

Transformation of Public Service: Rise of Technology, AI and Automation

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Abstract

The rapid advancement of technology has proven beneficial for enhancing efficiency, transparency, responsiveness, and effectiveness in the administration of public services. The internalization of technological innovations, including AI and automation, has become imperative to address the increasing needs and expectations of citizens in modern governance. Various developed and developing countries have revolutionized public services through the adoption of AI and automation. Nepal has made strides in digital governance, advancing from a paper-based form of governance to digital governance. Moreover, the Digital Nepal Framework aspires to restructure the economy through increased service delivery, production, and productivity by harnessing digital technology. The issues of the digital divide, ethical and responsible adoption of AI, citizen engagement and participation, and inclusiveness have been challenging. The government should prioritize investments in digital infrastructure, encourage tech innovations, and promote capacity development in the field of technology.

Keywords: public service delivery (PSD), artificial intelligence (AI), automation, digital governance, digital transformation.

Introduction

This article delves into the transformative impact of technological advancements, including artificial intelligence (AI) and automation, on public service and administration. It highlights the evolution of technological integration into the public sector and the monumental role played by AI and automation in modern governance. It explores how various Asian countries, including India, Singapore, Philippines, and South Korea, as well as other countries like Estonia, Canada, the United States, and the United Kingdom, have harnessed the advantages of technological development and digital governance to revolutionize public administration and service delivery.

The objective of this paper is to comprehensively examine the transformative impact of AI, automation, and technology in public service. The article discusses the challenges and concerns posed by the adoption of AI and automation, emphasizing issues such as data privacy, bias, security,

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and the digital divide. It showcases the role of citizen engagement and participation in shaping the future of governance through technology, emphasizing open data initiatives, virtual public hearings, and user-friendly online platforms.

Additionally, the article underscores the importance of responsible AI adoption, highlighting exemplary regulatory frameworks, for instance, in the European Union, Canada, and Singapore. It emphasizes the need for informed consent and comprehensive training programs for public officials to maximize the benefits of AI. The paper provides insights into digital transformation efforts in Nepal, highlighting the country's progress and outlining the necessary steps for embracing technological development.

In conclusion, the article outlines a strategic roadmap for governments, including the prioritization of national security, regular AI algorithm audits, and ethical guidelines. It stresses the importance of investing in technological education and digital literacy to empower citizen and bridge the digital divide, ultimately paving the way for a more equitable and technologically inclusive future.

AI and Automation in Public Service

Public service, a cornerstone of democracy, plays a significant role in ensuring citizens' needs and rights are fulfilled. Public administration fuels the engine for delivering services in a more efficient and equitable way. Public services have undergone transformation through technological advancements and modernization while accomplishing shifting public demands and expectations. Initiatives like e-governance, data analytics, and big data have dramatically changed the administration of public services. Governments have embraced open data, digitalization of services, and data-driven decision-making to make government services easily accessible to citizen.

The unprecedented pace of technological progress and the influence of automation and Artificial Intelligence (AI) in government operations has emerged as a boon to the public sector. AI and automation are smart techniques for achieving more effective and efficient results through the application of technology. AI aims to simulate many aspects of human intelligence with the intelligence of computers. It enables robotics, computer systems, and machines to comprehend and recognize patterns, learn from data, and make decisions. Now, AI has revolutionized every sector and industry, holding significant implications for our future.

Countries like the United States, China, South Korea, Germany, Japan, the United Kingdom, and others have been extensively utilizing AI and automation technologies across various sectors. Moreover, China aims to become a global AI leader by 2030, overtaking the United States. Similarly, the US has made significant investments in research and development related to AI. The Global Partnership on Artificial Intelligence (GPAI) seeks to harmonize AI technology with democratic values and human rights. Additionally, the US plays a pivotal role in ensuring the alignment of the mission of GPAI and the Organization for Economic Cooperation and Development (OECD).

History of Technological Integration

Historically, governments sought ways for efficient management of records and communication. The evolution of the printing press in the 15th century revolutionized the government information system. Similarly, the emergence of industries commenced with the Industrial Revolution in the late 18th century and necessitated government regulation. Thus, the government expanded structures and bureaucracy to manage the increasing technological innovations. The invention of electronic digital computers in the mid-20th century enabled data processing and record-keeping in a more efficient and effective way. The easy and fast retrieval, storage, and analysis of information led to improved administrative efficiency. Moreover, simulation and modeling eased policy analysis and informed decision-making.

The birth of the World Wide Web (WWW), one of the most pivotal moments in technological history, revolutionized global communication and information. It enabled public agencies to embrace e-government initiatives leading to online services, citizen engagement, and direct dissemination of information. Similarly, the invention of smartphones in the 2000s has enabled more accessible and responsive government services with the use of mobile apps and websites. The evolution of social media platforms such as Facebook and Twitter in the early 21st century emerged as powerful tools for citizen engagement. Moreover, the intervention of blockchain technology with the launch of Bitcoin in 2008 is expected to enhance trust and confidence and reduce fraud. Public administration can leverage blockchain to enhance supply chain management, smart contracts, public procurement, secure identity verification, and record-keeping.

Modern cloud computing has allowed public sectors to reduce significant costs and investments in IT infrastructure, data centers, and servers. Cloud services facilitate remote work, e-government initiatives, and online delivery of services, enhancing citizen accessibility, collaboration, and convenience. Similarly, the concept of big data analytics, which gained prominence in the early 21st century, has offered governments data-driven decision-making, predictive analytics, fraud detection, program evaluation, and resource allocation. Thus, technologies have abundant potential to transform public administration to be more flexible and responsive while making it trustworthy, transparent, and accountable.

Public Sector and Administration: Impact of AI

The pre-20th century traditional Nepalese bureaucracy relied on manual record-keeping and filings and paper-based circulars and correspondence. The technological investment expanded after the democratic transformation in the 1950s with the introduction of telephones, radio, and typewriters. Communication and postal services have become significantly easier since the 1980s with the introduction of fax machines. Similarly, the introduction of computers and IT in public administration enhanced administrative efficiency and public service delivery. The initiation of e-government initiatives in the 2000s enabled online services, digital citizen registration, tax

payments, information systems, and digital signatures. Moreover, public administration has had an instrumental impact due to the expansion of internet connectivity.

In this 21st century, the global rise of (AI) in public administration stands as a defining hallmark of modern governance. The adoption of AI and automation emerges with no alternative; moreover, it is imperative to develop citizen-centric public service. The incorporation of automation and AI offers tremendous opportunities for public authorities. Innovations in digital governance aim to create efficient services and cost-saving efforts while maintaining the quality of public service delivery. The automation of routine functions has reduced administrative burdens, while data, trends, and patterns analyzed by AI have led to improved data-driven decision-making.

AI-powered chatbots and virtual assistants used in healthcare organizations, banking and financial services, and e-commerce companies streamline the processes through prompt responses to citizen inquiries. While excelling in data analytics, AI systems reduce decision-making errors and minimize the risk of incorrect assessment. Government security agencies deploy AI in predictive policing for analyzing past crime data, anticipating potential areas that lead to proactive prevention and control of crime. Thus, the rapidly evolving technologies have validated their potential to enhance the efficiency, transparency, and responsiveness of public services. While the demands of citizen in modern governance have escalated, AI and automation have become instrumental.

Global Rise of AI and Automation

According to the Republic of Estonia, Estonia offers an e-residency program that provides non-residents with chip-embedded ID cards, enabling remote access to public services. This simplifies bureaucratic procedures, reduces administrative burdens, and promotes entrepreneurship within the EU. Additionally, it allows entrepreneurs and freelancers from around the world to operate online businesses within the European Union. Estonia has leveraged automation and AI technology in various areas, including application processing, business registration, and digital contracts and signatures.

Estonia's X-Road stands as a testament to its leadership in digital governance. This advanced, secure, and efficient data exchange infrastructure facilitates seamless information flow between the government and other sectors. The platform provides a digital highway for the exchange of information while ensuring strong authentication and user authorization to maintain confidentiality and integrity (e-Estonia, 2023).

Canada has committed to transforming its immigration system by increasing automated services to meet the growing demand for study permits, work permits, and temporary residency. The Department for Immigration in Canada, specifically, Refugee and Citizenship Canada (IRCC), has been using automation in a points-based immigration program called the Express Entry System. This program utilizes AI algorithms to efficiently process immigrant applications and select candidates for permanent residency based on factors like age, work experience, education, and language

competency assessment. Moreover, automated systems assist in predictive analytics for application volumes, visitor visa processing, fraud detection, and decision support (International Bar Association, 2023). Australia has also implemented automated visa processing to expedite and streamline the application process.

The United States focuses on digital government strategy through the adoption of automation in Internal Revenue Services (IRS) for tax processing and AI in the United States Patent and Trademark Office (USPTO) for patent examination. Automated systems have enhanced the accuracy and efficiency of revenue services, reduced processing time, and detected errors. Similarly, AI algorithms enable prompt analysis of patent databases, reducing the cost of patent examination and accelerating approvals. While leveraging the power of technological advancements, AI, and automation, the Government of the U.S. emphasizes data security and privacy through strong data encryption protocols, strict access controls, regular security audits and testing, and data minimization (IBM, 2023).

The Government Digital Services (GDS) have revolutionized public services in the United Kingdom through digital platforms such as "gov.uk," providing simplified access to government information. This user-centric portal allows citizen engagement through intuitive design, reduced cost, and improved efficiency of services. GDS's commitment to open data and digital inclusion ensures the accessibility of services to all citizens and enables third-party developers to innovate. Similarly, the National Health Services (NHS) deploys AI algorithms for the diagnosis of patients and scheduling of appointments. This has reduced waiting times for patients and optimized healthcare resources. NHS has enabled telemedicine and telehealth by expanding remote patient monitoring and online medical consultations (gov.uk, 2023).

Revolutionizing Governance and PSD in Asia

According to the Asian Productivity Organization (APO), Singapore's Smart Nation Initiative, launched in 2014, reflects the government's commitment to digital governance and services. The initiative focuses on building digital infrastructure, including high-speed broadband networks and 5G connectivity. Moreover, it aims to leverage data analytics and AI in government decision-making. Singapore prioritizes smart mobility solutions, including autonomous vehicles, real-time traffic management, and innovations in healthcare, such as telemedicine. Citizens can access digital government services, including tax payments, through the "SingPass" platform under the Smart Nation Initiative.

South Korea employs AI-powered surveillance systems to enhance public security through the prediction, prevention, and detection of crimes, traffic monitoring and management, and disaster preparedness and response. AI is used to analyze suspicious activities and identify potential security threats in real-time, as well as to process crime data and identify hotspots. Additionally, AI systems facilitate the prompt response to accidents, traffic violations, and obstructions, ensuring road safety

and reducing traffic congestion. Automation supports disaster response efforts, including weather forecasts and the assessment of natural disaster impacts (APO, 2021).

India has streamlined the delivery of public services through an ambitious project known as the Aadhar System. This system assigns a unique 12-digit identity number to every resident of India, linking it to their biometric and demographic data. AI is used to verify identity during the Aadhar enrollment process by matching the Aadhar database with biometrics. This initiative has enrolled over a billion individuals in the system, reducing administrative burdens and facilitating financial inclusion. It enables direct government funds to reach eligible beneficiaries through digital payments and financial services while eliminating intermediaries (APO, 2021).

Meanwhile, the Government of India introduced and linked the Goods and Services Tax (GST) with the national ID system, ultimately integrating it with people's bank accounts for tax enforcement and compliance. This electronic tax filing provision has now broadened the tax base to 3.4 million additional indirect taxpayers in just six months. The success of the Aadhar digital ID program has triggered other Asian countries leading to the introduction of the e-KPT card in Indonesia, the NADRA system in Pakistan, and MyKad in Malaysia. The government of India has been implementing blockchain technology in Andhra Pradesh as one of the significant initiatives to reduce fraud and corruption in the land management system (APO, 2021).

The Philippines leverages crowdsourcing to enhance the quality of public education through the CheckMySchool (CMS) initiative. CMS, launched in 2011, is a groundbreaking community monitoring technique that partners with the Department of Education to produce reports on public educational programs, services, and infrastructures. It allows students, guardians, and community members to have real-time access to information and holds authorities of schools accountable. Through CMS, citizens can advocate and raise their concerns regarding necessary changes and improvements in school facilities. This has played a significant role in reducing corruption and mismanagement of public education. Moreover, this project has expanded to thousands of schools across the Philippines, while also inspiring other citizen-led monitoring efforts in other sectors beyond education (APO, 2021).

Nepal's Journey of Digital Governance in Public Service

In the early stages of the development of e-government worldwide, Government 1.0 aimed to utilize dedicated websites and government portals to provide public service information. Similarly, Government 2.0 prioritized public involvement in policymaking, openness, efficiency, and better user access to services, ensuring interoperability among government ICT systems via service-oriented architecture. Government 3.0 focused on integrating communication channels, establishing pervasive e-government, and building an e-infrastructure for advanced automation to anticipate users' needs. In Nepal, Government 1.0 represented a conventional, paper-based form of government

that utilized limited technology. The Government 2.0 stage utilized the internet, information portals such as websites, email, and basic online services.

Digital governance in Nepal has advanced towards Government 3.0, although it hasn't fully reached this stage. Nepal has made efforts to advance its digital governance infrastructure through the adoption of open government data, data-driven decision-making, and online public service delivery. It has also worked on digitizing government operations through e-government initiatives, enabling the provision of online public services. Additionally, Nepal aims to establish a digital identity system through the National Identity Card (NID), similar to India's Aadhaar system. This system is expected to integrate various government services, including driver's licenses, banking services, tax payments, the social security system, and voter registration. Data analytics techniques have been employed for evidence-based decision-making in various government agencies.

The Government of Nepal has been progressing in the digital landscape, implementing policy and institutional frameworks, including the National Broadband Policy 2015, Information and Communication Technology Policy 2016, Telecommunication Act 1997, and The Electronic Transactions Act 2008. According to the Ministry of Communication and Information Technology, the Digital Nepal program was expected to contribute up to NPR 800 billion to GDP growth by 2022. The government of Nepal introduced the Digital Nepal Framework (DNF) plan in 2019 with the goal of restructuring the economy through increased service delivery, production, and productivity by harnessing digital technology. DNF aspires to promote socioeconomic growth through eight sectors, namely digital foundation, education, energy, agriculture, health, tourism, finance, and urban infrastructure, along with eighty digital initiatives. DNF aims to expand the 5G network, public Wi-Fi hotspots, the National optical fiber network, and spectrum availability (Digital Nepal Framework, 2019). Key government entities such as the Ministry of Communication and Information Technology, Department of Information Technology, National Information Technology Centre, Office of the Controller of Certification, Nepal Telecommunication Authority, and other institutions play pivotal roles in implementing and regulating digital initiatives.

Nepal requires enormous political, financial, and administrative preparation to embrace Government 4.0 and Government 5.0. This leverages automation, Artificial Intelligence, Blockchain, the Internet of Things (IoT), big data analytics, 5G and connectivity, Augmented Reality (AR) and Virtual Reality (VR). For that, investment in technology infrastructure that supports AI, IoT, and 5G is indispensable. A comprehensive assessment of technological advancements and the contemporary status of digital governance is essential to develop a vision and strategic plan for the adoption of innovations in public service. Moreover, data governance and cybersecurity policies, which ensure ethical, secure, and responsive utilization of data, hold a significant foundation for the future of public service. The government needs to partner with the private sector, research institutions, academia, and intellectuals to embrace the further stages of digital governance. Furthermore, international strategic collaboration is required.

Challenges and Concerns

While AI and automation offer a paradigm shift in the public sector and society at large, they also pose certain risks. Ethical considerations, legal issues, and societal implications have been raised. As the public sector increasingly relies on data-driven decision-making, questions about the role and function of government have arisen. A vast amount of data collected, stored, and used by AI may lead to a breach of privacy, sensitivity, and confidentiality. AI algorithms may inherit biased data which ultimately influences policy formulation and later discriminatory outcomes. Moreover, ensuring algorithmic fairness, equity, and unbiased training of data in algorithmic decision-making is more challenging (European Journal of Information Systems, 2022).

According to the United Nations, 2.9 billion people in the world are still out of reach of the internet. Advancements in digital technology are deepening inequalities and the digital divide through unequal access to digital services and the benefits of AI and automation. Contrary to the motto of sustainable development goals, digital technologies are leaving nearly half of humanity behind. The barriers to accessing social services such as healthcare and education have significantly excluded certain populations and marginalized them further. AI and automation systems face vulnerabilities in security, such as cyberattacks, hackings, data breaches, data piracy, and deep fakes.

Nepal had 11.51 million internet users, accounting for 38.4% of the total population. The data reveals the growth of 822 thousand internet users, marking a 7.7% increase from 2021 to 2022 (Datareportal, 2022). The majority of internet users in Nepal, at 72%, access the internet through mobile devices, with 55% using mobile connections and 17% using broadband. Notably, internet banking has connected 1.5 million citizens, while mobile banking has reached 33% of the population. However, digital governance in Nepal faces persistent challenges, including the institutional development of digital payment, payment gateway, digital inclusion, and data centers.

The Digital Nepal Framework primarily concentrates on digital service flow; however, it neglects crucial factors such as digital footprints, data security, interconnectivity, and open government data. The existing legal framework falls short in addressing significant aspects of the digital economy, including digital entrepreneurship, digital investment, quality of data, and currency regulation. Organizational and individual resistance to change, weak digital infrastructure and technological incompetency, digital illiteracy, regulatory shortcomings in the private IT sector, and internet security vulnerabilities contribute to these challenges.

Responsible AI Adoption

The administrative routine tasks of public officials are at stake as most jobs are expected to be displaced by automation and AI. This requires the formulation of a strategic human resource development plan, including reskilling and uplifting competencies in accordance with the transforming technological development. Public employees should equip themselves with enhanced systems thinking, leadership, creativity, and emotional intelligence. The horizons of knowledge and

competencies regarding digitization, data analysis, software development, and cybersecurity should be enhanced by public officials.

Several nations have introduced various regulatory frameworks and guidelines for the responsible and ethical deployment of AI technologies. The European Union (EU) seeks to regulate the use of AI across member countries of the EU through the AI Act while ensuring the safety of AI systems. Canada has introduced a directive on automated decision-making. Moreover, it has implemented the Pan-Canadian Artificial Intelligence Strategy for advancing research and promoting collaboration between academia and industries. Singapore has published guidelines for data protection, accountability, and ethical adoption of AI (The Data Privacy Group, 2023).

United States deploys the Federal Trade Commission (FTC) and the National Institute of Standards and Technology (NIST) to work on guidelines and ethical frameworks for the regulation of AI, automation, and technological development. UK's Centre for Data Ethics and Innovation (CDEI), an independent advisory body, focuses on ensuring the ethical and responsible implication of data-driven technologies, Artificial Intelligence, and Machine learning (The Data Privacy Group, 2023).

The openness and transparency of the use of AI in decision-making processes help maintain the trust and credibility of citizen towards the government. Good governance today is governance that ensures fair and equitable use of automation and AI in public administration and public service delivery. Prioritizing data privacy and security, along with a strong code of conduct and regulations for data protection, is instrumental.

Citizen Engagement and Participation

AI has the potential to foster inclusive service-making. The development of user-friendly online platforms and portals allows citizens to access government information, receive services, and provide essential feedback. E-consultation and online surveys gather public opinions from a wider audience regarding public service delivery. The collected citizen feedback can be further analyzed for decision-making. Virtual public hearings, live streamings, and interactive features assist in policy discussions, enhancing participation. Open data initiatives automate indexing, classifying, and analyzing enormous datasets, making government data accessible to all stakeholders. It ensures transparency by enabling citizens to access and use available data while holding public officials accountable.

Conclusion and Strategic Way Forward

It should be ensured that the data required by AI should be obtained with informed consent. It is essential to emphasize national-level training programs and workshops for empowering public officials with AI and automation skills. Employees must be sharpened with adequate skills and competencies for leveraging the opportunities unlocked by AI and automation. It is essential to

ensure that public service providers and receivers are capable of utilizing the opportunities unlocked by AI.

Investment in AI Research and Development (R&D) agencies should be prioritized. The widened social inequalities and excluded populations caused by the digital divide should be considered while formulating public policies. Policy-makers should be mindful of technological inclusivity, promoting digital literacy, and strengthening digital infrastructure. The government should put forward serious efforts to verify the technologies critical to national interest and security.

A periodic audit of the AI algorithm should be conducted to rectify biases and ensure fair assessments. Ethical guidelines related to the enforcement of AI should be introduced. The academic sector and educational institutions should focus on producing future human resources in the fields of science, technology, engineering, and mathematics (STEM). Investment in digital education also enables access to technology, utilization of AI and automation, and leads to bridging the digital divide.

The transformative power of big data analytics is essential for reshaping policy-making processes (Digital Nepal Framework, 2019). The success of 'Digital Nepal' depends on how strategically digital innovations and technological advancement are internalized by all the three tiers of the government. It is imperative to consider the pivotal role of the digital economy in the Digital Nepal Program. The challenges and opportunities posed by the technological development should be addressed with the concrete policies, plans and strategies. The policymakers should prioritize unleashing the advantages of digitization, study and prepare legal and institutional framework for embracing AI and automation in future.

Nepal should prioritize investment in digital infrastructure such as high-speed internet networks, power supply, technological education, and training related to automation and AI. The government should encourage startups and innovation related to technology through funding provisions. Moreover, it should focus on establishing a conducive environment for digital investments. It is essential to focus on cybersecurity education and infrastructure. Moreover, international partnerships and collaboration should be enhanced for technology transfer and capacity building in this field.

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