are over 10 operations that take place in the background, instantly and accurately, and this is the key to its credibility and utility.

This paper departs therefore, to some extent, from the approach of the Working Paper and offers a wider perspective on why the UPI system[45] seems to be transforming the Indian economy beyond the confines and attributes of the payments and settlement system.

There are other factors of course, which fall broadly into the various identification and digitisation strategies adopted across the functioning of the government, which also perhaps help explain how and why the mapping of various payment and transaction networks are playing a major role in formalizing the wider economy. Some of these measures and initiatives have been subsumed within the Digital India programme[46] that was launched in 2015 with the objective of radically improving internet connectivity across the country. Digital India strategies thus fit with the idea of creating a nation-wide digital public infrastructure and operate in support of the India Stack.

At the same time, various economic and other indicators suggest that this is indeed the direction of travel, and the various statements of some of the architects of the UPI and India Stack

[45] Though not strictly accurate, I use the term UPI system to describe what is more properly explained by the India Stack and its various components.
[46] Coordinated through the Ministry of Telecommunications

system highlight the significant changes that have already happened and suggest that far more is to come.[47]

After all, the creation of institutions like The Securities and Exchange Bureau of India (SEBI) in 2002, Corporate Social Responsibility (CSR) requirements in 2013, the Competition Commission of India (CCI) in 2018, and National Financial Reporting Agency (NFRA) in 2018, and indeed others, have all re-shaped the landscape within which major financial institutions and corporates now have to operate and manage. Governance issues from within and public expectations from the outside, are perhaps reshaping corporate, individual and commercial behaviour in profound new ways.

Their roles and responsibilities have often evolved significantly in the aftermath of various scandals and crises, and usually in the right direction.[48] This seems to have an impact on corporate governance as they now seem to find that there are fewer and fewer ways to circumvent regulations and evade taxes.

[47] Nandan Nilekani, founder of Infosys and the man put in charge of developing the *Aadhaar* card system and the UPI, Pradeep Asbe, the present CEO of the NPCI (which runs the UPI system) and Pramod Verma, the designer of the *Aadhaar* card all say much the same thing.

[48] Not everyone agrees, particularly with reference to the identification of Ultimate Beneficial Owners.

3. Understanding the impact and scale of the transformation

To recap the transformation depicted above. Simplifying and facilitating a payments system that was free to use, interoperable and open access shifted a substantial part of economic activity from the cash into the banking sector. The extension of new bank accounts to over 530 million people also facilitated the transfers of direct benefits, while further expanding the capacity of the system to handle transactions through UPI. The more efficient and effective mapping of economic activity through digitized processes has in turn accelerated tax collection well above GDP levels, thus formalizing much of the informal commercial economy. At the same time, the introduction of a digital and unique ID system (*Aadhaar*) together with a vast upgrade and expansion of the telecoms and data handling network, at very low costs to users, essentially enabled the entire process. Taken together these contributed to a major structural shift in the way in which the economy functioned.

At the same time, reasonably high GDP growth rates, especially after the Covid shutdown in 2020, could perhaps be attributed to three factors. Firstly, government spending on social security and welfare benefits increased substantially to meet the effects of economic and social disruption, thus supporting demand. Secondly, the formalization of the informal sector provided more accurate growth figures as transactions were better measured and mapped.[49] Thirdly, growth could also be attributed to the greater velocity of transactions, facilitated in turn by the UPI system, and the greater effectiveness of transfers under the various Direct Benefits Transfers (DBT) programmes.

Against this backdrop, further shifts in the way in which the economy is evolving would appear to be relevant even as their full details need to be revealed, and their implications understood. That this could happen in spite of the disruptive effects of

[49] GDP figures are supposed to include the informal economy, so attributing exact reasons for India's high GDP growth rates remains to be determined.

demonetization (in late 2016) and the Covid shutdown in 2020 suggests that a system-wide shift is indeed developing.

Effects on the informal and black economy

- The size of India's informal economy has dropped from 50% of GDP to a range between 20-30% in just 7 to 8 years.[50]

- The formalisation of the economy is not however matched by formalisation in the labour force. If anything, unemployment is rising, which could be a serious longer term problem, with the percentage of workers still in the informal sector, and thus in insecure jobs, remaining around 70-80% of the total workforce.[51]

- Demonetisation succeeded in bringing virtually all the currency then in circulation as cash, back into the banking system, together with verifiable names and addresses, which then became the basis for further tax recovery measures.[52]

- Upwards of 180,000 bank accounts and mutual funds received large deposits of about US $75 bn (equivalent) in total,[53] leading to a surge in tax collection and forming the basis for more effective tax assessments.[54]

Aadhaar system roll out

- The roll out of a universal digital and biometric system of identification (the *Aadhaar* Card) is now complete[55], though a number of constitutional and legal issues remain to be finally

[50] Estimates of the SBI, and the Centre for Monitoring the Indian Economy (CMIE). Accurate figures are obviously impossible to collect and will take time to crystalise.
[51] From an assessment by SBI Research from 2024. As with growth and other figures, assessing the size of the informal and black economy is done through the use of a variety of proxy indicators and National Sample Survey results.
[52] Through e-KYC and Aadhar. This was indeed the stated objective of the Finance and Corporate Affairs Minister (2014-2019), Arun Jaitley, but was drowned out because of the enormous disruption and human suffering it caused.
[53] Further smaller amounts – perhaps $25 bn in total – were scattered over millions of accounts. The greatest income redistribution in India's history, people say.
[54] Deposits grew across the system, and this reference is only to deposits exceeding US $ 400,000/- (equivalent0
[55] But at the same time is a rolling process. Keeping the system uptodate is the current focus of activity.

settled. More than 1.3 billion *Aadhaar* cards were issued between 2009 and 2023.

- Almost every bank account is further linked through e-KYC to the *Aadhaar* system of digital identity.

- Further linkages to Permanent Account Numbers (PAN) of eligible tax payers (both individual and business) have been established in many cases, though the full integration and reconciliation of databases still needs to be done. The number of PAN cards in circulation currently numbers about 125 million, each identifying a specific tax payer.

- Through the use of *Aadhaar* ID systems, within the system of DBTs[56] an amount estimated at US $45 bn equivalent has been saved, mainly be eliminating fraud, duplication, fakes and ghost beneficiaries.[57] This process of 'cleansing' the system is ongoing and is likely to achieve further savings but will surely plateau at some stage.

- This figure vastly exceeds current expenditure on digitising these services and transferring money electronically (mainly through the IMPS system developed by the NPCI and suggest longer term efficiencies on a massive scale.[58]

Tax compliance

- Tax returns now number 125 million, representing a growth of over 15% per year over several years, though actual taxable incomes number only 85 million.[59]

[56] Which was the original objective of the unique ID system that became *Aadhaar*.
[57] Estimates from Government of India figures.
[58] Savings have been estimated by assessing the amounts traditionally lost to corruption, middlemen, duplicates, fakes and frauds, with indicators taken from the experience of LPG and ration card data sets. Cleansing the entire system is an ongoing, complex and sensitive process.
[59] It seems that people are registering with the tax authorities even as their income levels remain below the threshold. This suggest that a culture of compliance is spreading, but it is not entirely clear why.

- Business and individual tax returns have been fully digitised (for which PAN and/or e-KYC numbers are mandatory), together with Goods and Services Tax (GST) registration and claims.[60] All these databases now connect in turn to digital attestation from within the *Aadhaar* system. Though *Aadhaar* is not legally mandatory, in practical terms it has become indispensable.

- As a consequence, it is now possible to correlate and cross reference transactions and payments across virtually the entire formal economy, and with reference to various commercial supply chain transactions, and to link these to unique identities, bank accounts and tax filings.

- Tax compliance has surged as a consequence of digitization and the mapping of GST transactions, and through the identification of major bank account holders revealed through the demonetisation process.

Bank accounts and other indicators of financial inclusion

- Principally through the Financial Inclusion Plan of the government (*Jan Dhan Yojana*), initiated in 2016, new bank accounts covering more than 530 million people have been opened with e-KYC credentials, increasingly linked to *Aadhaar* ID numbers, reducing the number 'unbanked' to about 200 million, with coverage now about 80% of the entire population. A process that was projected to take 46 years was achieved within 7-9 years.

- Amounts deposited to these accounts and other beneficiary accounts for the period 2016-2024 are estimated at US$ 30-40 billion (equivalent)[61].

- Transactions through the UPI system account for a further US$ 2-300 billion per year and are expected to rise to about US$ 1 trillion per month as thresholds are increased and as more

[60] Through another system called TIN (Tax Identification Number) which is issued to every commercial entity.
[61] Central transfers amount to about US$30bn, the rest from State transfers.

transactions are covered (recurring payments, utilities payments, subscriptions, investments in secondary markets, etc). This relatively new surge in banking activity is creating markets for new products and services, and banks now have to think about extending other financial services (credit especially) to these account holders.

- Demonetisation in 2016 brought an additional US$75 - $100 bn (equivalent) into the banking system.[62]

- Further to the figures above, Direct Benefit Transfers (DBTs) from both the Central and State governments continue to be credited to the accounts of beneficiaries, giving banks substantially new deposits and millions of new customers on an continuing basis.

- Through the use of RuPay debit cards (again another initiative of the NPCI) debit transactions are free of cost, though with low transaction limits. Upwards of 400 million such cards have been issued. Questions on who will bear the costs in the longer run have yet to be resolved.

- Access to banking infrastructure is now virtually free of cost to customers as the government underwrites most of the costs (to date). Though this may change it is effective in promoting financial inclusion.

Mobile network coverage to support UPI

- Mobile networks and services supported by 4G and 5G telecoms infrastructure has led to several hundred million new mobile connections in all of India's 22 telecoms zones.[63] This network is used for UPI transactions in the main and is an essential part of the Digital Public Infrastructure (DPI) that supports the overall UPI

[62] These are estimates.
[63] There are varying and competing claims on this account. Many people still rely and use only 2G voice only mobiles, while a new generation of ultra cheap feature phones are targeting this segment of the market with a view of course to drawing them more fully into the UPI system.

process.

- To access a SIM card, customers have to link these to their *Aadhaar* numbers. Upto 15 SIM cards can be issued to any one individual, but where bank accounts are concerned, only one mobile number can be linked to a single bank account. This appears to be a security and anti-fraud requirement.[64]

- The UPI system requires bank accounts to be linked to mobile phones, hence the multiplier effect of these linkages, and hence the massive increase in mobile customers.

- Featured mobile phones with an in-built UPI app are now being offered at less than US $12/- equivalent. This strategy by Reliance Jio apparently targets the 300 million 2G users in an effort to bring them into the UPI network. While Reliance Jio obviously see a commercial advantage in this happening, the government also benefits by expanding their financial inclusion coverage by facilitating a deepening of the payments culture of the UPI system.

UPI transactions

- UPI transactions currently (October 2024) number over 530 million a day a massive increase over the year before.[65] Total transactions now account for a little less than half the entire global figure.

- These transactions connect 300 million individual accounts and 50 million merchant accounts across the entire banking system of over 580 registered banks, which is essentially the whole of the banking system.

- By comparison, the system of credit and debit cards (before UPI) connected only 7.3 merchant PoS terminals to cards working with

[64] In border areas, the number of SIMs per person is restricted to 9.
[65] Values however have grown by a smaller amount - perhaps 30%

50 banks.

- The UPI system can also be used for other purposes, like e-sign, FastTag, DigiLocker,[66] etc, for which there is a rapidly growing market. By exploiting this digital platform private initiatives to offer products and services have attracted upwards of US $50bn (equivalent) in investments.

- UPI payment systems are also being used for Initial Public Offerings (IPOs) of companies. Zerodha, for example, which has 17.5% of market share in the brokerage business operates partially through the UPI system, for example, to collect IPO investments through a system called Application Supported by Blocked Account (ASBA), which in turn is a process approved by SEBI, the market regulator.[67]

- Projections by the National Payment Corporation of India (NPCI) suggest that the UPI system will need to handle 3 billion transactions a day, linking the accounts of 150 million merchants to 900 million people, over the next few years.[68] This will require a continuous upgrade in capacity, but also more efficient use of existing capacity.

- Because UPI systems impose an upper limit on transaction amounts, the system as it exists significantly benefits small shopkeepers, street vendors, itinerant traders and so on. Large business and commercial enterprises, tendering and major supply processes, continue to use more conventional systems, and continue to rely on online banking services.

- Fraudulent transactions relating mainly to identity thefts, scams etc, have doubled in the past year. The NPCI is currently exploring ways to respond as identity fraud seems to lie the heart

[66] Apps developed for specific markets and functions.
[67] Basically, investors and banks have to confirm that the funds needed to meet their IPO offers are readily available, and on this basis can apply for shares.
[68] Dilip Asbe cited these numbers in his interview with Shradha Sharma in late 2023. Video reference below.

of these recent figures.

- In spite of the speed at which financial inclusion appears to be spreading, financial literacy remains very poor, and is a major challenge and gives rise to fraud and deception. In a country where basic literacy is so problematic, this is a long term concern.

- At the same time, familiarity and use of the UPI system is not consistent across the country. States in the West, North and South are far ahead of states in the East and North-East. This divergence is a problem and means in effect that financial inclusion is moving at different speeds in different parts of the country.

Direct Benefit Transfers (DBTs)

- The *Aadhaar* system of unique ID was actually established with this as a priority objective. System complexities had defied a solution for decades and only in 2009 was it decided that a unique ID system was needed to cover everybody (population scale).

- Direct Benefit Transfers (DBTs), are now paid straight into the accounts of individuals, families and various beneficiary categories, for which they need bank accounts and an *Aadhaar* and an e-KYC number.

- About US $ 40 billion has been so transferred (by the central and state governments combined – until 2024), without charges or costs. The full amount sanctioned is received without any cuts, charges or deductions, legal and illegal, *en route*. In itself this is an extraordinary achievement where, in the past, as mentioned above, 85% was lost.

- State governments are also now beginning to make more use of this facility, though numbers are not yet clear. The take up rate

currently varies significantly across states and their appears to be a correlation between the rate of take up in some states and UPI use.

- At the same time, the DBTs system is being cleaned up. Duplicate identities, frauds, fakes and defunct IDs of various sorts are being eliminated from the system. So there are dual impacts on the DBTs system. No loss of sanctioned amounts in transmission, and elimination of various duplicates and frauds.

Impact on banks

- Demonetisation in 2016 brought billions held in cash (estimated at about $75 bn) into the banking system at no cost to the banks.

- For the nation's central bank – the Reserve Bank of India – this helped restore some discipline and control over the monetary system. In addition, as cash handling has dropped the printing of currency can be scaled back with significant system wide savings.

- Largely due to the success of the UPI system and the shift to digital payments, most banks also changed their strategies for dispensing and handling cash. Fewer ATMs were needed, and fewer staff were needed to dispense or handle cash, card, chequeing and other transactions. Banks are now active in developing UPI apps of their own which endeavour to add value to banking with them.

- The *Aadhaar* system together with e-KYC requirements, saved banks and clients significant amounts, estimated at over 95%, on identity and document verifications, while also saving time.

- But… large number of new accounts, for which charges cannot be levied, and for which many hold very small balances and have little activity, will involve costs in the longer run. This issue has

yet to be resolved and has been articulated by banks and credit card companies on many occasions.

Private sector investment in apps using the Digital Public Infrastructure (DPI) created by the NPCI

- The number of start-ups, - mainly but not entirely in the fintech sector - has reached 148,000 in 2024, from a figure of less that 50,000 in 2022.

- Over US $50 bn has been invested in these start-ups and other fintech services, even as many have questioned the viability of this level of ambition.[69]

- Numerous new initiatives by the NPCI aim to expand the space in which fintech and entrepreneurs can develop products and services. These will increasingly target credit requirements, insurance, and commerce.

Further cascading transformations

Consequential and massive secondary transformations also seem to have flowed from the process described above. These are harder to quantify and assess but can be inferred from available data that is quite reliable.

There would appear to be two key pathways down which these secondary achievements have taken place and will perhaps continue to take place. Incidents of petty theft or street crime has dropped as fewer people walk around with huge bags of cash any more,[70] so that is noticeable and frequently commented on. But organized crime together with the various systems that generate black money, is another matter and figures relating to the current scale of the problem are not yet available, so obviously trends are

[69] There are two perspectives on this. Yes, the market cannot support this huge level of investment, so many start ups will fail. But the second view is currently dominant. Fintechs have to be in this market to position themselves for the future.

[70] Though of course this depends on the business

difficult to observe in this area. But if these activities are being squeezed then novel forms of cash handling and money laundering are sure to emerge, but at a higher cost to those active in this area. Overall criminality and the generation of black money should drop if this is true.

In the second pathway, corruption and losses due to system inefficiencies have been reduced, largely due to digitisation and direct payments to beneficiaries, but also more broadly to the widespread use of the *Aadhaar* ID system. This process of identity confirmation is now being applied to other areas where duplication and fraud are thought to be common, and measurable results are beginning to emerge. The cumulative effect on this latter process on public finances is likely to be significant as it cascades through the system.

Further downstream is perhaps the greatest prize of this process. Land, property and assets (gold and jewelry) have traditionally been bought and sold in cash and are considered by many, along with criminal activity and the funding needs of political parties, to be the fountainhead of all corruption. With an increasing number of transactions, payments and transfers now being mapped automatically to tax systems, and with identities authenticated through the *Aadhaar* process, it is thought that cash transactions in this sector of the economy have fallen significantly, while fraud and identity theft have also dropped.[71]

For example, legal documents relating especially to land transfers require the authentication of signatures and identities. This is now an instantaneous process, with *Aadhaar* ID numbers providing the means, instantly (in theory) eliminating fraudulent and fake transactions.[72] Upwards of 80 million such authentication requests are handled every day on this account alone, but of course not just

[71] At the same time, corruption is the most flexible of business models and new and inventive ways are continuously being developed to circumvent the law. The continuing and massive scale of tax evasion by profit shifting off-shore is a persistent challenge.
[72] Stamp Duty collections, especially in states with ore digitised processes, have surged even as some of these rates have been cut.

for land transfers. All legal documents require such authentications, so it is likely to directly impact massive new areas of the economy.

But somewhat unnoticed in this process is that much of this shift should, if deepened and consolidated, work for the benefit of the poor, in other words the bottom half of the socio-economic pyramid which is itself more than half the entire population. Costs to access and use this system, whether relating to UPI, banking, digitization or telecoms, have been eliminated or drastically reduced, which should facilitate further measures for financial inclusion. At the same time, Direct Benefit Transfers (DBTs) targeting the poor are now transferred instantly and without losses in between.

If the problem of basic literacy and also financial literacy can be effectively addressed, In turn and in time, this will compel banks and card companies to significantly redesign their business models if they are to retain and expand market share within this space, which itself will represent a major transformation within the financial services sector.[73]

But scale in the Indian context also refers to the enormous mountain that remains to be climbed in delivering on the full financial inclusion agenda. Payments systems are just a small part of any such process, and to this needs to be added credit, investment and insurance penetration, which are all dismally low at the moment. Coverage and inclusion in turn depend on another transition: to complete the process of bringing the informal economy into the formal economy. So the issues of coverage and inclusion essentially address the 'gap' that exists between where things stand now, and how they should ideally be. So the financial inclusion agenda still has a long way to go if financial services are to be accessible across the whole geography and population of India. Assessments by the NPCI itself suggest the following:

[73] This is already happening and is an evolving process. It remains to be seen what final shape it assumes because issues remain relating mainly to who will bear or underwrite the costs of this system as it develops.

- That UPI coverage can still be scaled up by about 300% by 2027, for which the NPCI is planning capacity augmentation

- Credit and insurance penetration, which is currently virtually absent from many parts of the economy and particularly for the micro and small commercial sectors and for many households in rural areas, can be massively scaled up.

- Access to investor credit through formal channels, which is again virtually absent, can significantly expand the number of companies directly accessing investor funds from the current level of 7,850 listed companies[74] to the remaining 1.56 million commercial entities (out of 2.63 million registered entities)[75].

- That then leaves the self-employed sector, estimated to number 55.3 million micro enterprises, employing upwards of 60% of the rural work force and 40% of the urban work force.[76] Currently entirely within the informal sector, with limited access to credit, insurance or any financial services, they represent the very bottom of the pyramid, but as the numbers demonstrate, are a huge part of the informal economy.

[74] As of October 2024. 2,350 on the National Stock Exchange and 5,500 on the Bombay Stock Exchange.
[75] Deregistering defunct and fraudulent enterprises is yet another objective that is being pursued.
[76] Figures from the Annual Survey of Unincorporated Sector Enterprise (ASUSE) conducted by the Indian Statistical Institute, Kolkata.

4. What does financial inclusion mean for India, and why it matters

In itself, the term 'financial inclusion' is anodyne and probably means little to advanced economies. But for countries like India it is not only one of the principal objectives of all development strategies but also a means of reaching out directly to the whole population without going through cumbersome administrative structures. It is in addition a way of avoiding corruption by cutting out the role of intermediaries and middlemen form whatever benefits, welfare transfers, or services are provided.

It is also the basis for all development, and an effective agenda for financial inclusion would also reflect positively on governance in general, thus creating a platform for other services and for further growth within a formal economic structure.

But banking infrastructure is essentially passive and has to be activated and deployed to achieve inclusion, and ultimately development. That means the full range of financial services has to operate from taking deposits, providing payment and other services, processing credit and recovery operations, and offering other services, etc. The same would also apply to insurance companies and other providers of financial services.[77]

By accelerating the implementation of the financial inclusion agenda, the government can actually accelerate the overall development agenda. But traditionally, in order to deal with this, the general approach of the government was to assume (probably correctly) that development, reform, and modernisation required a coordinated and integrated approach across the entire span of government and society, vertically (from central to local levels) and horizontally (across the entire central apparatus). Indeed, the Planning Commission was created in 1950 for exactly this purpose, while most international institutions also shared much the same

[77] Insurance companies were also nationalised along with the banking system.

idea.[78] But the experience of the UPI episode, which is still unfolding, suggests alternative approaches can perhaps work more effectively.

The introduction of a digital and biometric *Aadhaar* card[79] seems to have now unlocked a process that can achieve what policy orchestration at a grand scale could not. A bit like an avalanche that acquires velocity and mass, we are looking at a similar process in the way the *Aadhaar* - UPI experience is creating a wider and ever expanding impact across the entire economic system.

This is not of course to say that governance in India has significantly changed[80], but that the *Aadhaar* - UPI experience now demonstrates how massive change can be initiated and delivered, and how it can accelerate the pace of change in many other areas. But equally important, it demonstrates how the development agenda can perhaps be more effectively addressed using other approaches, provided of course that a number of linked issues and dilemmas can be simultaneously resolved.

The UPI system has thus measurably helped accelerate a much broader set of policy initiatives that are, together initiating a wider economic transformation that is both structural and substantive in other ways.

Development through efficient financial markets?

Take financial markets for example. They currently serve a narrow - but still huge - market consisting primarily of larger companies - both national and international - and start-ups that have the

[78] People also forget that various forms of centralised planning were in fact encouraged by international institutions in order to channelise investment into infrastructure development

[79] Which was and remains very controversial for a mix of reasons, mainly relating to privacy and the dangers of an intrusive and extra-constitutional surveillance potential.

[80] To be sure, the actual implementation of the Aadhar system often created confusion because it was not mandatory, but expected. No one really understood what this meant in practical terms. Only recently, with the alignment between Aadhar, e-KYC and the PAN card system has it become much clearer. At the same time, some important legal and ethical issues remain to be resolved, not to mention issues surrounding data privacy and data security.

potential of quickly becoming major players.[81] They currently do nothing for unregistered micro and small enterprises,[82] for obvious reasons. But these unregistered and informal entities essentially cover most of the agricultural and rural economy, in all its forms, and account for the vast majority of the country's labour force. They would typically need capital but have limited means of accessing loans. Accessing capital markets would seem a distant dream for many of them.[83]

Banks, in the absence of credit histories or any formal documentation, would charge 25-30% interest to cover their risks if at all they agreed to lend. At the same time, MSMEs were estimated to account for 60-70% of labour, 33% of manufacturing, 29% of GDP and 48% of exports.[84]

Bringing this part of the economic landscape into the formal economy should obviously form part of any effort to promote economic development. But as yet there are many steps and stages through which this process has to pass. Including them in the banking system and mapping them into the tax network, is a start. The next stages, will include three frameworks all building on the third layer of the India Stack – that relating to data governance:

- ONDC, as an Open Network for Digital Commerce, aims to completely open up commercial and supplier relations to competition
- OCEN, an Open Credit Enabling Network[85] is expected to radically reduce the costs, delays and risks of credit operations for individuals and commercial entities across the whole MSME sector, while also connecting lenders and investors to potential borrowers.

[81] Perhaps the 5th largest in the world
[82] Known collectively as the Micro, Small and Medium Enterprise (MSME) collectively
[83] Of course one should be careful with such sweeping generalisations. Many large Indian companies started life as small and informal activities. So it does happen, but is not the norm.
[84] Figures from the government of India
[85] For which work is ongoing by the NPCI, and which will also make use of the UPI framework.

- The Unified Lending Interface (ULI), will operate at lower thresholds and will provide credit alternatives for consumers.

Finding a way to connect the activities of financial markets to the requirements of this part of the economy would thus yield huge benefits but will take time to develop.

Kevin James' paper sets out ideas to increase the efficiency of financial markets[86] not specifically for India but relevant nevertheless. By bringing the MSME sector into the formal economy, registering them for tax and other purposes, and connecting them to the formal banking system, both efficiency and equity issues could be addressed together with risk concerns, which of course are the key objectives of any development strategy and which is so important - socially and politically - to the whole country.

For a country like India, therefore, comprehensive financial inclusion will probably be an essential pre-requisite to most of India's development objectives.

[86] Kevin James, Rebooting Financial Markets in the aftermath of Brexit.

5. Can India's experience and example be replicated elsewhere

The relevance of India's policy experience in this area to the requirements of other countries would look obvious but is much harder to determine in actuality.

As many countries have learnt to their cost, no two systems, countries, or cultures are the same, and assuming a good idea in one system will work in another is to vastly overstate the similarities between systems.

Indeed, even within India, the same is true within and between states.[87] At the same time, there is perhaps no doubt that a good idea, if properly adapted and adjusted for the operational realities of another system, can be made to work. But the initiative, shape and direction of that process has to be a product of an internal process within each country.

Indian negotiators in international fora often characterise their system as being *sui generis* - that is to say unique to itself.[88] But the same is probably true for most countries, large or small, rich or poor. The difference is of course in the case of India is that of scale. As a large economy with a huge population, scale matters when planning for something as big as this. For the private sector, finding viable markets within this 'population scale' framework would also differ between countries – generally speaking the bigger the scale and the higher the average income, the better.

But in the case of the UPI system, its design was intentionally built to be open source and interoperable, as a digital public infrastructure with universal coverage, free of cost. These terms may appear to be a little abstract when considering the reality of a

[87] Many of which were created from enormously varied colonial and pre-colonial systems, but some of which are more recent creations. For example, rules relating to Corporate Social Responsibility (CSR), and the classification of GST rates are at variance to those followed in other countries.

[88] A position often adopted in trade negotiations and often with reference to India's unique socio-economic and policy challenges.

particular country and what this could mean for them, but the premise as mentioned in section above on the logic behind India's approach to the India Stack is relatively straight forward. The state will provide the digital public infrastructure platform required, and it is then for entrepreneurs and others to develop goods and products of various sorts. - commercial or non-commercial - for wider use. In turn and in time, as with the internet and GPS, to be a stimulus for wider economic activity and development, and a platform for entrepreneurs to develop and innovate with further products and services.

The question that arises however, is to what extent would this be relevant or useful for other systems to use, or would it serve as a model for other countries to consider. Here there are some specific features of the Indian system (and experience) that would suggest proceeding cautiously.

- India is perhaps the most unequal major economy in the world with huge pools of poverty in the midst of growing concentrations of wealth. Distributional and equity issues matter when designing a system. Current data from the UPI system suggests that its uptake is uneven and there are significant differences between india's various regions and states, and within society. The same is true of tax compliance through the digitization process. Uneven access to financial services can create significant long-term divergence. While this may perhaps be a very specific problem to India, and may actually be transitional, it is nevertheless something that policy designers would need to bear in mind.

- India still has significant foreign exchange controls in place which equip the government with an additional set of policy instruments that can be used in many different ways and is unlikely to change soon. This contrasts with the position of many emerging economies.

- India's security agenda is also becoming increasingly active in shaping investment, trade and economic policy. Other countries would obviously have very different considerations in this context.

- An open source, interoperable and free to use digital public infrastructure is likely to be opposed by some powerful interests in the banking, financial services and telecoms sectors whose global business models may be disrupted.[89]

- The elimination of MDR and bank charges, together with other costs currently met by the government, puts commercial debit and credit card providers at a disadvantage. At the same time it does raise long term questions about the viability of a system where the government meets most of the costs. Any government going down this route would need resources to cover these obligations.

- At the same time, the design principles built into the India Stack together with the lead responsibility assumed by the government and its agencies (principally in this case by the RBI and the NPCI) have brought down the costs of accessing and using the system very significantly. This part of the whole approach adopted by India would surely be of interest to any country in the world.

- The *Aadhaar* system in India is designed for development purposes and not for national security. This distinction is important if the identity system is to gain traction, acceptance and credibility. Many countries already have a security-determined state identity framework, and another identity framework for taxes. Is it worth having three?

- Digitising the entire tax filing and handling system and connecting it to a functioning internet system, together with an *Aadhaar* like facility for digital authentication takes time and is very

[89] In India's case, international banks, Visa and Mastercard, have all been outspoken in highlighting questions of viability

complicated, as experience in India has shown. Low levels of literacy make it hard to see how it would work, especially as simultaneous and massive upgrades to telecoms and internet connectivity would seem to be necessary, and which makes the system even more demanding in terms of the publics ability to make use of it. There are also a lot of additional legal complications involved, sometimes involving constitutional distributions of power.[90]

- India also has a legal framework, through the Payment and Settlement System (PSS) Act of 2007 requiring banks to settle payments immediately. The practice in many countries of banks holding on to these funds for 5 or more days would be illegal in India. So each country would need to consider whether legal changes were needed, and if so, be ready to deal with the reaction from banking and other powerful interests.

- Data from this system has to be secure and privacy has to be respected, and indeed the law was changed in India in 2023 to ensure this.[91] Moreover, the third level of the India Stack specifically addresses the issue of data, and the system is designed so that people own and control their own data. But of course this is easier said than done. In India's case Account Aggregators have been created, and are subject to regulatory oversight. This is somewhat unique and the design of the system is important.

- India is also strong enough[92] to require that data storage and data servers are located within the country (and without back door access), but enforcing this is harder than anyone realises. Not many countries can do this. Again, powerful corporate interests

[90] In the GST sphere, legal clarity is sought by commercial interests to distinguish between 'gaming' and 'gambling', which sound similar but are completely different.
[91] Through the India Digitial Personal Data Protection Act of 2023. Ths Supreme Court has also clarified that data protection is a Fundamental Right under the Constitution.
[92] This is an untested assumption. In reality, global corporate interests backed by powerful governments, can bring a lot of pressure to bear.

and international partners may push back against it.

Each of these issues is complex and sensitive, with significant commercial stakes involved. Addressing these challenges would require not just resources, domestic regulatory and technical capacity, but significant political resolve.[93]

[93] Capacity and cost are additional factors.

6. What the future may bring

While this paper has been assessing and analysing how the formalization of the Indian economy is accelerating the process of financial inclusion, with an implied and positive impact on development, a number of worrying realities remain.

Many of these issues are deeply interconnected which again suggests that any meaningful development agenda has to advance along a broad front. Beyond policies, legal frameworks, regulations and institutions, huge and sustained investments are also required across all areas of social, physical and digital infrastructure.

In this particular case – infrastructure development – state governments play a dominant role where education, health, housing and rural infrastructure and rural and local services are concerned. While the overall strategy may be financed from funds provided by the central government, the degree of commitment of each state government may differ as they may have other priorities they prefer to address. Standardising and equalizing investments across all social and physical infrastructure sectors has been one of the most stable national policy objectives over the decades, but it is has always been a challenge to actually deliver. And without basic improvements in education, literacy and numeracy, the whole strategy could fall short.

Much of the challenge for India will be to find a way to manage this strategy for financial inclusion and to give it meaning and substance.

But for the purposes of this paper, and within a debate on what financial inclusion can generally bring, perhaps the following issues need to be addressed.

Cyber and data security

It is self-evident that any system dependent on technology to this extent needs to be secure and reliable and heavily protected. This

is a challenge that will extend into the indefinite future, and while global policy and regulatory coordination may help in some areas, most of the work needs to be done within the national economy. Capacity and systems would be needed to do this, with AI posing an additional challenge.

Fraud in the UPI payment system has also doubled over the last year. A committee within the NPCI is looking in to finding ways to address this problem, but of course it remains a rolling challenge. It seems that most fraud arises because identities are shared by people who are not particularly aware of the risk, and the task of the committee is to build in features that will help identify and neutralize prospective frauds.

Labour market formalization

As referenced in the paper, the process of formalization does not yet extend to the labour market. Indeed, the informal labour market share remains largely as it was since independence. This suggests that a policy of financial inclusion needs to be accompanied by other policies, to address the social and equity dimensions of the development debate more forcefully.

Indeed, if wages remain low, and the status of workers continues to be informal and hence insecure, then the whole growth model could be fundamentally compromised, simultaneously dragging down the financial inclusion strategy.

Regional differences

Though barely referenced, it is evident from available data provided by the RBI and the NPCI that the use of UPI is uneven across the various regions of India, while tax revenues are also skewed, suggesting either that economic activity is lopsided and uneven and/or that the process of formalization is slower in some states than others. It is not clear why this is happening and whether it will remedy itself as the network effects of both digitization and the UPI system take hold. At the same time, it does need to be addressed as a priority because of the way it is linked to the formalization

agenda and to the various plans to expand credit into the MSME sector.

Filling the gaps in the Financial Inclusion agenda

In simple terms, the level of penetration of credit, investment and insurance services in the Indian economy is far too low and currently represents only a fraction of what it could be. Escalating penetration is estimated by the NPCI to involve an expansion in transaction activity by more than three-fold, and in credit, investment and insurance activity by a thousand-fold, though of course from a very low base. This is huge and would obviously involve a number of long term strategies.

The RBI has announced their intention to develop and launch a Unified Lending Interface (ULI) to provide credit facilities for smallish requirements, corresponding in some ways to the UPI system for transactions.[94] Two other frameworks for other forms of credit provision have also been developed but need to be adopted and scaled up significantly.[95] These are the OCEN and ONDC.

Taken together, these aim not only to simplify and expedite overall credit flows, but to simultaneously unlock India's potential in e-commerce. Estimates suggest that if this funding gap is to be addressed, then an additional US$ 250 bn (equivalent) would be needed every year to cover all forms of investment and credit.[96] But to unlock this flow, the whole of the MSME sector needs to be formalized, and be mapped to the banking and tax systems, while documentary requirements that provide credit history and collateral confirmations would also be needed.

To address this problem, the RBI has developed a regulatory framework to recognise 'account aggregators' (AAs) to provide –

[94] Being piloted since 2023.

[95] For a better understanding of the differences and similarities between the three frameworks, please see Yashwaria Gupta's article: How ONDC, OCEN and ULI are transforming digital lending in India, as listed in the references.

[96] Based on an assessment that less than 11% of credit needs are currently met by formal credit institutions. These numbers emerged from the Report of the Expert Committee on the credit gap of the MSME sector, of June 2019.

like the *Aadhaar* system – an online and digital facility which remains under the control of the borrower. Formalising this sector, would also open the possibility of further investor flows through financial markets.

But there is in addition another type of informal economic activity that also needs to be formalized and covered, which stands largely outside the MSME sector, though overlaps to some extent. Known as Own Account Establishments (OAE), they number about 55 million people who work in the domestic or household sector, which in turn represents about 41% of the Unincorporated Sector Enterprises (USE). This sector is dominated by women and is particularly vulnerable, and hence important.[97]

Complexity of technology based systems could exclude rather than include

While the India Stack and the digitization of tax systems have been designed to provide for a simple user interface, even as the underlying systems and protocols are fiendishly complex, levels of financial and indeed basic literacy remain very poor especially amongst the principal target groups.

This may deter people from taking up and using the system, particularly if reports of fraud and identity theft continue to be heard and published. Indeed, a recent article in the Economic and Political Weekly (EPW) makes exactly this point (among many others).[98] Many people find it very difficult to resolve *Aadhaar* related difficulties, let alone working out how to align *Aadhaar* numbers to e-KYC numbers, and then use UPI processes.

Unless addressed systematically, this problem is likely to get worse as more and more processes and products become digitized and as the financial inclusion agenda expands to cover credit,

[97] Farzana Afridi forcefully makes this point in an Indian Express editorial of December 11, 2024. See references for links and details.
[98] EPW article *KYC and access to Bank Accounts,* Vol. 59, Issue 46, November 2024,

insurance and investment.

National skills shortage

It may seem odd, but there is currently a significant and ongoing shortage of IT skills in India, and the speed at which qualifications are delivered falls short of requirements, and more importantly of quality and standards. Evidently a system-wide problem for the whole educational structure, it will take time to resolve. But a question remains of whether this could be an impediment to delivering on the broad agenda over a sustained period of time.

Complexities of connecting to the international system for payments services

Though international payment facilities have only recently started, these are currently limited to just a few jurisdictions.[99] As the rupee is not fully convertible, a number of complex political, organizational and legal processes need to be addressed in each case. But the potential is huge and taking the figures relating to inward remittances as an indication of the possible size of this market, an annual figure in excess of US$100bn could easily be targeted. If this can be done, and without charges or costs to either party, then the impact will be significant especially as tourism flows increase.[100]

Linked to this debate around remittances and transfers is an issue that is being increasingly discussed, but which is nowhere near reality: whether a UPI type system could serve as a global public good, and make use of India's Digital Public Infrastructure. The SWIFT system, for example, conducts 50 million transactions a day, with a value of over US$ 22 trillion, which in volume terms is a fraction of transactions managed by UPI, but in value terms is astronomical when compared to the figure of $2-3 trillion per year that the UPI system handles. The fees that banks, and others, collect from this system are similarly enormous, and for some at

[99] Singapore, the UAE, Nepal, Bhutan and France, to start with.

[100] Remittances typically attract fees of 5-10%, so on a remittance figure of $100bn, an amount of $5-10bn would represent an additional flow into the Indian economy.

least, probably constitute a major source of revenue. Could a UPI type arrangement challenge this established system, and if so how would it work.

Will the transformation process plateau?

This is perhaps the critical long term concern for the system. If the rate of growth of UPI drops and plateaus, and if tax revenues similarly flatten, then there is a danger that the financial inclusion agenda will stall. There is also a danger that India's public finances will deteriorate and problems of debt management will return, further constraining investments in Digital Public Infrastructure and beyond.

Though the net has been spread wide, through the simultaneous expansion in new bank accounts, mobile phone coverage, and Direct Benefits Transfers, it still lacks sufficient depth. Most UPI transactions are relatively small, as are the balances in these newly opened bank accounts. Banks still have legitimate concerns over the viability and costs of maintaining these accounts when there is insufficient activity to cover operational expenses.

Deepening this process will not only give it more traction but will of course engage the attention of banks more fully.

Two routes have been identified to address these concerns. In the first place, as mentioned earlier, the UPI system itself can be expanded by over 300% by 2027, which would mean upto a trillion transactions a day, with monthly amounts equivalent to US$1trillion. It is thought that this can be achieved by expanding the payments for which UPI can be used to include subscriptions, utilities payments and, perhaps most importantly, investments. But of course thresholds will remain relatively low, even if marginally increased, so major payments systems will continue to dominate most commercial and investment activity.

The second route is by broadening the system to dramatically boost credit activity throughout the economy through the ULI,

ONDO and Open Credit Enabling Network (OCEN) frameworks. This initiative includes many of the same features as the UPI system, and in effect builds on the third layer of the India Stack – that is the data governance layer. It is open access, interoperable and free to use, which of course means that the network effects could be attractive to many fintechs in particular operating in this sector. As part of this, regulated account aggregators (AA) would be critical to dramatically reducing the costs and risks to lenders and borrowers.[101]

In both cases a long term commitment to policy direction will be essential.

[101] The RBI has already registered 17 AAs as NBFCs, with 3 more applications under process.

7. Conclusions

Although it is very difficult to establish cause and effect, and furthermore to disentangle which exact initiative led to which precise transformation, it is clear that a transformation at many levels is indeed taking place in the way in which the Indian economy works.

In the public mind the changes that are taking place are directly connected to the UPI system, which does indeed seem to have triggered the whole process. At the same time, it is also clear that the unique bio-metric ID system known as *Aadhaar* is largely responsible for the durability of this very process. But Aadhaar is not an active ingredient, so to speak, but nevertheless an indispensable part.

The Indian experience described in this paper also suggests that technology properly used and harnessed can indeed induce major structural changes. Hitherto, the consensus within India and probably around the world, was that development by its very definition could only be addressed by a comprehensive set of interconnected policies and strategies across a broad front. The UPI case suggests that alternative approaches may actually work as well. Of course, even in this case, further system-wide reforms do need to take place, but they can follow in its wake.

Another feature of India's experience worth bearing in mind is that any transformation has to reinforce, and not deplete, public finances. Many emerging economies are economically fragile and can't afford to take major risks, so building a strategy that ensures public finances are strengthened is essential.

It is interesting to note in this regard that a great deal of what the UPI system was trying to do was actually to reduce costs and so facilitate transactions. Their approach did not entail great expenditure, and this design priority seems to have been absorbed into the digitization agenda as well, and now features in the

broader approach to extending digital public infrastructure (DTI) to other functions as well.

And finally, on the point of policy replication by other countries, caution needs to be exercised. India's model contains extraordinary ideas, and their experience makes for a compelling case. But every system, culture and situation is different. If at all there is a core idea that can be worked up into a functioning and relevant system, it is about digital public infrastructure and its underlying operating principles. These would seem to be critical.

8. Note on Annexes

This paper has been put together for a mainly international audience who may not be familiar with the Indian system. At the same time, it would have diverted attention from the main narrative if the paper digressed into explaining the Indian system and its various complexities. A few of these more relevant points have indeed been put into the footnotes, but obviously on a small scale.

By putting a few connected issues into a series of annexes, anyone who would like to understand some of these complexities is welcome to delve deeper. Of course, beyond these annexes are much larger stories, but for that sort of deep dive the net to identify relevant books, articles, online sources and debates would have to be cast much wider.

Annex 1

Governance and policy implementation in India, and how it has evolved

In the introduction to this paper a question was raised whether the apparent success of these various policy initiatives could represent a breakthrough in the way in which policy is conceived, designed and implemented in India.

Although it is tempting to say yes, the reality is somewhat different. The general policy process still suffers from the same system-wide cultural and operational problems, but it does seem that within this overall framework a pathway has been found to improve the effectiveness of some elements of policy implementation.

Technology seems to lie at the heart of this approach as it is now being used to overcome the very impediments that have typically compromised any major policy initiative. This broad technology platform is being increasingly referred to as 'Digital Public Infrastructure'. Publicly owned and technology based, it is additionally open access, interoperable, free to use, and at population scale. It resembles, and was indeed based on, the ideas behind the internet and GPS. It is also sometimes referred to as 'Public Rails', that is a system that anyone can access and use.

The India Stack and Digital India are both part of this approach to provide specific services which, if sustained, will have a much wider and more transformative effect than has already been achieved. As systems, they are moreover cost effective, politically neutral, and provide opportunities for the private sector to build on.

In a way this differs significantly from how the government normally functions, or at least is thought to function. At first sight the organisation of the government of India is fiendishly complex, while on further inspection it is not just complex but also remarkably

inert. Trying to understand who does what even in this limited area is not for the faint-hearted.

Add 28 state governments and 8 Union Territories (central government administered territories) into this mix, each of course with multiple languages, and their various traditions, practices and priorities, and the sheer scale and complexity of addressing any policy challenge that hopes for national level consistency becomes apparent.

But of course from the inside, it looks and feels different. Officials learn to deal with only what's in front of them and not to try and understand or shape the whole system, how it is held together and what it does as a whole. Nor do they agonise about why it takes so long to get anything done when it is obvious to anyone on the outside when something needs to be done. From the inside, it is a hive of activity, but from the outside it often looks passive and unresponsive.

By drawing on a part of this reality – that is the government ministries deal with what is in front of them and do not worry too much about what is happening in the wider system – it was possible both through the India Stack and Digital India strategies to push policy dramatically forward, of course across a fairly narrow front. By doing so, it seems to have provided a sort of 'proof of concept' to the rest of the system.

And in fact, this is borne out by the vast number of initiatives that are being developed in different parts of the system that incorporate the use of technology into the heart of their strategies.[102]

But the underlying reality of the way in which India is governed remains much the same, even as parts of the system are dramatically upgraded. Basic health, education and housing, which

[102] This includes the framework policies relating to e-commerce, credit markets and retail lending, namely the ULI, OCEN and ONDC.

lie at the base of the development pyramid, together with rural infrastructure as understood in its broadest sense, still need to be massively upgraded and improved in order to support and sustain the achievements of UPI and Digital India.

And beyond social and physical infrastructure, the reality is that when it does act it often uses blunt instruments to deal with sensitive and complex problems.[103]

In this sense, the process of demonetisation (in late 2016), and the closing down of most of the economy during Covid (in 2020), reflected exactly this long-standing problem with governance. Hastily implemented and poorly thought through, these and similar measures would create extensive confusion, disruption and hardship, especially for the poor and vulnerable, which in India is more than half the country.

Indeed, even as we talk about the success of *Aadhaar* and the GST roll out, there were many problems through their formative stages which are still being resolved.[104] When *Aadhaar* was introduced in 2010 it was not very clear what it was for or why it was needed. The sheer speed and scale at which it moved from an idea to reality itself created confusion. After all, the financial services sector had KYC to deal with, while individuals had their tax codes. The value added of another system of ID was never clearly understood and was considered a huge irritant by many. The same applied to the digitization of tax returns, especially with respect to the introduction of GST, and for the first couple of years there was widespread confusion and controversy.

[103] The endless sequence of clumsy and sometimes brutal anti-insurgency operations, dating back to the 1950's, is another example. Dealing with public order, protests, riots and various other forms of civil disturbance is another, though in most of these cases it is a combination of state and local police who are responsible.. Other parts of the system, whether it is the various forest departments, revenue officials (both essentially state responsibilities), income tax, excise and customs authorities, or indeed any other executive agency, often goes in hard and heavy and causes further damage to the credibility of the very constitutional system they are sworn to uphold.

[104] There remain a number of legal issues that need clarification and resolution in both cases.

But a striking feature of this entire process was the persistence with which the government continued to pursue their agenda, even as a new party took over in 2014 – that is 4 years after *Aadhaar* was first conceived. This element of continuity, followed by the acceleration that occurred especially after the twin disasters of demonetization in 2016 and the Covid shutdown in 2020 certainly seems to have helped accelerate the process of transition. From the publics point of view, UPI represented a quick, efficient, and reliable way to deal with small transactions while minimizing human contact and cash handling.

However. the fact that the digital infrastructure was in place to manage and support this rapid transition towards managing cash-less activities was a striking enough departure from the usual methods of governance, while the persistence with which this was pursued helped sustain the process. This paper focuses on just a few elements of the way in which society as a whole adapted, but there were other startling examples. With the shutdown of schools during covid, text books were provided with QR codes which students could download. Hundreds of millions of downloads enabled some (though certainly not all) students to keep up with their studies. A similar extraordinary measure – delivered through apps - was used to help individuals across the country monitor and keep up with their vaccines for Covid. For an emerging economy with a vast population, this was extraordinary.

Perhaps an explanation can thus be found in three areas. In the first place, as mentioned, the technology was already in place and proven (and to that extent politically neutral), together with the required organizational, regulatory and legal frameworks.[105] Secondly, there was a conscious political strategy to pursue the financial inclusion agenda and digitization agenda even though the implications and difficulties were poorly understood, which may help explain why it was so chaotic in the beginning and has since settled into a fairly stable pattern of improvement and growth. And thirdly, this agenda could be pursued using a limited number of

[105] Some dating back decades

agencies and departments, thus contradicting the more traditional view of how development should be organized, which assumes that simultaneous measures would normally be needed across the whole of government, vertically and horizontally, for any progress to gain traction and take hold.

What actually happened suggests that a narrowly focused agenda, pursued vigorously and without much regard to side effects could indeed be very effective. In that sense, the governing system has not become more sensitive or alert to public sentiment but is just determined on a specific course of action in certain situations can be very effective. This of course holds important policy lessons for many developing countries.

The oddity of this approach can be seen in other areas as well. Any successful strategy for financial inclusion and the extensive use of digital and telecoms technology would normally require fairly high levels of basic literacy and numeracy. In their absence, the danger of course is that the process would actually become exclusionary rather than inclusive, as individuals and families struggled to understand and make use of the system. But the government pursued the first phase of the agenda without much initial regard to the literacy requirements, and only later did it identify financial literacy as a priority and is now scrambling to raise standards, skills and awareness in that area. It has also been flagged as an important skill needed to combat online and digital fraud.

At the same time, while the UPI system is simple to use, online banking is not. But transactions are only a small part of the full range of financial services that are needed. So while the net of financial inclusion has been cast wide, the system still lacks depth as low average deposits in many newly opened accounts would seem to attest. So in this sense, the financial inclusion agenda is its preliminary phase, and success will be when most financial services are available to the whole population, who in turn will know how to make the best use of it.

For this approach to work, another governance feature would need to be evident. The willingness and determination to keep finding solutions to any problems that might emerge. This does indeed seem to be a characteristic of the present approach where difficulties are met with more ambitious statements of intent which then require the whole system to respond. For example, the government has been trying to develop a Universal Health Interface (UHI) but without much success yet. And last year (2023) saw an announcement that a Universal Lending Interface (ULI) was being piloted and would help facilitate lending and borrowing for consumers of various sorts. While this may make sense in some respects, it actually demands an even higher standard of financial and general literacy. Though both the UHI and ULI are bewilderingly complex in their underlying operations, the idea – as with UPI – should be simple and effective to use.

To conclude: transforming a colonial era bureaucratic system to deal in turn with a feudal social order and a largely pre-industrial or pre-modern and informal economic system, capable of operating in the modern world, was recognised as essential from the start.[106] Thus the two objectives of UPI - financial inclusion and creating a system to transmit benefits, subsidies and services directly to everybody - lay at the heart of most policy approaches for all these years, but were never realised.[107] Technology based approaches now suggest that this objective is now within reach.

[106] The Five Year Plans, together with administrative reforms and structural reforms to the economy present us with a catalogue of these endeavours.

[107] For example, the nationalisation of the SBI in 1956, followed by the nationalisation of 14 other major banks in 1971, led to a massive surge in branch expansion, from roughly 3,000 to about 30,000, thus creating the infrastructure necessary to support a strategy for financial inclusion. But still the objectives of universal financial inclusion and universal delivery of benefits and services invariably fell short, and the capacity of the system remain underutilised.

Annex 2

Note on finding ways to verify identity

At the heart of the problem of actually doing something meaningful to achieve financial inclusion lies the problem of verifying identity. Bank branches were needed of course, but people's identities had to be verified while opening accounts, especially in a society with high rates of illiteracy. Fraud was a massive and growing problem, with identity theft or misrepresentation common. Again this may sound strange to those in advanced economies where births and deaths are routinely recorded, supplemented in many cases by identity cards or other official methods, but in India most people in rural areas pass from birth to death without being mentioned in any official documents.[108]

Over time, the government used proxies (like ration cards, voters registration lists, school registrations, and caste and tribal certificates) to try and ensure that welfare benefits, transfers, subsidies and services reached their various target groups[109], but this whole arrangement was very unsatisfactory, clumsy, patchy and vulnerable to corruption. Upwards of 85% of these transfers were lost in the process of delivery.[110] At the same time, creating false and fraudulent certificates became an economic activity in itself, adding further to the black and informal economy.

But the scale of the problem was immense. No one had a recognisable identity card that could be used everywhere and for any purpose.[111] As mentioned above, identities, when recorded, were often in local languages and drawn from local procedures that

[108] The legal obligation to record births and deaths was introduced in the 1950s but widely ignored. What was the point, was a refrain commonly heard, of taking the trouble to record a birth or a marriage or a death, if there were no tangible benefits flowing from the process, or if there were no government services that were offered or provided.

[109] Targeting benefits was a nightmare for administrative systems. The poor as a whole were never targeted - because of budgetary constraints - and so specific castes, sub-castes, tribes, sub-tribes, nomadic groups and definable population groups were laboriously surveyed and targeted.

[110] As Prime Minister, Rajiv Gandhi made this point repeatedly in the mid 1980s. Assessments of this problem came essentially from the Planning Commission's various studies of programme implementation.

[111] A few had passports, but the numbers relative to the scale of the problem were tiny. Driving licenses were another option, but again the numbers were limited. Moreover, driving licenses were issued by state governments and not be any central authority. Integrating data bases to provide cross referencing was simply not practical as data requirements and technical systems differed across the country.

addressed specific requirements. This was hardly an acceptable or viable method of verifying identity, and many procedures (as with passports or driving licenses) also required local references and police verifications in addition. More bureaucracy, long delays and more corruption, but still only covering a small percentage of the population.

Interestingly it was the Planning Commission[112] that came up with the general approach that led to the creation of the Unique Identification Authority of India (UIDAI) in 2009, which in turn developed the *Aadhaar* card system. One of the co-founders of Infosys[113] and his team developed a system for universal and unique identification of every individual in the country. There was no mention at that time that this should be digital or that it should necessarily be bio-metric. Nevertheless the brief was general and what emerged would ultimate trigger the extraordinary transformation that is unfolding today.

This initiative, coming as it did from the Planning Commission was also at variance to the approach followed in other countries where it was typically the ministries of the interior and the intelligence agencies who identified what went into identity cards, and further required everyone to carry one. Originating from a development perspective perhaps helps account for its success as it was of course understood as a means to help ensure that various welfare and benefits transfers went to the right people.

The design actually adopted combined several features that are worth mentioning. *Aadhaar* itself means ‘basis’ or ‘platform’ and that is exactly what it was. The designer of the system advised that it be digital, and to make it relevant and useful in a society where many people were illiterate, or were literate only in regional or local languages, suggested it be bio-metric (finger prints and irises) to create unique identities. These were thereafter mapped to a central

[112] Since replaced by NITI Aayog
[113] Nandan Nilekani. One of the several people who are credited with creating the India Stack and of turning a concept into a reality. His book, Imagining India: the Idea of a Renewed nation’ published in 2008 reflects his thinking at the time.

data base, and digitised, which meant in effect that identify could be verified in real time by any agency that needed official authentication. For example, for land registration or court document certification, identity has to be confirmed on each occasion.[114]

In the early days these cards lacked a legal basis or a formal official mandate. This issue was addressed in 2016 with the passage of specific legislation creating a statutory body to manage the system, and mandating its status for official purposes under the provisions of the *Aadhaar (Targeted Delivery of Financial and other Subsidies, benefits and services) Act* of 2016, and the UIDAI was then brought under the Ministry of Electronics and Information Technology (MeitY).

The wording is interesting because it is explicitly about the delivery of various financial benefits and makes no mention of security related purposes.

By early April 2016, over 1 bn *Aadhaar* cards had been issued, from a process that actually began in 2010 and which managed to issue upwards of 600 million cards by 2012.[115] With these cards already in circulation, the legislative framework conferring an official and legal status on the cards allowed the government to move quickly to expand its use for multiple purposes.

But there was more. In creating and designing suitable legislation the *Aadhaar* system had to be additionally recognised by key regulatory agencies - a process that took 2-3 years and to some extent explains why formal legislation was only introduced and passed in 2016. The RBI (for use across the banking system and financial services sector); SEBI (for use in financial markets); TRAI (for use in the telecoms sector); IRDA (for use in the insurance sector), etc. The objective was clear. *Aadhaar* was to be the 'foundation' or 'basis' for all identification requirements across the

[114] About 80 million certifications and confirmations take place every day through the digital process.
[115] The speed and scale of this achievement is astonishing by any measure

spectrum of the financial services sector, including telecoms which of course regulates and facilitates digital transactions and data exchanges.

At the same time, it was not mandatory and the Supreme Court has on several occasions clarified this. But in practice it is essential. Issues of privacy and data security are also still active policy debates, and legislation to this effect was finally approved in 2023.[116] Important questions of data privacy still however remain to be settled.

Know Your Customer (KYC)

But there were more elements to the system that were needed to raise the level of identity confirmation to international standards in the specific area of banking and financial services.

Following on from international commitments to target money laundering, tax evasion and other financial crimes, Indian banks were required by the RBI to implement KYC requirements in 2002. This was some 14 years before *Aadhaar* acquired a statutory basis.

As with many things in India this was never clearly explained to the public (or indeed to the banks) and there was considerable confusion as to what was required to complete the KYC process and why. It was also an additional cost to the banks and of course to their customers who had to submit an endless stream of documents that were certified, countersigned or authenticated by whoever the banks thought were needed to make it all look legitimate.

Nor was there any standard format for banks to follow - just some general requirements relayed by the RBI. So each bank designed its own systems and identified its own requirements, and levied its own charges to complete verification and authentication procedures. As long as this was generally compliant with RBI

[116] Digital Personal Data Protection (DPDP) Act of 2023

guidelines and met the 'data sharing obligations' of member states, it was fine.[117]

But the system itself was compromised precisely because there was no uniformly recognised system of identity verification at the base of the system, and so there were the usual problems of fraud, misrepresentation, corruption and duplication. But on top of everything, it compromised the ability of banks to respond to customer or depositor requests, and if anything impeded the process of adding new accounts.

The complex problems of actually making the KYC system work without causing too much trouble to clients was resolved by creating a digital e-KYC system in 2013 and linking this to the *Aadhar* ID system.[118] Banks needed KYC documents from customers and clients, and by linking these to the *Aadhaar* system it was possible to verify and authenticate identities instantly and at a fraction of the earlier cost.[119] e-KYC and *Aadhaar* therefore work together to facilitate activity in the financial services sector, which in turn supports the strategy of financial inclusion.

Permanent Account Numbers (PAN) cards

Pre-dating and preceding KYC and *Aadhaar* were efforts by the Income Tax department to assign an identity to each income tax account, and then, subject to being above income tax thresholds, to link bank and other accounts to this number. The PAN card system was first introduced in 1961 and is now digitised and required to be linked to all financial transactions. Foreigners living and working in India are also required to obtain a PAN card, so it is not valid for any purpose other than to identify the parties involved in a financial transaction, with of course a view to evaluate tax returns.

[117] Here we enter the realm of the Financial Action Task Force (FATF) of the Financial Stability Board (FSB), and their BEPS agenda. Basically targeting tax evasion but in polite terms.
[118] Many of the same people who created Aadhar were also active in connecting KYC to Aadhar.
[119] US $2/- as against an earlier figure of US$100/- approximately.

PAN cards were thus designed to assign a single number to a single person (or company), and thus help correlate and ultimately process returns, claims etc. But the system was paper-based for many years and it was easy to circumvent. In addition, at the time it was introduced and for many years thereafter, there was no real means of verifying identities, so it was equally easy to create false identities and false accounts. All presumably with view to evading tax scrutiny.[120]

In theory, each payee should have just one PAN number. In reality, this was not the case. Moreover, some banks had hundreds of accounts linked to a single PAN number, on paper at least.[121]

With digitisation taking place across the Income Tax department through the early 2000s, these data bases were substantially scrutinised, reconciled and to some extent cleaned up. Moreover, income tax case handling was automated and computerised from 2013 onwards, and corruption dropped significantly as these systems kicked in.

Aadhaar and e-KYC created another layer and level by which data sets, submissions and information could be triangulated and verified. As highlighted in the main paper, demonetisation brought more than US$75bn into the banking system in 2016, it was relatively easy for the IT authorities to identify defaulters and tax evaders, or at least to ask for explanations about huge deposits.[122] So this trinity of identification processes, though often problematic, has recently served an important purpose and perhaps explains to an extent why tax receipts have surged in recent years.

So from an tax compliance perspective, the interlinking of *Aadhaar*, e-KYC and PAN cards has helped change the landscape completely. Moreover, as these systems are fully digitised, the

[120] and which may explain, to some extent, why the tax returns above the tax paying threshold are only filed in 85 out of 125 million cases where PAN cards are registered.
[121] One reason why BankPayTM was ordered to close and migrate their customers elsewhere was because of this precise problem which was though to conceal serious money laundering activities.
[122] As mentioned earlier, some 160,000 accounts showed as sudden and huge increase in deposits.

earlier forms and methods of distorting and disrupting the overall revenue collection process has largely disappeared.[123]

Of course, a huge and inventive community still works vigorously to circumvent tax regulations and perhaps this is why the Tax Justice Network (TJN) assesses revenue lost to the government of India at about US$ 32 bn. for 2022-23.

At the heart of this particular problem is an issue familiar to the architects of the *Aadhaar* and e-KYC system - the true identity of ultimate beneficial owners. For this to be resolved, serious international cooperation will be required.

[123] Not entirely of course. A lot of people who hold duplicate and illegal PAN cards argue that their safety and security are at stake.

Annex 3

The banking system in India

The nationalisation first of the Reserve Bank of India in 1949, and then of the 14 major banks in the early 1970s, created the backdrop for the massive expansion of the branch networks within the banking system. Thereafter, the RBI tried to direct the flow of bank lending into priority sectors through the use of various forms of priority sector lending.[124]

The number of branches increased by over 130,000, from a narrower, more urban-centred base of about 3,000. This network of new branches still however could only register new accounts if the rural, small town and agricultural economy itself grew rapidly and created surpluses. But this never really happened on the scale anticipated, and nor was their much impact on the various priority sectors that had been targeted by the RBI and the government, and by 2015 estimates of those unbanked still exceeded 700 million.

Of course this also meant that banking coverage had indeed succeeded in covering over 300 million people but average deposits were low as was general banking activity in areas outside major cities. Many of these branches were not viable in a commercial sense but were maintained anyway as the government pressed on with its plans for financial inclusion and development.[125]

Furthermore, the size of the informal economy never really shrank. At independence it was estimated at more than 60-70% of all activity[126], and accounted for more than 80% of the labour force.

[124] A clever but infernally complicated arrangement where fraud and misrepresentation were hard to detect or catch.
[125] A lot has been written about the inefficiency of this vast spread of bank branches, but its worth has been vindicated by the ease with which the extraorrdinary expansion of accounts took place from late 2016 onwards. These 250 million new accounts were opened in these rural and small town branches in the main.
[126] God knows how this was calculated as many parts of the economy were not even monetised, and many parts of northern and eastern India were in turmoil in the aftermath of Partition and the enormous migrations that took place - estimated at over 10 million moving in both directions.

While this percentage dropped to around 50%, it was due more to the growth of parts of the formal sectors of the economy than to the efforts at financial inclusion. Moreover, the percentage of the labour force in the informal sector remained at about 80%.

There was in addition another problem: the black economy grew significantly and posed a challenge to governance systems as some of these funds flooded into the political system.[127] Agriculture and the general rural economy, together with many street vendors, smaller shops and businesses were also in the informal sector. They were, in terms of this debate, 'financially excluded.'

Financial inclusion in the Indian context thus meant bringing the informal, unrecorded economy into the formal economy, stifling at one level the black economy, while creating the financial infrastructure needed for everyone to receive whatever entitlements, subsidies or benefits they were entitled to, and more importantly to participate in the legal economy. This in turn meant reducing the attraction of holding cash and other physical assets (especially gold and jewelry) with the safer and more productive option of keeping money in the banks.

Families and individuals may still choose to mitigate against risk and uncertainty by continuing to hold gold and jewelry (for example), but a bank account does provide an attractive and safe alternative as all accounts are insured by the government[128] up to an amount of Rs. 5 lakhs (about US $6,000/-) which is sufficient for most smaller accounts.

But in spite of this significant expansion of banking coverage, it was estimated that the informal sector still accounted for about 50% of all economic activity in 2010, with much of this accounted

[127] A fascinating debate in itself. How, why and when it started has been discussed on many occasions, but it was real and it came to pose a threat to political stability in many states.
[128] Through the deposit insurance and credit guarantee corporation (DICGC), which is owned by the RBI. In reality and in a crisis, the government is likely to enlarge the application of this guarantee during a crisis, as the RBI itself is owned by the Ministry of Finance, as indeed happened in 2020 when the amount was raised from Rs.1 lakh to Rs. 5 lakhs.

for by the poorest in society.[129] Creating a state-owned banking infrastructure only solved half the problem. Action was still needed to get people and businesses to make use of this capacity for organised economic activity.

[129] Landless, casual and migrant workers, remote and marginal communites, for example. 60-80% of India's labour force falls into the category.

Annex 4

Scandals as drivers of change

A striking feature of the Indian system is how scandals can force a change of policy or regulatory behaviour. While this reality is sometimes a source of amusement, it nevertheless does seem to serve a purpose in driving reform and policy change. Whether it all moves in the right direction on every occasion is a debate in itself.

Why are scandals in India so much more important than in many other parts of the world? As with successful and legal enterprises, at one level it is of course a matter of scale. India's market is enormous and corrupt ideas and methods can and do make a lot of money. At the same time, when these scandals become public, it is this very scale of the mischief that creates a strong public and political reaction. Scandals also offend public sensibilities because of the huge pools of poverty that remain an integral part of India's reality.

Improvements in transparency, driven partly by the normal dynamic of any democratic system with open debates, has been supplemented by investigative reporting and, in 2006, by the Right to Information Act (RTI). This combination has proved effective in generating debates and discussions about scandals and their system wide effects. Indeed, state level officials often talk about how the culture within which they operate has been fundamentally changed as information about local projects and programmes etc are made available to the wider public.

These scandals then help expose the fault lines in India's regulatory framework and financial services sector, and trigger in turn, and in some cases, a series of modifications and reforms. They also demonstrate how easy it is to game the system when reform ideas have been poorly thought through or improperly applied. This strange dynamic seems to be peculiarly Indian, partly because the complexity of the Indian system is so daunting, partly because the scale of these scandals is truly astronomical, and

partly because they were so easily carried out. The connivance of officials and politicians and many others (so-called Godmen are often involved to add further colour) adds further spice to the mix.[130]

In the specifics of the Indian context, economic liberalisation and the advent of the internet created opportunities for the formal, informal and illegal economies to flourish. The numerous scandals of the past three decades were also qualitatively distinct from those of the 1970s and 1980s, which tended to involve gold smuggling, gambling, property transactions and various forms of thuggish behaviour prevalent in Bombay (Mumbai) at the time. Even the financing of Bollywood films was linked closely to these activities, and film stars were paid in cash, gold or shady property deals. In essence and in practice, a huge part of the illegal or black economy was also being recycled into the genuine economy. Untangling this stew of legal and illegal systems was - and perhaps remains - a major policy challenge.

Some specific examples may help understand how publicity surrounding various scandals fed policy and regulatory reform. Accounting and other frauds were frequent especially after liberalization from 1991 onwards but were not possible without the connivance of accountancy firms. This led directly to the establishment of the National Financial Reporting Authority (NFRA) in 2018.[131] This agency now oversees the Institute of Chartered Accountants of India, (ICAI), which traditionally regulated accounting standards and practices. Self-regulation by this professional body was seen to have failed, hence this development. Other self-regulating professional bodies, (lawyers, doctors, etc) evidently suffer from the same problems and will probably attract the same regulatory measures in due course.[132]

[130] The Right to Information Act of 2005 (RTI), together with the work of investigative journalists and reporters are the unsung heroes in exposing scandals, and who is involved.
[131] Under the Companies Act of 2013
[132] Interestingly, these professional categories prefer cash payments thus raising questions about their levels of tax compliance, etc.

Hard indicators of the scale of this problem (even today) can be seen in the amount of money held abroad through various evasive tax measures.[133] The OECD estimates that India loses in excess of US $15 billion a year to evasive tax practices, while the Tax Justice Network (TJN) puts this figure at $32 bn for 2022. These numbers – whether right or wrong - are enormous and give us a sense of the scale of the problem.

The introduction of *Aadhaar* in 2009 and the Goods and Services Tax (GST) in 2017, together with all the other measures to digitise identification, payments and tax registrations, has thus transformed the landscape in several areas of the economy where corruption - both petty and substantive - used to flourish. At the same time, it has dramatically increased the levels of tax compliance, but of course has yet to completely solve the problem of tax evasion.

Regulatory responses have often been driven by public, media and parliamentary pressures, which is generally a healthy sign. But India's regulatory framework, in much of its present form, is relatively new and perhaps not fully formed or equipped with the authority and power that it needs. It is also dealing with practices that are as old as time itself and as creative as the most sophisticated and advanced business models. It is self-evident therefore that regulatory reform and adaptation has to be a continuing process. Society too may be changing, and attitudes adjusting accordingly.[134]

There are obviously many other issues involved as well, which are referred to in different parts of this paper, but what it should mean is that the scope for massive scandals to go undetected for years is likely to diminish as the Indian economy transitions from the informal to the formal. At least that is the expectation.

[133] Profit shifting to the accountants and lawyers who facilitate this, but tax evasion to most normal people.
[134] Corporate Social Responsibility (CSR) measures and ideas are evolving to reflect a more compliant and less evasive way of doing things.

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