

Governments across the world are stepping up their investments in information and communications technology (ICT) for improved delivery of information and services to citizens. Public sector organisations are now steadily moving beyond the narrow objective of delivering e-governance through various portals and websites. They are adopting next-generation technologies such as internet of things (IoT), cloud computing and artificial intelligence (AI), which are significantly changing the way services are accessed and delivered.

These technology solutions are helping governments address the serious challenges facing their economies and improve their abilities to deliver core services to the citizens. These include the growing demand for services, ageing infrastructure, decline in budgets and rise in environmental threats.

A look at the emerging ICT trends and solutions in the government and public utilities space...

IoT

IoT presents a range of promising opportunities for several government enterprises to effectively manage their operations. For instance, city governments can use IoT to analyse the complex aspects of city planning and management such as population growth, zoning, mapping, water supply, transportation patterns, food supply, social services and land use. IoT can also aid in waste management by controlling the disposal of waste at regular intervals, determining the best time to collect waste and deciding the ideal route for waste-carrying vehicles. Moreover, IoT applications can help government agencies quickly aggregate and analyse information about an emergency event such as a gas leak and give instructions to the people affected by it.

Despite beginning its IoT journey long after the developed economies, the Indian government is taking significant strides in the IoT space. In 2015, it released the draft IoT policy with the aim of creating a \$15 billion IoT market by 2020 and increasing the number of connected devices in the country from 200 million to over 2.7 billion. As per the policy, the government would set up projects using IoT and would reduce the customs duty or even allow full exemption on the import of raw material required for such projects. The government's Smart Cities Mission and Digital India programme are also likely to fuel the demand for IoT products and services. The various initiatives proposed to be taken under the Smart Cities Mission such as smart energy, intelligent transport systems, waste management and smart lighting would be based on IoT. The Digital India programme, which aims to make India a digitally empowered society and a

knowledge economy through the creation of a robust digital infrastructure, will provide an opportunity for start-ups to build digital solutions around IoT.

While government enterprises are stepping up their investments in IoT, they also need to overcome challenges such as the lack of skills in handling the data generated by IoT, insufficient funding to modernise their IT infrastructure, and risks and uncertainty regarding privacy, security, interoperability, and return on investment.

Cloud computing

Cloud computing is increasingly gaining uptake among government enterprises. It enhances agility, improves workforce productivity and reduces costs. Cloud technology standardises and pools IT resources and automates maintenance tasks that are done manually under the traditional frameworks. The use of cloud frees up resources, which can be invested in mission-critical applications and services and shifts the focus from asset ownership to service management, thus improving citizen engagement and service delivery.

By adopting the cloud model, governments can free up a lot of time and human resources to focus on devising better delivery mechanisms. Moreover, since cloud computing offers services on a pay-as-you-go and pay-per-use basis, there are no upfront costs involved in buying the IT equipment, resulting in significant cost savings for governments. Cloud computing also helps governments avoid the problem of technological obsolescence since all the software and hardware upgrades are done at the cloud service providers end.

In order to utilise and harness the benefits of cloud computing, the Indian government has launched the GI Cloud initiative, MeghRaj. The focus of this initiative is to accelerate the delivery of e-services by optimising the government's ICT spend and infrastructure and developing e-governance applications. Under the MeghRaj initiative, utilities are offered several cloud-based services such as server vulnerability assessment, server backup, and anti virus and network/application firewalls.

Social media

Over the past few years, social media has made it easier for citizens to voice their opinions, and for governments to hear them. It has provided a platform for governments to address customer grievances through tweets and Facebook comments. Moreover, governments across the world are leveraging social media platforms as low-cost and effective communication tools to spread information about their various schemes and programmes, and raise awareness about events that directly impact the citizens. Social media can also help governments measure public sentiments, which can serve as valuable inputs while framing public policies.

In India, the Andhra Pradesh government effectively used social media for disaster management during cyclone Hud-hud. The Ministry of External Affairs used Twitter to help the Indian citizens stranded in Libya and the Middle East. The Delhi government used social media for effective traffic management during the odd-even scheme.

In order to increase the uptake of social media among government enterprises, it is necessary to improve security on their online portals. Since these enterprises share information that is typically more sensitive than that of any private sector organisation, their social media accounts are prone to hacking and misuse. Hence, government departments with a social media presence must adopt robust cybersecurity solutions to protect their accounts. Another major challenge that most government organisations face while using social media applications is that of filtering relevant information from the huge volume of data. This calls for the adoption of advanced data analytics systems, which can detect meaningful patterns and trends in social media conversations.

Artificial intelligence

Government agencies are still at a nascent stage of AI adoption. AI is deployed to improve the speed and quality of services. The potential use cases of AI in the public sector are similar to its common applications in the private sector. Further, AI can reduce the administrative burden by taking up tasks of a repetitive nature, help resolve resource allocation problems, and make predictions based on historical data.

An early application of AI in public utilities is the addition of customer service chatbots on the central and state government websites. These can be used to respond to citizen queries. Going forward, AI can be used to perform much more sophisticated tasks such as making welfare payments, detecting financial frauds and planning new infrastructure projects.

To work effectively in these scenarios, AI needs to constantly learn and improve its capabilities. AI applications that aim to simply replace interactive voice response systems on customer service calls, or automate basic computer tasks, will not be as transformational as applications that learn and improve over time. AI will also have more impact if it reduces the administrative burden and enhances human efforts, as opposed to replacing workers. If applied strategically, AI applications can deliver citizen services more efficiently, while potentially reducing costs and increasing citizen satisfaction and engagement.

The Indian government too is exploring the potential use cases of AI in improving governance. To this end, the government's policy think tank NITI Aayog is spearheading a national programme on AI.

The way forward

While the government's efforts to harness the potential of next-generation technologies such as IoT and AI are still at an early stage, the fact that the majority of enterprises have acknowledged the enormous potential of digital transformation is a significant development. Going forward, it is essential that government organisations and utilities stay ahead of the technology learning curve to serve citizens better. To this end, it is necessary to address issues such as network downtime, lack of qualified IT staff to oversee day-to-day IT operations, integration of multiple technologies and the increasing cost of technology.

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