

Government Service Delivery in India
A platform-based framework to handle complexity and scale

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Abstract

How can technology be leveraged to improve citizens' access to public services? This paper proposes a framework to build a platform-based government service delivery solution that would bring every department/agency of the government on a common, unifying digital platform. The defining features of this platform would be its adoption of consent-based data sharing protocols and open access which will incentivize private developers/entrepreneurs to co-create solutions. The intervention has the potential to drastically improve access, affordability, coverage and quality of the services for the citizens in sharp contrast to the government controlled delivery systems in India. Since the shift towards platforms would require large organizational and cultural changes, this paper introduces the existing literature around the topic and proposes further research opportunities, especially in the context of a developing country like India.

1. Introduction

The government in a third world country like India almost monopolizes the provision of public goods and services. The seemingly neutral bureaucrats generally toe the line of the ruling party politicians, as the latter control their transfers and postings. Bureaucrats often (mis)use their discretionary powers over the provision of services at the behest of their political masters. Either the services having potential for high corruption- are not digitized or the benefits of digitization are targeted to the vote bank of the ruling party (Bussell, 2012). Interestingly, the same politicians spend a lion's share of their daily time meeting their constituents to help them out for seemingly routine public services like getting scholarships, old-age pensions, character-certificates or subsidized ration-cards by directing the same bureaucrats to consolidate their grip on power (Bussell, 2019)

In addition to this, researchers - in a recent survey of the World Bank that measured the effectiveness of government service delivery in India - have pointed out significant concerns about coverage, access, affordability, quality, gender bias as well as complexity in the business processes (Demirguc-Kunt & Klapper, 2017). As per the findings, there exists a wide variation amongst states on the above-mentioned parameters and only 40 percent of applicants are able to apply for the goods and services they need. As estimated by Transparency International in 2005, Indian citizens pay INR 21,000 crores (approx. USD 3.5 billion) annually for getting access to government services, which they, otherwise, are genuinely eligible for.

Technology platforms successfully reduce the costs of monitoring and information acquisition. Citizen convenience increase in general with the service processing time got reduced by even up to 29 percent in one of the cases (Dodge et al., 2018).

The present paper builds on the literature on the network effects of the Internet Economy. The phenomenon of co-creation in the present networked world has given rise to new economies of scale that are driven by demand. A very successful experiment in this regard was done by Apple Inc. when it used its operating system (iOS) and AppStore to connect two sides of the market. On the one end were the application developers and the other was the consumers. In such ecosystems, the app developers attract consumers, and consumers attract app developers generating value for each group. With the increase in the number of participants on each side, that value would grow exponentially with the phenomenon usually referred to as 'network effects.'

With the rise of the network economy, there has been a complete change in value creation. The companies of the industrial era relied on supply-side economies of scale whereas the Internet era firms focus on demand-side economies of scale (Kumar, 2018). The value of the Industrial era companies lied in the creation of assets, machinery, and their human resources.

The values in the case of network-driven companies are because of the communities that participate in their platforms.

Researchers have categorized companies into four broad categories based on their chief economic activity: Asset builders, Service providers, Technology creators, and Network orchestrators (Anderson, 2018). Network orchestrators are the real game-changers as people and companies create the value together. Since there is no physical production happening in the companies itself, as the producers as well as consumers are creating the value from outside, it has to only manage the externalities.

Amazon, Google, Alibaba rose to their fame using similar platform models. Uber and Airbnb are other prominent examples. They created their technology stacks by exploiting free APIs of GPS, Google maps, payment service providers, and other stakeholders.

The platform economy has brought profound macroeconomic changes, with traditional management practices undergoing huge disruption (Choudary et al., 2016). The existing organizational models have paved ways for new ways of doing business by realigning the stakeholders (Kenney & Zysman, 2016). Such entrepreneurial platforms are here to stay and have grown at a very fast pace, especially because of the strong alignment of commercial incentives. For the purpose of this paper, such platforms are termed as 'commercial platforms.'

In this paper, I focus on government platforms. The concept of Government as a Platform is already being used in a number of countries including India (Brown et al., 2017). The term Government as a Platform has been interpreted differently in different contexts (O'Reilly, 2011). These interpretations include providing better services; breaking down organizational silos; co-creating solutions (Pope, 2019) among others. Passport service delivery automation in India has been successfully implemented in Public-Private Partnership mode with Tata Consultancy Service taking the lead. Similarly, Government Service delivery in the state of Punjab is being implemented through private service operators. UMANG (Unified Mobile Application for New-age Governance), the mobile application created by the Ministry of Electronics and Information Technology (MEITY), Government of India, is an attempt in this direction, bringing together a number of services rendered by Government agencies and private organizations on one technology platform.

Whatever the context may be, governments are increasingly shedding their monopolistic role in the provision of public goods and social support by involving other stakeholders on such platforms.

Researchers evaluated the impact of similar biometrically authenticated payments infrastructure ("Smartcards") on the delivery of National Rural Employment Guarantee

Schemes (NREGS) and Pension programs in the Indian state of Andhra Pradesh (Muralidharan et al., 2016). It was established that the user experience of the beneficiaries improved along with the reduced delays in payments and these interventions led to aggregate time savings amounting to USD 4.5 million per year. In fact, 90-93% of beneficiaries preferred the new system over the old one, which was a clear indicator that investments in digital infrastructure had significantly enhanced the “State Capacity” for the implementation of welfare programs in India.

It continuation of the same thought, this paper proposes the idea to throw, the government data related to citizen services like licenses, birth and death certificates, vehicle registrations etc. as well as common digital infrastructure, open to young software developers and enterprising firms to create applications and sustainable service delivery solutions for the public as well as their own businesses.

This paper makes three important contributions to the existing literature on technology platforms. Firstly, it explores the possibilities of new innovations riding on the existing technology platform ‘India Stack’ to improve service delivery in India. Secondly, it suggests the possibilities of collaboration amongst the government sector and private entrepreneurs to create innovative solutions for the common public. Thirdly, it suggests a new model of governance that may entail futuristic changes in the governance framework of the country.

The remainder of this paper is divided into three parts: section 2 outlines the research objective; section 3 describes the existing technology framework along with its open digital public infrastructure and proposes a new service delivery framework to boost co-creations amongst ecosystem partners; section 4 bring in the possible challenges to the assumptions and section 5 concludes the paper by introducing the possibilities for further research opportunities.

2. The research objective

This paper explores the possibility of creation of ‘government platforms’ to bring the private stakeholders together to solve societal problems. The idea is to use the digital public infrastructure as a common good to engage the ecosystem stakeholders to co-create the solutions.

The most researched and quoted example of Government as a Platform in the Indian context is the use of Aadhaar for Direct Benefit Transfers. *Aadhaar* is a randomly generated 12-digit unique number issued through a rigorous process of demographic and biometric de-duplication. It is termed as a strategic policy tool by the Government (Unique Identification Authority of India, n.d.) to promote inclusion, service delivery reforms, and fiscal prudence.

As detailed out in Table 1, the government of India has transferred USD 50.9 billion (INR 38,16,31,55,46,976) to beneficiaries of various social security schemes through almost 4.4 billion transactions in the Financial Year 2019-20.

Table 1			
Sr. No.	Scheme Name	Direct Benefit Transfer (in USD millions)	Total No. of Transactions (in millions)
1	PAHAL (Cooking gas subsidy)	3489.5	1415.6
2	MGNREGS (Workfare program)	6139.5	368.1
3	NSAP (Pension)	1081.9	214.5
4	Education Scholarships	893.8	10.7
5	PMAY (Housing Program)	5851.1	12
6	PDS (Subsidized food)	10918.4	1337.8
7	Agricultural input subsidy	6,181	39.6
8	OTHERS	16328.9	989
Grand Total		50884.1	4387.3
Source: Direct Benefit Transfer Mission, Government of India https://dbtbharat.gov.in/ accessed on 12th July 2020			

Researchers (Mukhopadhyay et al., 2019) empirically applied the platform theory to the e-government domain and established that the architectural and business model attributes of *Aadhaar* have helped the Indian government in scaling up and reaching out to the bottom of the pyramid. While conceptualizing, the scope of the *Aadhaar* platform was restricted to the provision of core services like authentication, privacy, and security. The open approach based on standard APIs created avenues for complementarities between public and private as well as competition amongst private players that actually served the interests of poor.

2.1 The existing framework as well as public infrastructure for Platforms in India

iSpirt – the Indian Software Product Industry Roundtable- has already created a technology stack named IndiaStack (<https://www.indiastack.org/>) which is a complete set of Application Program Interfaces (APIs) for front end development that allows interoperable communication between different technologies, gateways & applications through collaboration and integration of data as well as services.

IndiaStack has been designed to boost innovation, and has the potential to create the largest market in the world by boosting universal access to systems and services. The IndiaStack team

compares this stack with TCP/IP technology stack that led to the creation of the Internet (Katte, 2020).

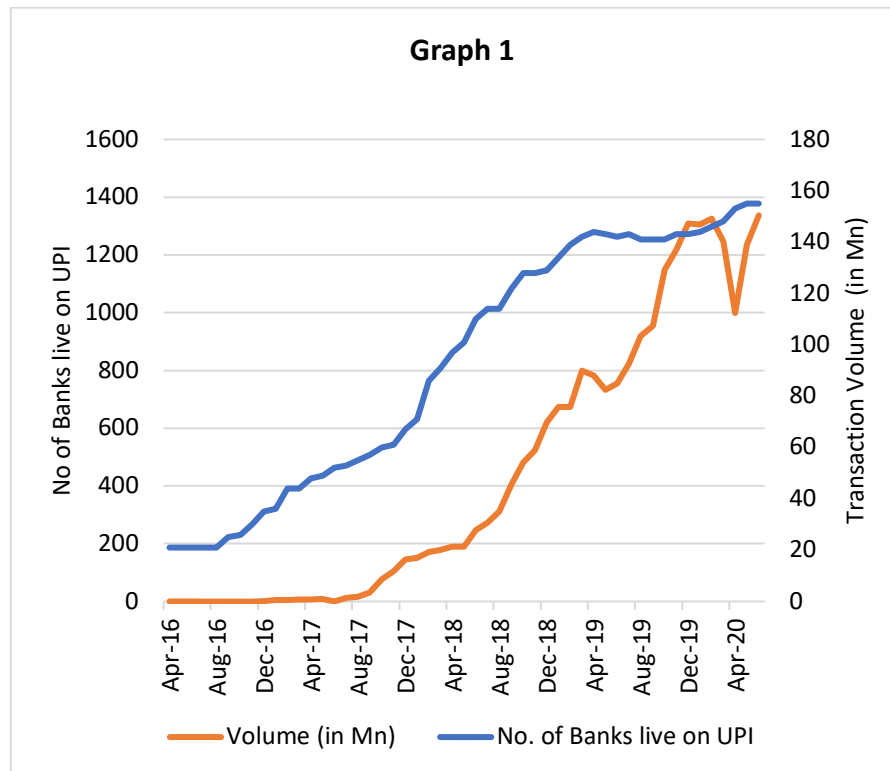
IndiaStack is being managed as a public good. The stack has four layers namely consent layer, cashless layer, paperless layer and a presence-less layer. These layers utilize the technological and infrastructural foundations created by the government's **JAM** trinity. **JAM** trinity refers to Jan Dhan scheme bank account number, Aadhaar number (a unique number to identify every resident with her biometric details) and Mobile phone number, respectively. If these three details of a person are clubbed, any administrative, financial or social services can be rendered, using IndiaStack technology platform. A simple description of IndiaStack is presented in Table 2 below

Table 2		
Layer	What it provides	Technology behind it
Consent layer	Allows data to move freely and securely. Will help democratize the market for data	Consent Architecture (Secure Data Sharing Framework)
Cashless layer	Creates a single interface for all the bank accounts and wallets in the country to democratizes payments	Unified Payments Interface (Interoperable protocol to transfer money)
Paperless layer	Makes digital records move with an individual's digital identity eliminating the need for paper	eSign and DigiLocker (digital signature acceptable under law)
Presence-less layer	Creates a universal biometric digital identity that allows people to participate in any service from anywhere	Aadhaar authentication (Billion Plus Population)
Foundation of JAM Jan Dhan (Bank Account), Aadhaar (Identity) and Mobile (Access)		

With more than a billion mobile users and Aadhaar Identity holders, and 80% of the adult population having bank accounts, India is poised to be the largest market in the world for digital products. The goal of the government, behind this open API stack, is to revolutionize the financial and service sectors in the country and to reach to the poorest customers for the services, who have access to Aadhaar numbers and mobile phones and are ready to be onboarded. An individual can perform digital transactions (cashless and paperless) from a remote location (no physical presence required as online consent is given) using different layers of the stack. As per news reports(National Herald, 2019), Reliance Jio, the largest mobile operator in India, acquired around 90% of its subscribers using through Aadhaar authentication.

Creation of IndiaStack has been termed as India's WhatsApp moment (Nilekani, 2016). The stack has created unlimited opportunities for software developers, innovators and entrepreneurs in India to build thousands of apps using this set of free APIs.

The most important innovation in this regard is the use of Unified Payment Interface (UPI) for the creation of payment gateways. UPI powers multiple banks accounts into a single mobile application bringing together several banking features at a single point. The growth in the number of banks on-boarded on UPI as well as the transactions in Graph 1 below clearly demonstrate the impact of UPI in the Indian retail payment market.



Growth of UPI Transactions

Source: <https://www.npci.org.in/product-statistics/upi-product-statistics>
accessed on 9th July 2020

In the last few years, every bank in India has created its online mobile banking app. Money transfer in India has just become a click of the button experience. It started with BHIM (Bharat Interface for Money) developed by the National Payment Corporation of India but the competition from PayTM, Google Pay, SBI Yono, and many more followed. UPI has actually revolutionized the Indian retail payment market. As per official reports (Press Information Bureau, Government of India, 2020), the government transferred USD 5.2 Billion through Direct Benefit Transfers only during Covid-19 emergency lockdowns.

DigiLocker (<https://digilocker.gov.in/>) is a 'digital document wallet' created by Government of India as part of Digital India Program. It aims at 'Digital Empowerment' of citizens by providing them access to authentic digital documents. Such documents are legally considered at par with original physical documents as per the Information Technology Rules, 2016. Currently, 3.79 Billion documents, of 42.70 Million registered users are available in DigiLocker which can

be accessed by any individual or organization by getting the online consent of the owner of the data. These documents can be digitally signed and shared using the e-Sign facility.

The Top categories of documents available in the DigiLocker can be seen in Table 3 below.

Table 3 Categories of documents available in the DigiLocker		
Sr. No	Document Type	Available Documents (in millions)
1	Aadhaar Card	1229.2
2	PAN Verification Record	365.4
3	Insurance Policy - Two-Wheeler	246.1
4	Registration of Vehicles	214.2
5	Vehicle Fitness Certificate	196.2
6	Vehicle Tax Receipt	196.2
7	LPG Subscription Voucher	179.2
8	Class X Marksheet	107.5
9	Driving License	101.4
10	Insurance Policy - Car	90.4
11	Income Certificate	81.8
12	Caste Certificate	72.3
13	Class XII Marksheet	71.8
14	Insurance Policy - Commercial Vehicle	65.9
15	Ration Card	35.7
The Ministry of Electronics and Information Technology, Government of India Source: https://digilocker.gov.in/public/dashboard#! Accessed on July 16 th , 2020		

This has made real-time, consent-based, secure access of data from original sources possible with very minimal administrative costs. It is a step towards paperless governance with no need for physical presence of citizens or verification of their documents to avail any government or private services.

It has been established that ID systems (like Aadhaar), supported by payments and mobiles phone infrastructure can enhance the state capability to effectively deliver policies and programs related to Sustainable Development Goals (SDGs) as they empower the end-users with improved transparency, accountability and service delivery (Gelb et al., 2020).

3. The Proposed Framework

The framework proposed in this paper is a generic one, especially for the delivery of government services. Governments, especially in third world countries like India, have a very poor record of service delivery. The major reason behind this dismal performance is the government, as an organization, itself. Since the ministries and departments in the government are independent of each other, they work in silos. It is nearly impossible, in routine, to exchange the information amongst these departments. The fallout of this siloed approach is that the same citizen has to approach every department or wing of the government, for every single service. For each of her interactions, she has to provide documents related to her identity, demographic details, and other requirements. A government official, then, approves or rejects her request using the relevant rules or policies, which again is a manual process.

The present framework proposes that the government should provide access to the schema of data sets related to basic demographic details as well as service-related requirements to the entrepreneurs or start-ups, which can help the government in building applications around those datasets to facilitate citizen service delivery.

The idea is to break the silos and connect the individual departments of the government. This requires bringing every government department on the same data-sharing practices and standards, asking everyone to follow similar security and privacy protocols. This is a step toward collaboration and co-creation which actually means that it is an organizational design issue for the government. So, it comes out more as a governance reform issue than being a technical problem (Trendall, 2019).

One has to understand the working of the government to understand these issues from the basics.




Government Service delivery generally requires the following steps: -

1. Submission of application form
2. Submission of required documents
3. Upload of photograph
4. Payment of required fee

With the current rise in smartphone availability in India, all these steps/ processes can be performed by a citizen while sitting at home using applications built on the existing India Stack framework. This way, with just a few APIs, which would return only Yes/No responses to the

parameters asked for, the outside open market developers, would be able to create many applications for citizens.

The simplified version of the framework is presented in Table 4 below: -

Table 4						
Existing India Stack			Proposed Additions			
Layer	What it provides	Technology behind it	Authentication Payments Permissions	STARTUPS AND ENTERPRISES	Verifications & Validations	Government Master Data
Consent layer	Allows data to move freely and securely. Will help democratize the market for data	Consent Architecture (Secure Data Sharing Framework)		Focus on citizen experience		Citizens
						Employees
Cashless layer	Creates a single interface for all the bank accounts and wallets in the country to democratizes payments	Unified Payments Interface (Interoperable protocol to transfer money)	Service Delivery		Service Request	Businesses
						Schemes
Paperless layer	Makes digital records move with an individual's digital identity eliminating need for paper	eSign and DigiLocker (digital signature acceptable under law)	Benefit Disbursal		Status Query	GIS
Presence-less layer	Creates a universal biometric digital identity that allows people to participate in any service from anywhere	Aadhaar authentication and eKYC (Billion Plus Population)	GOVT'S UNIFIED SERVICE PLATFORM			Policies
						Properties
						Codes
Foundation of JAM Jan Dhan (Bank Account), Aadhaar (Identity) and Mobile (Access)			Focus on citizen experience (Process)			Laws

It is important to keep in mind that the citizen data would remain safe and secure in such transactions. individuals, Start-ups, or Enterprises would be able to earn money and citizen would get seamless and transparent services.

Residence Certificate Service

The above process can be elaborated with a use case of the "Residence Certificate Service" which is required by citizens of all the age groups for different purposes. By establishing a

secure communication amongst Government, Individuals/ Start-ups/ Enterprises & India stack, the service can be seamlessly delivered in the following manner: -

- a. Multiple individual and enterprising start-ups develop their own mobile or web applications for the delivery of government services. There will be competition in the market for UI, UX as well as pricing.
- b. The citizen opens up her favorite app. A user-friendly form takes regular input from him including his demographic details and a photograph.
- c. The app does live eKYC (electronic- know your customer) verification using the India Stack's authentication API.
- d. The app validates, from government, using secure API, whether or not, the mentioned land/ property is registered against that applicant. The response would be 'Yes' or 'No'
- e. If the response is Yes, the citizen has to submit the payment using the Unified Payment Interface (UPI).
- f. Accordingly, the citizen may be given the residence certificate by the system.
- g. The certificate may then be directly uploaded to DigiLocker, so that citizen can access & share the digitally signed document wherever he/she intends to.

The new framework is expected to end barriers to access. Citizens would not be required to travel long distances to access brick and mortar branches as the services would become available on mobile/ web applications. At the same time, paper-based instruments (cash) and identity documents (passports, licenses) will not be required. These apps will use digital money, biometric identity, documents, and live Aadhaar identification to execute the transactions.

It is important to keep in mind that poorer citizens in India suffered a lot during the Covid-19 pandemic. With sudden curfew and lockdown, they were unable to access basic social security as well as payments services.

The system will democratize the access of the systems, even to the poorest possible entrepreneur as the infrastructure is available free, which actually would eliminate any barriers to entry for experimentation.

The ecosystem suggested by the proposed framework will promote multiple mobile and web applications, similar to the one created by UPI and the consumer would have ample choice to choose her provider for a given service. Such government platform would be a super app like popular Chinese app 'WeChat' with so many utilities hooked into it.

4. Way forward

4.1 Challenges with the assumptions

Though this is a workable framework as far as technology is concerned, yet the success of such a 'Government Platform' would depend upon many preconditions.

The assumption that the data in all the organs of the government is digitized, codified and readily available to be explored using APIs, may not completely true. Similarly, the stakeholders may not at the same level of evolution in terms of availability of infrastructure, access, capacity building as well as regulations. There are still many unresolved policies and issues related to data, especially its anonymity, privacy, and security in India. Use of data at a large scale would require simultaneous collaborative work across three policy domains—Information Systems, Data Governance, and Legal (Garg, 2017).

Also, any such intervention will have to be planned and executed properly. In fact, the systems in such cases are to be designed from the first principles. Design thinking, actually, is a creative problem-solving process in which the user is kept at centre while designing solutions for her (Milkowska, 2018). The solution should actually first solve her requirements than the governments. In addition, behavioral, sociological, and cultural factors in addition to the availability of infrastructure also are very important which are often overlooked.

Even similar technical interventions may result in different outcomes depending upon the approach e.g. the State of Andhra Pradesh succeeded in their DBT program by focusing more on user experience and bringing payments infrastructure closer to the beneficiaries, while the State of Jharkhand had to roll back the program because of exclusion issues as the focus were more on fiscal savings (Muralidharan et al., 2020). Such technological interventions have the potential to generate exclusion errors due to technical snags that would disproportionately hurt the most vulnerable beneficiaries (Dreze et al., 2015).

4.2 Further research opportunities

Freely accessible secure public infrastructure is expected to bring in affordable access to limited public goods. Such an ecosystem would nurture innovative solutions. Stakeholders from all walks of life could be engaged for co-creation of such complex solutions at scale. But it is also important to understand that such challenges have deep social-cultural roots. Technology alone would not be sufficient to resolve such challenges (Toyama, 2017).

The current paper is an attempt to provide a framework to the stakeholders to work together and find contextual solutions using scalable public infrastructure, that would create trust and transparency for co-creation.

Platform thinking is very relevant in this context as it would help the stakeholders leverage the distributed resources and work towards shared access models, where they may not be required to own the resources. With such distributed governance, the citizenry would be able to self-organize for required products and services. Researchers rate such an ecosystem on many such variables using *platformization index* (Cicero, 2020) where in questions like whether the organization is fit for leveraging the platforms; whether the ecosystem itself is ripe for the change; whether users, regulators and other stakeholders would accept it; and whether there is capacity in the network to scale, are explored.

The current platform economy and its underlying logics have altered many power relationships (Izvercianu et al., 2014) and the government would have to be ready for that change. The Smartcards intervention in the State of Andhra Pradesh in India brought the technology as well as the people responsible for managing the funds closer to the beneficiaries and actually changed the stakeholder dynamics. (Muralidharan et al., 2016). The shift towards platforms would require a big organizational and cultural shift in the government. Researchers (Engin & Treleaven, 2019) have termed this data-driven revolution in the Public Sector as 'Algorithmic Government' as it is bound to have a huge impact on society, because of the pervasive nature of the Public Sector. Estonia is already working on such a technology stack that would include technologies like Chatbots to engage citizen inquiries, Robo-advisors to support civil servants and predictive analytics to transform the decision-making processes in the government.

The current framework can open up new vistas for digital experimentation in the government.

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