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## e-Governance Best Practices-Study of Trend Setting Government Initiatives

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**Abstract-** In the last decade both Central and State Governments have undertaken a large number of initiatives to leverage the benefits of Information and Communication Technology. All these initiatives aimed at improving the internal functions of Government Departments, ensuring smooth and better administration of its operations, speedy delivery of Government Services to the stakeholders, reduced cost of operations and improved decision making/ timely interventions based on analytics drawn from these ICT Systems. However majority of these initiatives worked in silos and failed in presenting a coherent single unified view of the Government to stakeholders. To leverage full potential of ICT Government of India launched an important and ambitious project namely “Digital India Programme”. Digital India programme envisions transforming lives of Indian populace and making India a thriving economy and a knowledge society. This paper is an attempt to showcase best practices adopted by the Government by highlighting successfully implemented/adopted technology solutions/architectures as models for success of Digital India Initiative as well as making a paradigm shift towards one government model.

**Keywords-** e-Governance, Best Practices, one government, citizen service, Digital India, Analytics, PRAGATI, Smart City, Video Conferencing, Network, Enterprise Architecture

### I. INTRODUCTION

As per UN Survey countries world over are shifting focus from silo based e-Governance Model to a coherent, integrated one Government model. The purpose of adopting the Whole-of-Government Approach is to provide integrated and joined up services that cut across not only the economic, social and environmental dimensions but also between various sectors, sub-sectors and activities. Government of India has introduced the Digital India programme with the vision to transform India into a digitally empowered society and knowledge economy having Digital infrastructure, on demand government services and digital empowerment as key thrust areas.

The unified one-government model aims at interconnecting ministries and departments/agencies by leveraging the potential of ICT to build a single government access point service delivery channel/platform, where citizens can access majority of services online, regardless of which government authority provides such services. It also aims to explore/exploit all possible service delivery channels (e.g. web, mobile, social media, kiosks) for providing government services in order to develop a sustainable Government.

Digital Transformation is a demanding process that requires time, effort, a strong will to improve, and skilled people with transformation experience. To achieve the objective of one-Government one of the ways forward is to frame policies, adopt Enterprise Architecture Framework, ensuring inter-operability by framing and enforcing e-Gov Standards, using open Application Programming Interfaces (APIs) and a cloud first approach.

Another way forward is by realising full potential of mobile technology and vast reach of mobile network. In this day and age, connecting is empowering, and without basic infrastructure financed by telecom operators, today's tech giants from Apple and Google to Uber and Facebook would not have achieved half the success that they enjoy.

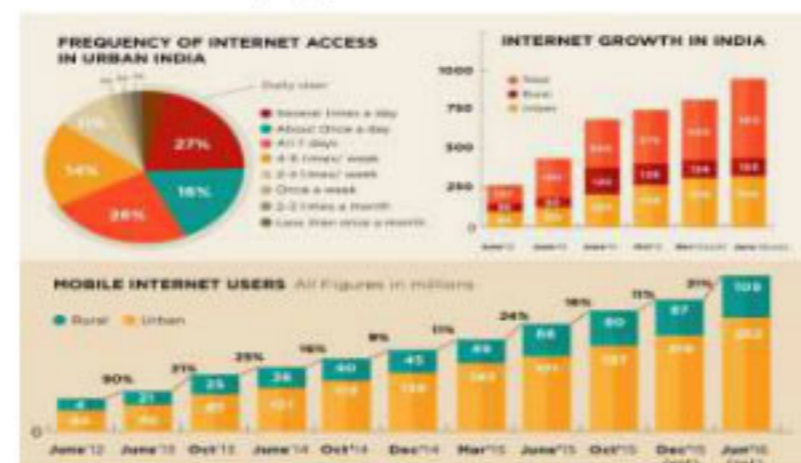


Figure-1: Mobile Internet access, growth and users

India is witnessing a very high growth of smart mobile phones all over the country and with cheaper data packs; the citizens are in a position to access Government services provided these are worth the value. The figure-1 shows the convergence of Internet Traffic through mobile and desktop during previous years. These trends show that the mobile usage is increasing manifold. Improvements in mobile broadband will help create conditions where mHealth, m-learning, MFS (mobile financial services) could thrive

### II. CASE STUDIES OF BEST PRACTICES

**India Enterprise Architecture Framework - IndEA:** As per 2016 data the e-Government Development Index (EGDI) of India is 0.463 which is way below the global average. In order to

<sup>1</sup>“Internet in India 2015” by the Internet and Mobile Association of India (IAMAI) and IMRB International

harness the full potential of ICT and improve EGDI, Meity, GOI decided to architect the big vision of Digital India and adopt an Enterprise Architecture Framework, tailor-made for the Indian

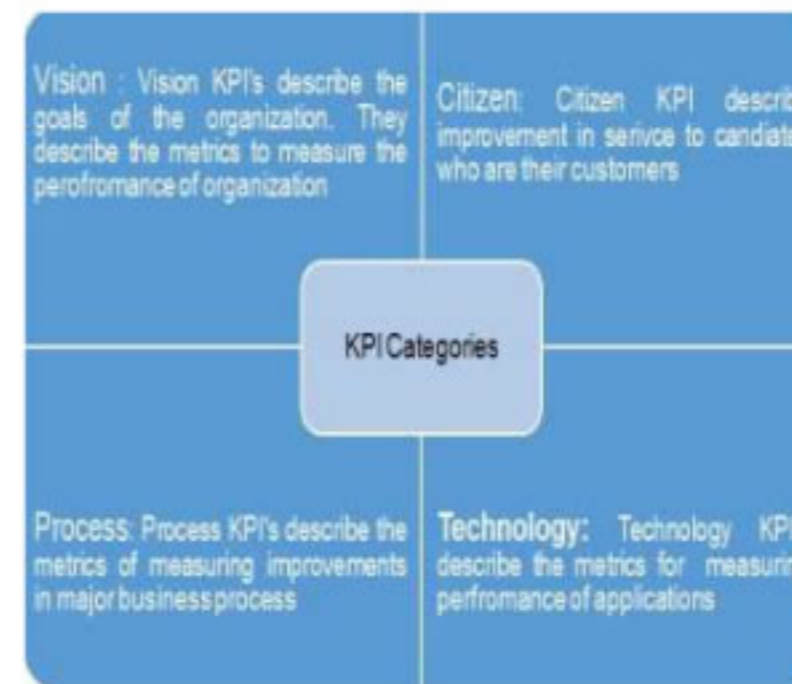
conditions, which can fulfil the aspirations of this large and diverse country. It was envisioned that such an Enterprise Architecture should be able to address the needs of both large national initiatives as well as the varied needs of the States. Working Group on National Enterprise Architecture by Ministry of IT, GOI has come up with a framework, aptly named as IndEA for India Enterprise Architecture. The vision of IndEA is to enable ONE Government – a Government that is least visible but is most effective, a Government that is not fragmented by narrow domestic walls but presents a single interface to the constituents, a Government that is citizen-centric, efficient, transparent and responsive.

The IndEA is a generic framework comprising of a set of 8 reference Models, derived from TOGAF® 9.1 and drawing from other models like the FEA. The reference models defined by INDEA are explained in brief below:

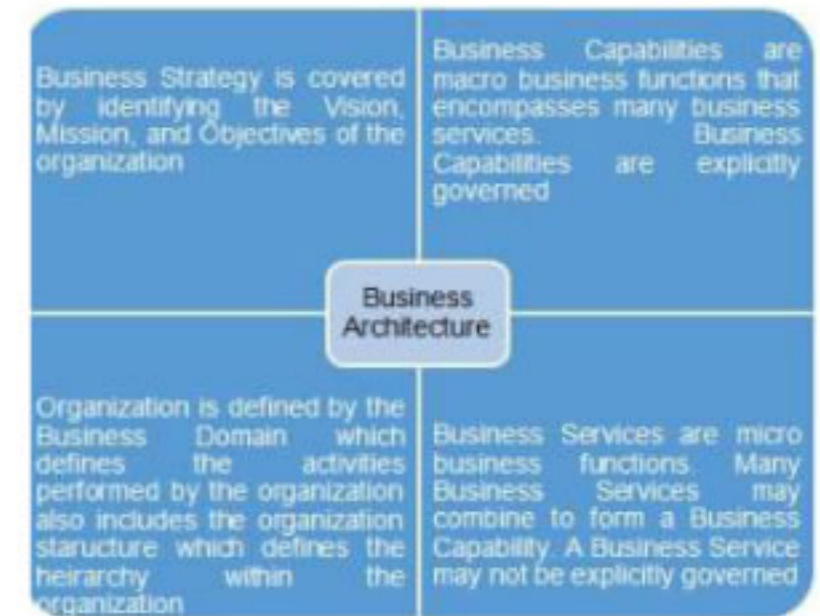
**Performance Reference Model (PRM):** Performance architecture provides mechanism to measure effectiveness and efficiency of the organization. Performance of the organization is measured using the Key Performance Indicators which are quantifiable measures of performance across four categories. The KPI are classified in to two types

Outcome: The measure of impact produced by an initiative like establishment of Enterprise Architecture

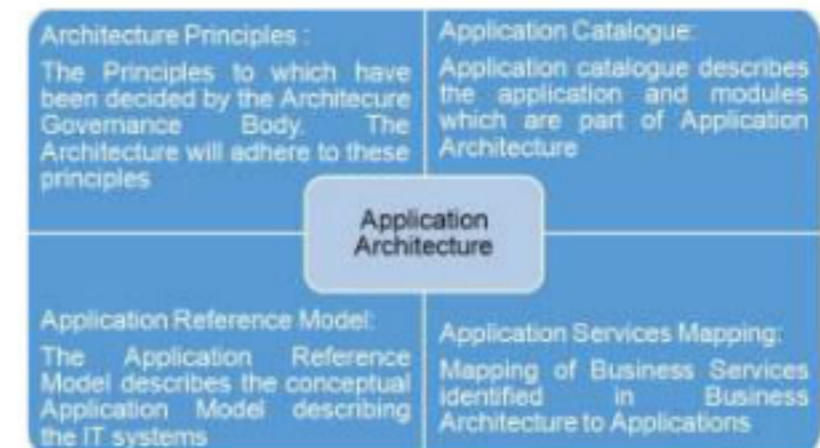
Output: Measure of service provided by organization over a period of time for e.g. Examination Management



**Business Reference Model (BRM):** Business Architecture defines business strategy, organization and business capabilities and services. The key entity in BRM is Service, A successful implementation of BRM requires defining or redefining the Enterprise Vision and Goals, Business Process re-engineering, building service portfolio and identification of services that are common across the Government/departments. In short BRM is about Why,WHAT, HOW MUCH, HOW FAST and WHO.



**Application Reference Model (ARM):** Application Architecture describes the To Be information Systems which would support the Business and Data Architecture. Application Architecture takes in to consideration the Business Requirements captured in Business Architecture and Information that needs to be processed and stored as described in the Data Architecture.



**Data Reference Model (DRM):** The data architecture describes the information that will be generated and processed by the applications. The data architecture describes the relationship between the information

**Technology Reference Model (TRM):** Technology Reference Model (TRM) defines the technology foundation of ICT-based systems to be designed. It lists all the components of the technology system.

**Integration Reference Model (IRM):** Enterprise Architecture enables organisations to collaborate and work together in order to provide public services in an integrated seamless manner. Integration architecture covers all the viewpoints (performance, business, data, application, technology, security).

**Security Reference Model (SRM):** Security Architecture prepares the organization to respond to potential threats and take preventive actions. Security architecture defines what assets need to be protected. The software assets that need to be protected are decided based on the business requirements defined in the Business Architecture and Stakeholders.



**Governance Reference Model (GRM):** The governance architecture would help in establishing an institutional structure for the development, management and implementation of Enterprise Architecture. Governance architecture would ensure compliance to Enterprise Architecture, meet vision and mission of the Government.

Any Government enterprise be it Ministries, States, Local Bodies or PSUs – can further extend these 8 Reference Models to create domain-specific architectures and implementation models.

**Aadhaar:** The project is run by the Unique Identification Authority of India (UIDAI) and was introduced in January 2009. The general idea of the program is to issue every citizen with a unique number to help identify them and provide them the benefit of schemes announced by the government. This unique identity involved the issuance of a 12 digit Aadhaar number and an Aadhaar card. The purpose of the Aadhaar was to make it simpler for people to avail government subsidies and have one number that would work as proof of address and proof of identity.

Presently, the Aadhaar number is not something that can be applied for online. Citizens can only go online to book an appointment at an Aadhaar centre. The applicant will have to go there with the appropriate document and also be asked to submit biometric data in the form of fingerprints and records of the iris. The Unique Identification Authority of India (UIDAI) has launched Challenge drive to enroll leftover population for Aadhaar, in 22 States/UTs where Aadhaar saturation of adult population has crossed 100 per cent (as per projected population figure of 2015). The trend figures as of now are given below.

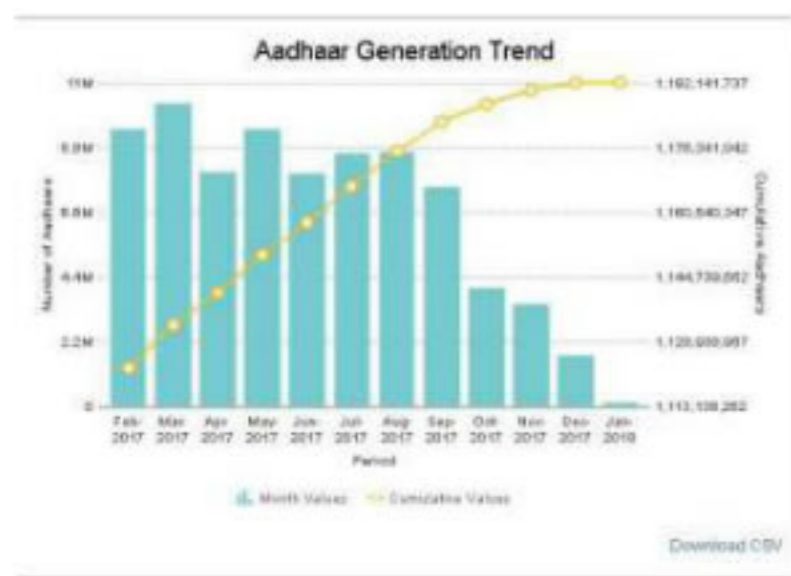


Figure-2: Aadhaar Generation trend for last 12 months.

<sup>2</sup> [https://uidai.gov.in/aadhaar\\_dashboard/](https://uidai.gov.in/aadhaar_dashboard/)

### III. PRAGATI (Pro-Active Governance and Timely Implementation)

PRAGATI is a unique integrating and interactive platform started on March 2015 with the objective to address common man's grievances, and simultaneously monitoring and reviewing important programmes and projects of national interest initiated by Government of India or State Governments.

The PRAGATI platform uniquely bundles three latest technologies: Digital data management, video-conferencing and geo-spatial technology. It also offers a unique combination in the direction of cooperative federalism since it brings on one stage the Secretaries of Government of India and the Chief Secretaries of the States. With this, the Prime Minister is able to discuss the issues with the concerned Central and State officials with full information and latest visuals of the ground level situation making it an innovative project in e-governance and good governance. The directions issued remains in the system for further follow up and review till the finality of the matter. PRAGATI is a three-tier system (PMO, Union Government Secretaries, and Chief Secretaries of the States). The Prime Minister will hold a monthly programme where he interacts with the Government of India Secretaries, and Chief Secretaries through Video-conferencing enabled by data and geo-informatics visuals.

Issues to be flagged before the PM are picked up from the available database regarding Public Grievances, on-going Programmes and pending Projects. It also takes into consideration various correspondences to PM's office by the common people or from high dignitaries of States and/or developers of public projects.

The system has been designed in-house by the PMO team with the help of National Informatics Center (NIC). As the name suggests, it is aimed at starting a culture of Pro-Active Governance and Timely Implementation. It is also a robust system for bringing e-transparency and e-accountability with real-time presence and exchange among the key stakeholders.

**Government Cloud:** In order to utilise and harness the benefits of Cloud Computing, Government of India has embarked upon an ambitious initiative - "GI Cloud" named 'MeghRaj'. The focus of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government. This will ensure optimum utilization of the infrastructure and speed up the development and deployment of eGov applications. The architectural vision of GI Cloud encompasses a set of discrete cloud computing environments spread across multiple locations, built on existing or new (augmented) infrastructure, following a set of common protocols, guidelines and standards issued by the Government of India.

The National Informatics Centre (NIC) is providing National

<sup>1</sup> <https://economictimes.indiatimes.com/news/economy/policy/mandatory-use-of-pfms-to-help-monitor-fund-flow-to-schemes-finance-minister-arun-jaitley/articleshow/61278917.cms>  
<sup>2</sup> <http://www.nrega.nic.in/netnrega/home.aspx>

Cloud services under the initiative MeghRaj. The services offered are as follows:

Infrastructure as a Service (IaaS)

IaaS provides basic virtual compute infrastructure resources like CPU, Memory, Disk Storage attached to blank VMs allowing one to install OS using ISOs, from scratch and customization.

Platform as a Services (PaaS)

PaaS provides pre-installed web and database servers so that one can publish and run web application without worrying about server setup. The servers are pre configured ready with basic security hardening.

Software as a Services (SaaS)

This provides on demand software service. SaaS is a software delivery model where users are not responsible for supporting the application or any of the components. The server infrastructure, OS and software is being managed by cloud services

Storage as a Service (STaaS)

STaaS provides need based storage solution. It provides excellent alternative to the traditional on-site and dedicated storage systems and reduces the complexities of deploying and managing multiple storage tiers. One can use it to mitigate risks in disaster recovery, provide long-term retention for records and enhance both continuity and availability.

**Public Finance Management System (PFMS):** The Public Financial Management System (PFMS) is a web-based application for payment, accounting and reconciliation of Government transactions. It integrates various existing standalone financial systems. PFMS is a financial management platform for all plan schemes having a database of all recipient agencies and is integrated with banks handling plan funds and State Treasuries. It ensures efficient and effective tracking of fund flow to the lowest level of implementation for plan scheme of the Government. For the schemes sponsored by GoI, a sanction order followed by credit to the state through RBI is given by central ministries using PFMS. Earlier the process was dependent on the physical orders.

PFMS has the capability of providing real time information and tremendous potential to improve programme/financial management, reduce the float in the financial systems by enabling "just in time" releases and also the government borrowings with direct impact on interest cost. PFMS can track and monitor the flow of funds to the implementing agencies and its possible to know the actual status of utilisation of funds by the multiple implementing agencies of the central and state governments.

The PFMS provides various stakeholders with a reliable and meaningful management information system and an effective decision support system. The payment process in PFMS starts at Programme Division level. It moves further through Drawings & Disbursing Officer to Pay & Accounts Office for making payment directly to bank account of beneficiary.

Over 300 central and state government schemes are now riding

on PFMS and payment of more than Rs 2.91 lakh crore relating to various schemes under DBT has been made through PFMS since 2013. PFMS has enabled the Government in taking forward the DBT initiative with collateral benefits of plugging leakages and eliminating ghost beneficiaries. Payments to 34.19 crore beneficiaries have been made through PFMS and there are 21.72 lakh programme implementing agencies registered on PFMS.

**MGNREGA:** The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is the flagship programme aiming at enhancing livelihood security of rural households, by providing at least 100 days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. One-third of the participation is by women. The MGNREGA provides wage employment, while focusing on strengthening natural resource management through works that address causes of chronic poverty like drought, deforestation and soil erosion. This programme has been implemented in the rural areas of all districts.

This programme was subject to severe criticism with a huge financial outlay being misused by middlemen. The payment disbursement involved mass corruption and there was no accountability at officer level. But with the IT initiative and online MIS for all processes such as job card creation, muster rolls enrollment, work detail, reporting mechanism, fund allotment and approval has resulted in a great success. The wages are paid directly into the accounts of the workers using DBT all over the country, covering the rural areas. The current progress of the scheme is given below in Table-1, which speaks volumes about its wide coverage and reach:

Table-1: Status for the Financial Year 2016-17 (in Crore)

Total bank accounts	8.62
Total individual bank accounts	7.5
Total joint bank accounts	1.12
Amount disbursed to bank accounts	23016.36
Total post office accounts	2.60
Total individual post office accounts	2.35
Total joint post office accounts	0.25
Amount disbursed to post office accounts	3168.45
Total households applied for job card	12.44
Total job cards issued	12.11

**Mid Day Meal-Automated Reporting and Management System (MDM-ARMS):** With a view to enhancing enrolment, retention and attendance and simultaneously improving nutritional levels among children, the National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme on 15th August 1995. The scheme underwent many changes over the years and is now known as "National Programme of Mid Day Meal in Schools". Over 10 crore eligible school children in almost 11 lakh schools

benefit from the Scheme. In order to efficiently manage the enrolment and meals being served in the Schools of various States, the MDM-ARMS software has been developed as a product so that any State Education Department can use it.

The challenge here was the mode of data collection on daily basis either using SMS, IVRS, USSD or web-enabled software. These schools are mostly in areas which do not have good connectivity and majority schools don't even telephone facility. However, the teachers serving in these schools do have mobile phones but then Internet is missing at these locations. So either SMS or IVRS are the chosen modes for data collection. However, the IVRS facility costs at least one Re per call and the SMS rates vary across different mobile service providers (because teachers have mobile connections from all ISPs) as per plan opted by the subscriber, ranging from nil paise to almost Rs.3 per SMS. It would also mean extensive account keeping and re-imburement of expenditure to each and every teacher of these schools.

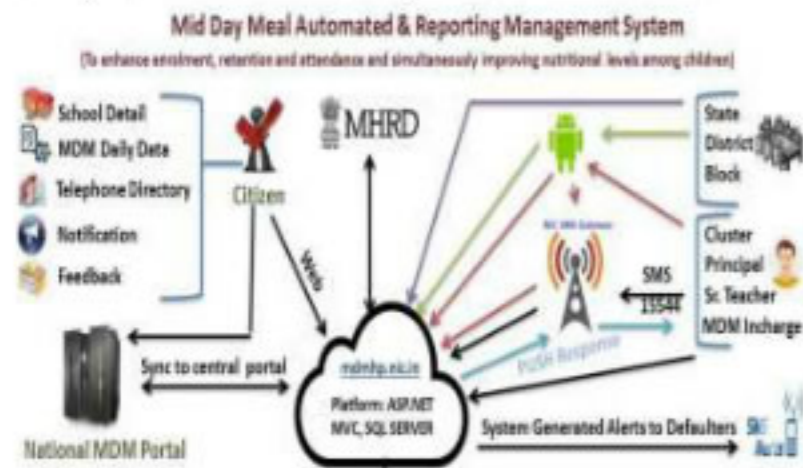


Figure-4: MDM ARMS data flow diagram.

To keep costs down and accounting simple, the MHRD, GoI got a toll free number issued from TRAI for collection of this daily meals data. A web-based solution has been developed for registering schools, teachers, their mobile numbers and to generate auto-alerts and MIS Reports. However, data for this web-based system is collected from simple mobile phones using SMS. The system is being used by many States and increasing monthly transactions data is shown below in Table-2:

Table-2: Month-wise SMS based Transactions<sup>5</sup>

Month, 2016	Total Transactions
March	41
April	1529
May	4961
June	5939
July	2455
August	2646156
September	3444942

<sup>5</sup> MDM-ARMS portal at <http://mdmhp.nic.in>

#### IV. KEY FINDINGS / RECOMMENDATIONS

e-Government transformation from the silo-based model to the inter connected one government model requires the following:

Government Ministries, departments or agencies must define a Long-term e-Government vision

Policies and a strategic framework on the lines of India Enterprise Architecture Framework need to be framed/ derived in order to deliver sustainable citizen-centric and citizen-driven services. Impact of IndEA has resulted in creation of NIC Enterprise Architecture, Public Service Commission Enterprise Framework (PSCEAF) and University Enterprise Architecture.

There must be a better and holistic collaboration between various Government entities. All the departments needs to streamline their processes and various services should be standardised enabling ICT systems across government Ministries, Departments or Agencies to talk to each other.

Ministries/Departments should leverage the advances in technology in order to strengthen the underlying technical infrastructure for ICT systems, with a focus on integrated service delivery gateways so as to facilitate online delivery of government services. The underlying architectures framed/adopted for various ICT systems should promote interoperability and seamlessly sharing of data across various ministries/departments.

PRAGATI model should be replicated in states enabling Chief Ministers to monitor projects/administrative aspects with District Administration and other authorities.

Technology per se is not the crucial factor, but connectivity is a cause of concern. Without good and reliable connectivity, no service delivery is possible. Private participation in providing connectivity is advisable. There should be optimal use of the infrastructure created earlier like NICNET, NKN, SWAN, SDC, NSDG and wherever possible this infrastructure must be expanded to panchayat level for acting as backbone for last mile connectivity.

The Government of India needs to go in for extensive capacity building through public and private channels. The aim should be have atleast one digitally literate person per family.

The Government must carry out process reforms and, if required, make necessary changes in the existing acts, rules, manuals to simplify the already established systems.

#### V. CONCLUSION

The digital transformation of the country and the vision of one government can take place with mandatory adherence to architecture principles laid down in India Enterprise Architecture Framework and a robust last mile connectivity framework for all stakeholders, including the citizens living in remotest locations of the country. There is a need to explore and

exploit all possible delivery channels be it web, mobile devices, social media, kiosks or service help desks. Adherence to e-Gov standards released by Meity, GOI will ensure and promote interoperability and seamlessly sharing of data across various ministries/departments enabling the government to deliver various services from a common point. Affordable smart phones with cheaper 4G plans from ISPs, will ensure that the online Government services are availed by the citizens, who are becoming tech-savvy. The connectivity options for Government set-up will improve as services will be offered from Central servers, automatically in most cases, being the result of process reforms. The case studies discussed in the paper clearly highlight the vast coverage area of the country in the case of Aadhaar, MGNREGS. These solutions have been successful in achieving the vision envisioned and have been devised as per ground situation of connectivity in different locations. The usage of different technologies for data collection and providing the web-enabled information systems in MDM-ARMS is another case-study focusing on specific problem based solution on a large scale. The future of digital India looks bright in this scenario with more large scale integrated applications being developed and rolled out.

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