Transforming India through E-governance—Initiatives, Challenges and Road Ahead

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Abstract

India has witnessed tremendous economic growth in recent years and has emerged as the sixth-largest economy in the world. It has withstood the challenges posed by occasional recessions and downturns. However, there are challenges in the form of poverty, unemployment, financial exclusion, corruption and need for further reforms. Therefore, productive governance becomes crucial to ensure that benefits of growth reach the population. The role of e-governance becomes highly significant in this context. It helps governments and businesses to improve efficiency and thereby concentrate their efforts on other aspects of their respective roles. The benefits of e-governance to society are in the form of greater transparency and simplified delivery of services among others. Several measures have been initiated by the government to simplify various rules and procedures, improve ease of doing business, and delivery of various government services. Encouraging public participation is one of the most crucial initiatives. However, ensuring cybersecurity is extremely crucial for the success of all e-governance initiatives.

This paper discusses various e-governance initiatives of the government including participatory governance with case studies. It highlights challenges in the form of IT security threats to e-governance and way forward to next round of India's economic and social transformation.

Keywords: E-governance, participatory governance, cybersecurity, economic growth, productive governance

OVERVIEW

There were innumerable challenges at the time of Independence of the country. Changes inevitably happened over the years and here we are right in the middle of a fascinating era of economic resurgence. India is now the sixth-largest economy and has emerged as a channel of growth for the world economy. India enjoys the demographic dividend with around 18 per cent of the population in the age group 15–24 and 28 per cent of the population under the age group 0–14 whereas the corresponding figures for China stand at 12 and 18 per cent respectively.[1] This augurs well for the economy. We do face occasional challenges of slowdown and downturn. Despite that we bounce back stronger and more optimistic after each such downturn. With 5.7 per cent growth in the first quarter of 2017–18, there are concerns regarding the growth rate and slowdown of economy though it is still expected to grow at around seven per cent in the current fiscal as per the Asian Development Bank. The slowdown was expected due to demonetization and the introduction of goods and services tax. The government is expected to initiate some measures

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[1] World Population Prospects: The 2017 Revision.

to improve the economy.   There is a visible difference in how India is perceived now globally in contrast to the pre-reforms era. At the same time, challenges in the form of poverty, unemployment, financial exclusion, corruption and need for further reforms remain. To accelerate the development process and identify solutions to the aforementioned challenges, productive governance becomes increasingly significant.

E-GOVERNANCE INITIATIVES

Over the last decade, e-governance has been adopted by the government for various functions, such as e-procurement, public distribution system, accounting system for local bodies, ticketing and catering facility in railways (See Case Study A), implementation of various government schemes such as Mahatma Gandhi National Rural Employment Gurantee Act (MNREGA), single-point collection of all utility bills through e-sevas, and registration and driving licenses in road transport offices (See Case Study B) and collection of property taxes amongst others. Some of the recent initiatives include the launch of digital India initiative with schemes to improve digital literacy through programmes such as e-sign, and e-health, to connect Gram Panchayats through Optical Fibre Network, expansion of common service centres among others. The government has made it mandatory to link Aadhaar number with bank accounts, pension accounts, permanent account number, and mobile phones. It has also created an Aadhaar enabled payment system (AEPS) (See Case Study C). Accomplishment of these initiatives may help in e-delivery of services and further strengthen the e-governance mechanism. Here are a few simple case studies on e-governance for easier understanding.

Case Study A: IRCTC Service

Let us suppose Mohit Das wants to travel from Secunderabad to Nagpur along with his family during the winter season. He opts to travel in a sleeper coach and has numerous trains to choose from. After carefully exploring the various options, he opts to travel in Secunderabad–Nizamuddin Duronto Express as it has sleeper coaches unlike other Duronto trains, which usually have only AC Coaches. However, the major advantage offered by IRCTC on this train is the facility to book bedroll at economical cost while entering the passenger information by selecting the checkbox button. Here IRCTC offers the customer the facility to book a superfast train at an economical fare inclusive of food cost along with the facility to simultaneously book a bedroll.

Benefits to the customer: The benefit to the customer is one-time easier booking at affordable price in a superfast train. The customer is not required to wait for the ticket confirmation, copy the PNR number and visit the e-bedroll section at the specified timings.

Benefits to IRCTC: Satisfied customer with possibility of repeated travel and word-of-mouth publicity.

Challenge: If the customers are not aware of the particular facility and are in a hurry to book the ticket, they may miss out on travelling at an economical fare and opt for more expensive AC

Coaches, which is not necessarily a preferable option during winter season. IRCTC may loss passenger traffic due to lack of adequate information with customers.

Solution: Providing information to the customer regarding the facility provided in the particular train on the IRCTC home page.

Case Study B: Issue of Driving License

Let us suppose Bashir is an RTO employee for the last 27 years. During the initial years of his service, he had to deal with numerous requests for driving licenses, make verification and maintain a manual register. Yet the mechanism was not foolproof to confirm whether the details provided where correct and adequate. There was added pressure of criticism from customers who would complain for delay in completing the license issue process. Enquiries from investigating authorities would further consumer time and delay the work at hand. Customers on the other hand had to make repeated visits to the RTO or engage with the middlemen to know the status of their application. Later the government introduced an application Sarathi, designed by the National Informatics Council.

Benefits to the employee: Sarathi has made it easier for employees to handle the applications, check status, verify records and dispose the applications at a much faster rate. He no longer requires going through manual records. With the consolidation of records across the country, it is much easier to gather and provide required information

Benefits to the customer: Customers are no longer required to make repeated visits to the RTO. They can check the application status online. They can also pay the application fee online. People have the option to book slots for appointment for learner license tests and driving tests.

Case Study C: Aadhaar Enabled Payment System

Government of India introduced the facility of Aadhaar Enabled Payment System. This system allows a consumer to withdraw, deposit, make payment, get mini statement and pay bills to the merchant by using Aadhaar number and fingerprint scan at a microATM available with an approved banking agent or merchant. The customer has to link his Aadhaar number with his or her bank account

Benefit to the customer: This is a cardless payment system. Hence, customers are not required to carry their ATM card, hence is more convenient.

Benefit to the bank: As the fingerprint scan is used, it reduces the risk of fraud.

Challenges to the customer: A customer may have more than one account with a bank. However, he or she will be able to avail this service with only one account of the bank. MicroATMs may not be available at all places.

Challenges to the bank: The bank must ensure that the MicroATMs are foolproof and are not tampered with.

PARTICIPATORY GOVERNANCE

One of the most visible scheme that encourages public participation is the Swachch Bharat

Abhiyan. However, one of the most important measure towards participatory governance is the introduction of the MyGov Portal. The government encourages public to share ideas and suggestions on a wide range of topics. This can help the government in identifying and considering viable suggestions while developing policies. It also uses this website to conduct various contests and innovation challenges pertaining to various departments and ministries (See Case Study E). These challenges have attractive prizes, which in turn encourage people to come up with unique solutions within a set of defined parameters. The official website of the Prime Minister also offers opportunity to the people to raise public grievances (See Case Study D) and offer suggestions to the government. These measures may be beneficial in the long run. Similar initiatives by state governments would help in promoting participatory governance. The following are a few case studies for easier understanding.

Case Study D: Redressal of Grievance

Let us suppose Rishab is concerned about a public grievance. He has numerable channels available to raise the public grievance or suggest a measure to address the grievance. After due deliberation, he opted to either use the official website of the Prime Minister or submit the grievance on the website of the Department of Administrative Reforms and Public Grievances (DAR&PG). He visits the relevant page, selects the relevant category and submits the grievance. Rishab receives a reference number on submission. The relevant authority will now consider and forward the grievance to the concerned department/personnel.

Benefit to the citizen: The citizen has an opportunity to share the grievance with the government. With the reference number, he or she can track the status of the grievance on the website of DAR&PG, place reminder request and provide feedback upon disposal of the issue. If the response is satisfactory, the citizen will have a positive feeling that he or she has contributed to the resolution of an issue.

Benefit to the government: The government has an opportunity to understand the grievance as it is not necessary that the personnel are aware of all public grievances. It can consider the issue while framing new policies.

Challenge to the citizen: While some grievances may be resolved immediately, others may take time. In case the concern raised is not addressed to his/her satisfaction, the person may get dejected and may use other channels such as public platforms and social media to raise the issue. While the citizen is free to use any other channel to raise the issue, it is also important to understand that the concerned authority has the freedom to decide the merit of the issue raised based on his/her experience and knowledge of the efforts made by the concerned department.

Challenge to the government: The government must ensure that the issue raised is resolved in a reasonable period. It is also important to devise an internal follow-up mechanism to check whether the promised or suggested action on the grievance by the concerned personnel is taken within a reasonable period.

Case Study E: Challenges and Contests

A particular ministry of the government invites citizens of the country to participate in a contest to suggest a new theme or mission on the MyGov website. It announces appropriate prizes for the winners. Now let us suppose Anjali, a postgraduate student is excited to participate in the contest. She goes through the terms and conditions of the contest and submits her entry in the specified format.

Benefit to the citizen: The citizen gets the opportunity to showcase his/her talent and creativity. While the winners may be motivated to participate in more such competitions, others may be motivated to further enhance their skills.

Benefit to the government: There are numerous benefits to the government. The government gains access to creative themes and suggestions. As public participation is encouraged, such contests create positive impression of the government. The openness of the government may encourage employees of the concerned department to be more forthcoming with their suggestions and ideas in future.

Challenge to the citizen: Delays in announcing the outcome may dissuade people from participating in such contests/challenges in future.

Challenge to the government: In an e-environment, it is important to announce the results of the competitions in a reasonable period to retain interest of the people. Unreasonable delays may raise doubts with respect to transparency and intention of the government among the participants. It is also important for the government to ensure confidentiality and integrity of submissions received in electronic form.

CYBERSECURITY THREATS

E-governance is likely to be the mainstay of governance. Information and communications technology as well as Internet act as the platform for delivering e-governance. As threats are inherent in the information technology and Internet environment, it is therefore important to secure the e-governance infrastructure from cybersecurity threats. Threats to cybersecurity may arise in various forms such as use of weak credentials, lack of regular software and security updates, breach of security infrastructure by hackers, as well as cyberattacks by intelligence agencies of rival countries. With the adoption of nuclear deterrence by several countries to prevent attacks by rival countries, cyber warfare has emerged as a major threat. Cyberattacks can not only hamper the functioning of the government, but also disrupt banking and defense systems as well as transport, communication and power networks amongst others. Cyberattacks can also result in leakage of sensitive personal information as well as confidential or classified information (See Case Study F). Therefore, cybersecurity is as important as any other form of national security. The WannaCry ransomware attack in May 2017 and the Bad Rabbit ransomware attack in October 2017 that affected thousands of systems across different parts of the world further emphasize the importance of preparation against threats in the cyberspace.

Case Study F: Dealing with Cyber Threats

Let us suppose Renu is an employee in a government department. In the course of the routine work, she visits a legitimate website infected with malware, which she is not aware of. She clicks on a seemingly genuine but malicious link on the website.

Consequences: In this case, the system used by Renu may get infected with malware. Hackers may use malware to steal confidential data, gain unauthorized access to the system and may infect other computers in the network. Lack of appropriate security measures and compromise of confidential data may also have legal implications for the government. Furthermore, a sophisticated cyberattack on an important installation or utility facility may pose serious challenge for the IT security professionals and the government in restoring services. Compromise of sensitive defense-related information could also pose threat to national security.

Remedial Measures: The employee must inform the concerned IT personnel in case of any suspicious activity. The compromised system may be disconnected with other networks in the system to prevent further damage.

Proactive Measures: Regular monitoring of the networks, conducting cyber awareness programmes, guidance on strong passwords, circulation of information regarding latest cybersecurity threats, swift application of patches released by software developers to mitigate vulnerabilities, adequate backup of confidential data, creation of incident handling team and ensuring availability of cyber forensic experts among others would help in countering cyber threats.

The following crucial aspects should be factored to secure the e-governance systems from IT security threats.

1. **Creating awareness**: It is crucial to create awareness among employees on different types of IT security threats, password and credentials management.

2. **Regular training of IT professionals**: Information technology professionals should be trained regularly on new developments and encouraged to be aware of the threats in the IT security environment

3. **Appropriate monitoring of networks**: It is important to ensure regular and effective monitoring of networks to detect any unusual activity.

4. **Proactive security management**: In the prevailing cyber threat environment, it is crucial to be proactive in identifying vulnerabilities with the help of cybersecurity professionals such as penetration testers and ethical hackers.

5. **Software updates and security advisories**: Developers periodically release software updates from time to time. Hackers often attempt to take advantage of the time gap between the release of patches by the software developers and their subsequent implementation by the public. Therefore, there should be a mechanism in place to identify and apply relevant software updates as well as keep track of security advisories regarding vulnerabilities.

6. **Safeguard against social engineering threats**: Employees must be aware of threats on social media as well as professional networking sites as attackers may try to gather confidential information by using social engineering techniques. For example, let us suppose Ankit an employee of a government department is promoting the department's achievement on a microblogging platform say Twitter. Now suppose Arvind, another user of Twitter follows Ankit and regularly likes Ankit's posts. Over a period, both Ankit and Arvind develop a good rapport with each other. Now if Arvind has a malicious intention, he may attempt to trick Ankit into revealing confidential information. As such, security policies should be developed for appropriate and safe use of social media by employees.

7. **Effective implementation of security policies**: It is important to monitor implementation and adherence to the IT security policies by the employees. As e-governance systems may have access to sensitive information, restrictions should be placed on access to external sites. Employees must be made aware of threats arising from clicking on suspicious or phishing links (See Table 1), downloading of files from personal email and external websites. Attackers may use malicious files to install malware and steal sensitive information.

Table 1   Phishing: Methods, types of attacks and preventive measures

Methods	Types of Attack	Some Preventive Measures
1. Instant messages and Internet relay chats, various forms of chat applications	1. Cross-scripting	1. Always type the website name directly on the address bar rather than clicking on links on search engines.
2. Spoofing emails	2. Electronic surveillance	2. Preferably work with user accounts without administrative privileges unless absolutely essential.
3. Trojaned hosts	3. Hidden attacks	3. Use strong and different passwords for different sites and accounts.
4. Web-based attacks	4. Man-in-the-middle	4. Cross-check correctness of sender email address
	5. URL obfuscation	5. Check for padlocks and security certificates
		6. Avoid suspicious URLs similar to that of the actual URL but with proxy names in the link or spelling mistakes.

Source: Compiled by Author from various sources

8. **Safeguard against programming errors**: Attackers may take advantage of the programming errors to insert malicious code, evade authentication, and disrupt the functioning of the system

or gain access to confidential information. Government should therefore regularly conduct security audit of websites and systems. SQL injection, format string attacks, path traversal attacks, brute force attacks, URL redirection, stack attacks, heap attacks, codebook attacks are some of the attacks that are resorted by hackers to exploit various vulnerabilities in programming.
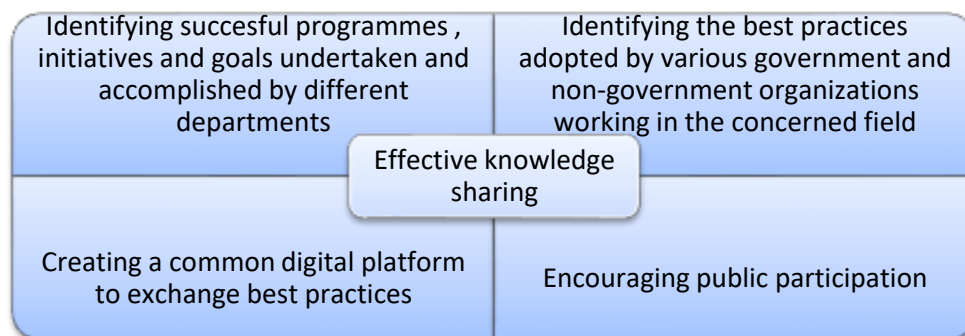
9. **Provision for incident response teams**: Incident response teams should be created to restore systems in the event of a cyberattack to protect data, minimize losses, and safeguard network and systems from further damage.

10. **Provision for data back up:** A cyberattack may halt the operations of the systems. As such it is crucial to have alternative back up sites to ensure early restoration of operations.

CONCLUSION AND WAY FORWARD FOR SOCIAL AND ECONOMIC TRANSFORMATION

Social and economic transformation is interrelated. The next transformation should focus on sustainable development and strengthening the fundamental aspects of the economy. A diverse yet vibrant economy requires a multi-pronged strategy for the next set of social and economic transformation. E-governance has a role to play in all future strategies. The following measures are suggested:

1. **Emphasis on knowledge sharing**: Lack of awareness on best practices often results in duplication of efforts. Emphasis on knowledge sharing (See Figure 1) can ease the process of identifying solutions and help hasten the implementation process. A digital platform can be created to encourage sharing of best practices and ideas.

Figure   1
Source: Prepared by Author

2. **Setting up of public health enterprises:** Public health enterprises (See Box Item A) with electronic record keeping can improve the health services in government hospitals. Better healthcare facilities can help reduce lifestyle related diseases and in turn have positive impact on the productivity of the people.

BOX ITEM A: Public Health Enterprises

Today, India is known for its medical treatment worldwide. Over the years, there has been a visible growth in the number of healthcare providers in the private sector. The government has also set up All India Institute of Medical Institutes in six other cities in addition to the centre in Delhi.   However, affordability of healthcare services is still a cause for concern due to income disparities. While on the one hand some of the private hospitals are out of reach of people due to high costs, concerns over facilities in government hospitals is a known factor. The author proposes creation of public health enterprises for improving the healthcare infrastructure in the country.

Background: Steel Authority of India Limited runs hospitals and health centres in the cities where it has steel plants (e.g., Bhilai in Chhattisgarh) and caters to the healthcare needs of not only its employees but also wider population.

Aim: The aim of the public health enterprises would be to provide affordable yet quality healthcare services to the public.

Model: These enterprises would be either standalone, linked to an existing profitable public sector undertaking, or set up as a public–private partnership model. While these enterprises can have in-house medical staff, they can also tie-up with reputed medical professionals to cater to the needs of inpatients as well as outpatients. In due course, these enterprises could make an initial public offering to ensure profitability. Based on the success of these enterprises in a predetermined time frame, audit and survey of their acceptability among the general public, some existing hospitals could be converted to this model for enhancing their efficiency.

3. **Focus on sustainable towns**: Better town planning with provision for electronic records can not only improve the living conditions in the towns, but also reduce the burden on cities. Tier II and Tier III towns and cities have the potential to be the next hubs of growth of India and therefore should get the required focus and attention of the central and respective state governments.

4. **Provision for social security schemes**: For a country like India, ensuring social security for all its citizens is a challenging task and would place lot of financial burden on the government. However, provision of social security has its advantages as it may help reduce the anxiety of the people, enhance their decision-making skills, improve productive working hours, and may have a positive impact on the consumption patterns.

5. **Make in rural India**: A 'make in rural India' campaign to promote handicrafts and cottage industry, showcase the talent of rural population and improve the livelihood of the rural population can help in creating sustainable villages. Villages with tourism potential should be identified and transformed to create 'Gateways to India'. Emphasis on Improved intra- and inter-village connectivity, focus on ensuring basic infrastructural facilities in village,

and rural tourism can improve the living conditions in villages, enhance productive hours as well as contribute to the local and regional balanced development.

6. **Mentors for development**: We often witness delays in policy formulation and implementation. Policies at times may not reflect the ground realities. Each district should have a mentor or mentors for development to remove the bottlenecks and enhance the pace of development. These mentors can be individuals with proven track record in social issues in the region.

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