

RESEARCH PAPER

LEVERAGING IT TO REDUCE GOVERNMENT FOOTPRINT

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Abstract

This paper explores the transformative capability of Artificial Intelligence in modernising public governance, focusing on its role in overcoming operational inefficiencies in government offices in Pakistan. The potential of AI in bringing about efficiency, reducing costs, and improving service delivery is illustrated through cases such as the e-governance initiative in Estonia. It focuses on digitization as the basis for AI integration to handle repetitive tasks and advanced AI systems for predictive analytics and real-time decision-making. The paper proposes a phased framework for implementation using the case study of the Chief Commissioner's Office in Islamabad, starting with high-demand public services such as marriage certificates, police verifications, and domicile issuance. This approach underlines the twofold benefits of AI adoption: increased efficiency in administrative processes and sustainable governance.

Noting the challenges in resource constraints, ethical concerns, and data quality issues, this paper provides a more organised policy framework, including the setting up of a National AI Authority to promote public-private partnerships and capacity-building programs for top civil servants. In addition to automating processes, decreasing human effort, and driving innovation, the benefits of AI could also help to attract foreign investments toward Pakistan and position it as a regional leader in AI-driven governance. Actionable policy recommendations include targeted funding for digitization, RPA and AI training for civil servants, and academic-industry collaborations to encourage AI research. The objectives of these measures are to establish a governance framework that is scalable, efficient, and inclusive, which guarantees improved resource allocation, promotes innovation, and increases public satisfaction.

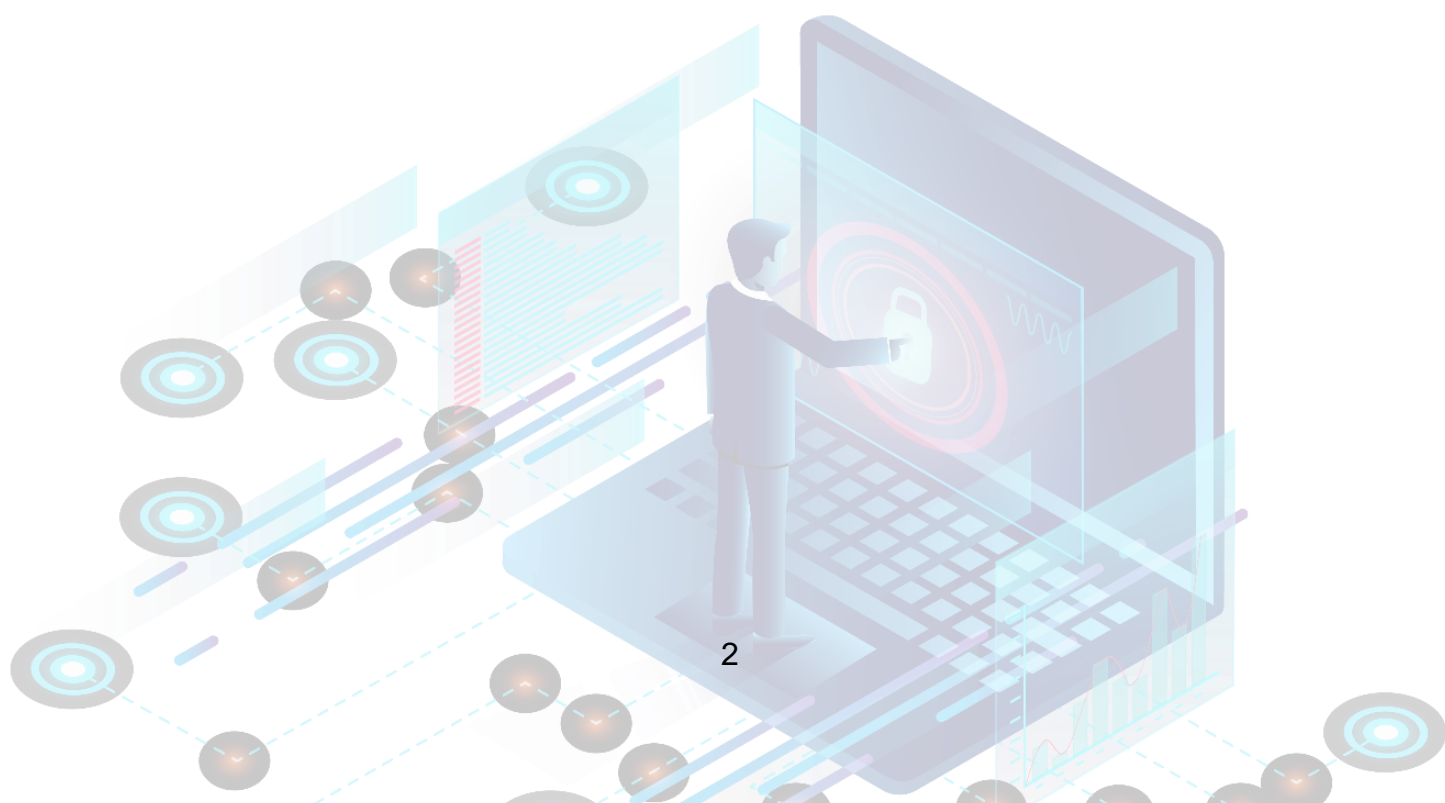
Policy Recommendations

Based on interviews and findings of this study, we propose the following policy recommendations to leverage artificial intelligence in order to reduce the footprint of the Federal Government of Pakistan, increase work efficiency and equip public offices with future-proof technology.

- Allocate budget to counter resource constraint in public-offices in order to digitize available public record.
- National Information Technology Board and the Ministry of Information Technology should create Intervention Teams to help create RPA Models based under national AI authority on the

requirements of different public offices. A pilot team should be assigned to the Chief Commissioner's Office for this purpose.

- Capacity building of Civil Servants should be done at the Civil Service Academies to introduce them to the concepts of RPA and AI for a generational change.
- Public-Private Partnership should be explored where the private sector can help create models of RPA for public offices to counter government's resource constraint.
- To equip the nation with these emerging technologies and secure the future, higher education institutes and think-tanks should be encouraged to research and explore areas of Artificial Intelligence



Introduction

Artificial Intelligence (AI), a rapidly evolving field of computer science, is revolutionizing various sectors, including government operations, by automating tasks, optimizing resources, and enhancing decision-making processes. Defined as the simulation of human intelligence in machines, AI enables computers to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and perception¹. One of AI's most promising applications is reducing the footprint of governments, allowing for more efficient, effective, and sustainable governance. This transformation has the potential to lead to cost savings, enhanced service delivery, and increased citizen satisfaction, positioning AI as a crucial tool in modern governance.

Governments worldwide are increasingly recognizing the transformative potential of AI and are investing heavily in AI initiatives. According to McKinsey Global Institute, global government investments in AI-related projects amounted to over \$20 billion between 2016 and 2018². These investments reflect a growing commitment to leveraging AI for public sector efficiency, particularly in developed economies where governments have been at the forefront of AI adoption.

The Global Shift Towards AI in Government

Globally, governments are increasingly turning to AI to address complex administrative challenges, improve public service delivery, and optimize resource management. In the United States, for example, AI is used to streamline operations in healthcare, finance, and defence, to enhance efficiency and reduce costs³. Similarly, European countries are integrating AI into public services to improve transparency, reduce bureaucratic inefficiencies, and enhance citizen engagement. The European Union's AI strategy emphasizes the need for ethical AI, with a focus on privacy, data protection, and the reduction of government overheads⁴.

In Asia, countries like China, India, and Singapore are at the forefront of AI adoption. China's national AI strategy, launched in 2017, aims to make China the global leader in AI by 2030, with significant investments in AI research and development (Li et al., 2020). AI is being deployed across various sectors, including smart cities, healthcare, and law enforcement, to enhance public services and reduce government costs.

¹ Russell, s., & norvig, p. (2020). Artificial intelligence: a modern approach. Pearson.

² mckinsey global institute. (2019). Ai: the next digital frontier. New york.

³ executive office of the president of the united states. (2020). Ai for the american people. Washington, d.c..

⁴ european commission. (2021). Artificial intelligence: ethical guidelines for trustworthy ai. Brussels.

Singapore, known for its digital government initiatives, has integrated AI into public administration to improve service delivery, such as using AI algorithms to predict and manage public transport demand⁵.

In South Asia, the adoption of AI in government operations is gaining traction, driven by the need to improve public service delivery, enhance governance, and reduce operational costs. Countries like Pakistan, India, and Bangladesh are exploring AI's potential to address challenges ranging from economic development to social welfare.

Pakistan has started to recognize the potential of AI to modernize its public sector. The Pakistani government has launched several initiatives to promote AI adoption, including establishing AI research centers and developing AI-powered solutions across various sectors. For instance, Pakistan's Ministry of Information Technology and Telecommunication has been actively working on policies to integrate AI in public administration, aiming to automate routine administrative tasks and enhance decision-making processes⁶.

One notable example is the use of AI in improving healthcare delivery. The government is exploring AI-driven diagnostics and telemedicine solutions to bridge the gap in healthcare access, especially in rural areas. AI-powered platforms are being developed to manage patient data, predict disease outbreaks, and streamline hospital operations, which helps reduce the burden on government healthcare facilities⁷.

Similarly, in the education sector, AI is being used to enhance learning outcomes and streamline administrative processes. The introduction of AI-powered e-learning platforms during the COVID-19 pandemic highlighted the potential for AI to transform education delivery and reduce administrative costs associated with traditional schooling methods⁸. However, the adoption of AI in Pakistan faces challenges such as a lack of skilled workforce, inadequate digital infrastructure, and limited access to high-quality data.

⁵ govtech singapore. (2020). Smart nation: ai in public services. Singapore government.

⁶ Ministry of it and telecom, pakistan. (2021). National ai strategy: transforming governance. Islamabad: government of pakistan.

⁷ ali, s., & chaudhry, s. (2021). Ai in healthcare: a case study of pakistan's public sector. Journal of health informatics.

⁸ shah, a., & akhtar, m.

India's AI Strategy: A Model for Regional AI Adoption

India, one of the largest adopters of AI in South Asia, has positioned itself as a leader in leveraging AI for governance. The Indian government's AI strategy, "AI for All," emphasizes using AI to address challenges in agriculture, healthcare, and education while reducing government inefficiencies⁹. AI-driven platforms have been deployed to improve service delivery, such as in the Pradhan Mantri Jan Arogya Yojana (PM-JAY), a national health insurance scheme that uses AI to detect fraud, manage claims, and optimize resource allocation.

India's success in AI adoption offers valuable lessons for Pakistan and other neighbouring countries. The Indian government's approach to fostering public-private partnerships and investing in AI research and development has significantly accelerated AI integration into government services. By creating a robust ecosystem that supports AI startups and encourages innovation, India has managed to reduce its government footprint while improving service delivery and citizen engagement.

AI in Bangladesh: Leveraging Technology for Social Impact

Bangladesh is also exploring AI applications to enhance government efficiency and service delivery. The government has initiated several projects aimed at automating administrative processes, improving healthcare delivery, and enhancing public safety through AI-driven surveillance systems¹⁰. AI-powered platforms are being used to monitor traffic, manage public grievances, and streamline public sector operations, contributing to a more responsive and efficient government.

However, challenges such as limited access to funding, inadequate infrastructure, and a shortage of skilled professionals continue to hinder the full-scale adoption of AI in Bangladesh. Despite these hurdles, the government's commitment to digital transformation and AI-driven governance indicates a positive trajectory for future AI integration.

The adoption of AI presents a significant opportunity for governments in South Asia, including Pakistan and its neighbouring countries, to modernize their operations, reduce costs, and enhance public service delivery. While challenges such as infrastructure gaps, skill shortages, and regulatory concerns remain, the continued investment in AI research and capacity building can help overcome these barriers. By learning from regional and global best practices, South Asian governments can leverage AI to reduce their footprints, drive innovation, and build more sustainable

⁹ niti aayog. (2018). Ai for all: india's national strategy on artificial intelligence. New delhi.

¹⁰ bangladesh ministry of ict. (2021). Ai initiatives for public sector efficiency. Dhaka: government publications.

and efficient public administration systems. This paper explores how AI is being utilized to reduce government footprints in Pakistan, focusing on one governmental institute, and examines the challenges and opportunities associated with AI adoption in this.

Literature Review

As Artificial Intelligence integrates in the global digital network, its impact on public service delivery is becoming more evident. Government offices are exploring the use of AI across the world to reduce human resources as well as increase efficiency. Evidently, one of the numerous challenges of AI in government is that while citizens' trust may increase, it may also decrease due to a "violation of citizens' privacy or lack of fairness in using AI for public governance"¹¹. Governance as the activity to "make and enforce rules, and to deliver services." The delivery of that public service can be made more efficient in Pakistan by automating repetitive tasks and e-government systems¹².

Since resource is a constraint in developing countries, including Pakistan, AI in government can offer to relieve that resource from mundane and repetitive tasks¹³. Incorporating AI in public life can not only address problems of resource constraints but help scale operations and standardize delivery systems¹⁴. However, despite the numerous advantages of AI in public life, it has its share of challenges, especially for developing countries where digitisation has yet to implement across the board.

Zuiderwijk et al., (2021) highlights some of these challenges as: "data challenges; organizational and managerial challenges; skill challenges; interpretation challenges; ethical and legitimacy challenges; political legal and policy challenges; societal and social challenges; and economic challenges." An important step to

¹¹ zuiderwijk, a., chen, y.-c. And salem, f. (2021) 'implications of the use of artificial intelligence in public governance: a systematic literature review and a research agenda', *government information quarterly*, 38(3), p. 101577. Doi:10.1016/j.giq.2021.101577.

¹² fukuyama, f. (2013). What is governance? *Governance: an international journal of policy, Administration, and institutions*, 26(3), 347–368. <https://doi.org/10.1111/Gove.12035>.

¹³ kuziemski, m., & misuraca, g. (2020). Ai governance in the public sector: three tales From the frontiers of automated decision-making in democratic settings. *Telecommunications policy*, 44(6), 101976. <https://doi.org/10.1016/j.Tel.2020.101976>.

¹⁴ dwivedi, y. K., hughes, l., ismagilova, e., aarts, g., coombs, c., crick, t., ... eirug, a. (2019). Artificial intelligence (ai): multidisciplinary perspectives on emerging Challenges, opportunities, and agenda for research, practice and policy. *International Journal of information management*, 101994. <https://doi.org/10.1016/j.Ijinfomgt.2019.08.002>.

implement AI in the government sector is to digitize the available record. Since AI is highly dependent on the data that it is built upon, the quality of data can lead to "biased or skewed AI algorithms' outcomes"¹⁵.

Among many of AI benefits for citizens and public service delivery are its ability to "provide emergency response, enable custom and low-cost education, detect fraud and corruption, improve crime reporting, predict and preempt social services interventions, informing proactive repairs of infrastructure, and anticipate cyber-attacks and personal information loss on public websites"¹⁶. However, the implementation of AI in providing faster and more efficient government services to the citizens can also increase fears of unemployment, creating a resistance among workers in adopting these technologies.

And while the concern of job automation and the "rise of robots," may give rise to speculation about increased unemployment, such fears are not new - a "LIFE Magazine cover from July 1963 grimly proclaims, 'Automation's really here; jobs go scarce - point of no return for everybody."¹⁷. Even though AI may replace repetitive low-skilled jobs, history has shown that when certain "profession becomes unneeded, other job opportunities emerge"¹⁸. Increased efficiency, faster growth and rising economic opportunities can lead to rising employment as well.

In Pakistan's case, artificial intelligence can be implemented to streamline government processes and reduce inefficiencies. For example, Robotic Process Automation can be used to automate repetitive service delivery tasks in the Chief Commissioner's Office. According to (Khalil, 2024), "AI can aid in legal research, evidence standards, and sentencing, offering predictive capabilities and streamlining routine case management." This can, the author argues, "restore public trust and efficiency in Pakistan's judiciary, paving the way for a modern, digital legal system."¹⁹

According to the Government AI Readiness Index 2022, Pakistan has an AI index of 40.22 compared to the US, which has an index of 85.72, India with 63.67, and

¹⁵ janssen, m., brous, p., estevez, e., barbosa, l. S., & janowski, t. (2020). Data Governance: organizing data for trustworthy artificial intelligence. *Government Information quarterly*, 37(3), 101493. <https://doi.org/10.1016/j.giq.2020.101493>.

¹⁶ hila mehr, artificial intelligence for citizen services and government, harvard ash center for democratic governance and innovation, 2017.

¹⁷ thierer, a.d., castillo, a. And russell, r. (2017) 'artificial intelligence and public policy', *ssrn electronic journal* [preprint]. Doi:10.2139/ssrn.3021135.

¹⁸ miller, b. And atkinson, r.d. (2013) are robots taking our jobs, or making them? - itif. Available at: <https://www2.itif.org/2013-are-robots-taking-jobs.pdf> (accessed: 13 october 2024).

¹⁹ khalil, f. "a vision for digitizing judicial processes and integrating artificial intelligence in pakistan's judiciary: enhancing efficiency and upholding judicial integrity." *int'l jl ethics tech.* (2024). ijlet.org

China with 70.84²⁰. As Pakistan increases its digital footprint, many public offices have seen a surge in not just adopting Information Technology but digitizing data. The next logical step in this is to implement RPA and AI to not only reduce operational costs but also improve efficiency and decision-making processes within the government.

Estonia has created a model digital society called e-Estonia, which can have lessons for Pakistan when it comes to implementing Information and Communications Technology (ICT) solutions on a national scale. Diaz (2021) suggests that the digitisation of the Estonian society did not happen overnight. The author divides this into four distinct categories; internet access for all (connectivity); secure digital infrastructure (cyber-security); increasing government transparency (transparency 2.0); and providing government services online (e-governance)²¹.

In Estonia, 99 percent of public services are online (Diaz 2021), with the government estimating that the provision of these online services have saved "844 years of working time"²². Among many of the services provided online, any citizen can register companies, new business or even non-profits at an Estonian government portal. As of 2020, Estonia has also incorporated the use of AI in its already successful model of online governance. According to Estonia's Digital Agenda 2030, approximately "80 AI projects have been implemented or ongoing"²³. It further highlights that increased efficiency has been achieved "in the public sector by means of AI and other modern routine automation technologies."

While "all procedures concerning the public sector can be carried out using virtual assistants in Estonia"²⁴, Pakistan is yet to present its National Artificial Intelligence Policy. As it has been discussed, an approach to implementing RPA is to first digitize data and public record. In case of Islamabad's Chief Commissioner Office, public service deliveries like the registration of firms and charities, the acquisition of domiciles, driving licenses, marriage and divorce certificates and various police

²⁰ nazeer, sara, and yousma gil. "embracing artificial intelligence challenges for public sector organizations in pakistan." *journal of contemporary studies* 12, no. 1 (2023): 35-52.

²¹ Diaz, j. "towards more-evolved democracy: an exploration of digital governance in estonia and the lessons it holds for strengthening democracy in the united states." (2021). [html]

²² seo, hyungjun, and seunghwan myeong. 2020. "the priority of factors of building government as a platform with analytic hierarchy process analysis." *Sustainability*, july.

²³ ministry of economic affairs and communications. 2021. "estonia's digital agenda 2030."

[https://www.mkm.ee/sites/default/files/documents/202204/digi%
c3%bchiskonna%20arengukava_eng.pdf](https://www.mkm.ee/sites/default/files/documents/202204/digi%c3%bchiskonna%20arengukava_eng.pdf).
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c3%bchiskonna%20arengu_ava_eng.pdf](https://www.mkm.ee/sites/default/files/documents/202204/digi%
c3%bchiskonna%20arengu_ava_eng.pdf).

²⁴ Ministry of economic affairs and communications. 2021. "estonia's digital agenda 2030."

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c3%bchiskonna%20arengukava_eng.pdf](https://www.mkm.ee/sites/default/files/documents/202204/digi%
c3%bchiskonna%20arengukava_eng.pdf).

services like character certificates, tenant registrations and employee registration can all be automated through digitisation and RPA/AI-based solutions.

Initially policymakers may exercise caution to restrict AI technologies in fear of the perceived risks posed by these innovations to the safety, welfare and market risks. Although, a look at the early US Internet Policy lays rest to these fears by suggesting that these revolutionary industry's potential can be explored along with addressing the concerns²⁵. It is important to address concerns earlier on in the policy-making process, especially in the public sector where sharing and transfer of data itself raises many questions. Research has shown that there is lack of best management practices concerning AI use in the public sector. It is necessary to ensure that AI policies are backed by proper scholarship and research, as otherwise this could lead to significant ethical failures that could adversely impact governmental functions and society²⁶.

Governments have to be convinced that adoption of AI not only reinforces the advantages mentioned but above all it potentially addresses a major problem which is environmental sustainability, reducing self-interests and small collectives²⁷. This factor is an important consideration when configuring AI in government structures especially in organizations that primarily have public dealing such as the Chief Commissioner's Office in Islamabad, Pakistan.

De Sousa (2019) argues that even though the results of AI technologies have to be systemized it has been one of the critical strategies adopted by several countries around the world at different levels of decision-making²⁸. One such example is The European Union's "Digital Europe Programme" which has an estimated budget of €8.2 billion between 2021 and 2027. The Government of Pakistan has also made an effort to embrace AI and the Planning Commission of Pakistan in its "Vision 2025" emphasized digitalization through the "Knowledge Revolution" by connecting citizens and the government through E-governance, E-health, E-Commerce and E-Education (ibid).

²⁵ thierer, a.d., castillo, a. And russell, r. (2017) 'artificial intelligence and public policy', *ssrn electronic journal* [preprint]. Doi:10.2139/ssrn.3021135.

²⁶ zuiderwijk, a., chen, y.-c. And salem, f. (2021) 'implications of the use of artificial intelligence in public governance: a systematic literature review and a research agenda', *government information quarterly*, 38(3), p. 101577. Doi:10.1016/j.giq.2021.101577.

²⁷ nishant, rohit, mike kennedy, and jacqueline corbett. "artificial intelligence for sustainability: challenges, opportunities, and a research agenda." *international journal of information management* 53 (2020): 102104.

²⁸ gomes de souza, w., pereira de melo, e. R., de souza bermejo, p. H., souza farias, r. A., & oliveira gomes, a. (2019). How and where is artificial intelligence in the public sector going? A literature review and research agenda. *Government information Quarterly*, 36(4), 101392. <https://doi.org/10.1016/j.giq.2019.07.004>.

Therefore, introduction of AI related services in any public office, especially in the heart of the nation's bureaucratic structure could be a big step up in implementation of this strategy. In this regard lessons could be learnt from the Estonian digitalization of its public sector through innovations such as its e-Residence. The initiative's point of origin was the ambitious ideal of recruiting 10 million E-Estonians as part of the government's Digital Agenda 2020 in which the Estonian Cabinet "Prioritised the aim of increasing Estonia's international recognition in digital affairs"²⁹.

Why we Need AI to Reduce Government Footprints:

Pakistan is a country which is not very much technology driven. Most sectors, departments and areas still use old methods to circulate the data. One of the main aspects is public dealing which is most affected due to not having advanced technology in a government department. Therefore, this paper focuses on one of the government-level departments to implement the AI-driven technology to save time, increase efficiency and reduce human effort. This paper aims to give a framework for how Pakistan can implement AI technology at the government level. This paper specifically focuses on the *CHIEF COMMISSIONER* office to implement the automation of AI because of the intensity of public dealing in this office. A better framework will be provided in that area where the public dealing is happening daily, and the public is suffering from so many issues which can be solved by using AI.

"The Chief Commissioner's Office has also highlighted this issue, emphasizing a significant gap between the public and societal systems. Two major challenges in implementing an AI-based system in the Chief Commissioner's Office are a lack of trust and the absence of robust checks and balances. While online assessment systems are undeniably more efficient, their implementation in the Deputy Commissioner's (DC) office has proven to be challenging. The main problem would be the political hurdles blocking the installation of advanced systems. The DC office further added that the integration of artificial intelligence in the public sector could be greatly facilitated through proactive collaboration with the private sector. Moreover, the government must formulate a comprehensive strategy for AI integration, which would accompany an efficient AI workforce. Punjab is a very good example as it has successfully established digitisation systems at the provincial level. In a similar way, the DC Office Islamabad expects that similar digitisation strategies will be adopted in the capital (Deputy Commissioner Islamabad)"³⁰

²⁹ kotka, taavi, carlos vargas, and kaspar korjus. "estonian e-residency: redefining the nation-state in the digital era." university of oxford cyber studies programme working paper 3 (2015).

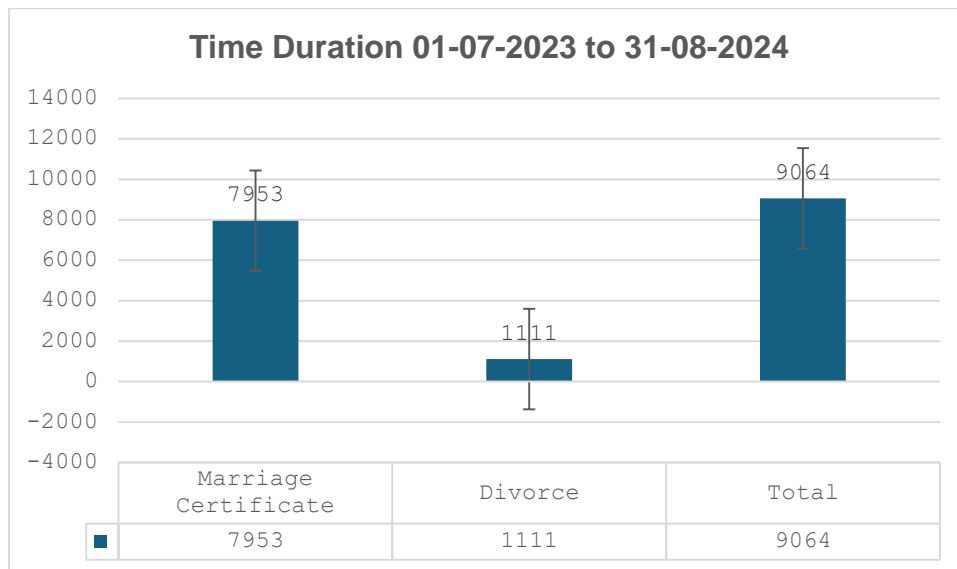
³⁰ an interview from deputy commissioner islamabad

Some of the followings are as:

Category	Details
Islamabad Transport Authority	Includes data on registered commercial vehicles, taxis, Food Panda, Bykea, rickshaws, school vans, online registration, fines, and license data integration.
Arms Dealers Inspection App	Inspection and management of arms dealers.
Security Companies	Details of employees, salaries, and weapons records.
Petrol Pumps	Daily data and stock availability for petrol pumps and LPG sellers.
Domicile Application Verification	Verification of domicile applications.
Marriage/Divorce Certificate	Issuance and management of marriage and divorce certificates.
International Driving License Online Application	Application process for international driving licenses.
Labour and Industry Department	Operations and data management for the Labour and Industry Department.
IFA System	Integrated Financial Accounting (IFA) system.
E-Stamping	Implementation of e-stamping for legal documents.
Excise Department Violations	Monitoring and addressing excise department violations.
Assistant Commissioner (AC) Offices	Providing services similar to civil courts.
Price Control and Complaint Mechanism App	App for monitoring price controls and handling complaints.
One Link Deposit	Handles domicile certificates, arms licenses, and birth certificates.
Website Development and Integration	Development and integration of ICT websites.

Source: Chief Commissioner Office Islamabad

Marriage & Divorce Certificate

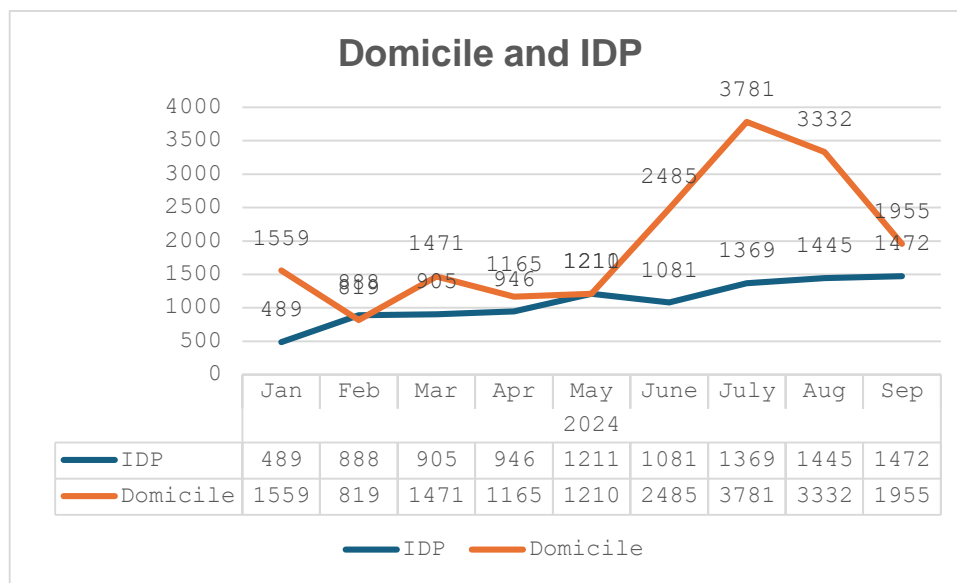


Source: DC Office Islamabad, Databank

The graph illustrates the number of marriage certificates and divorces issued between **01-07-2023** and **31-08-2024**, along with the total count. During this period, a total of **7953** marriage certificates were issued, significantly outnumbering the **1111** divorces. This indicates that the number of marriages was almost seven times higher than divorces. The total number of marriage-related documents processed, combining both marriages and divorces, stands at **9064**. Each category in the graph is accompanied by error bars, suggesting some degree of variability or uncertainty in the data, although the differences between the categories remain pronounced, with marriages clearly dominating the figures. The need for AI automation in processing marriage certificates and divorce records is driven by several factors that can enhance efficiency, accuracy, and scalability. As shown in the graph, with a total of 9064 records processed in a short period, the increasing volume of data makes it challenging for manual systems to manage effectively. AI can automate data intake, processing, and organization, significantly reducing human workload and minimizing errors. The error bars in the graph suggest some variability in the data, which AI can help eliminate by ensuring more accurate data entry and processing. Additionally, AI can drastically improve processing times by quickly validating documents and issuing records in real-time, leading to faster service delivery. Scalability is another key advantage, as AI can handle fluctuations in demand without delays, ensuring smooth operations during peak times. Moreover, AI can manage records more efficiently by categorizing and archiving them for easy retrieval, all while enhancing data security with advanced encryption to protect

sensitive information. AI also offers the ability to analyse data trends, providing valuable insights and predictions for future social patterns or policy decisions. Lastly, automating these processes results in cost savings by reducing the need for manual labour, allowing resources to be allocated to other essential services. Overall, AI automation improves accuracy, efficiency, and security in managing marriage and divorce records, making it essential for modernizing document processing systems.

Domicile and IDP

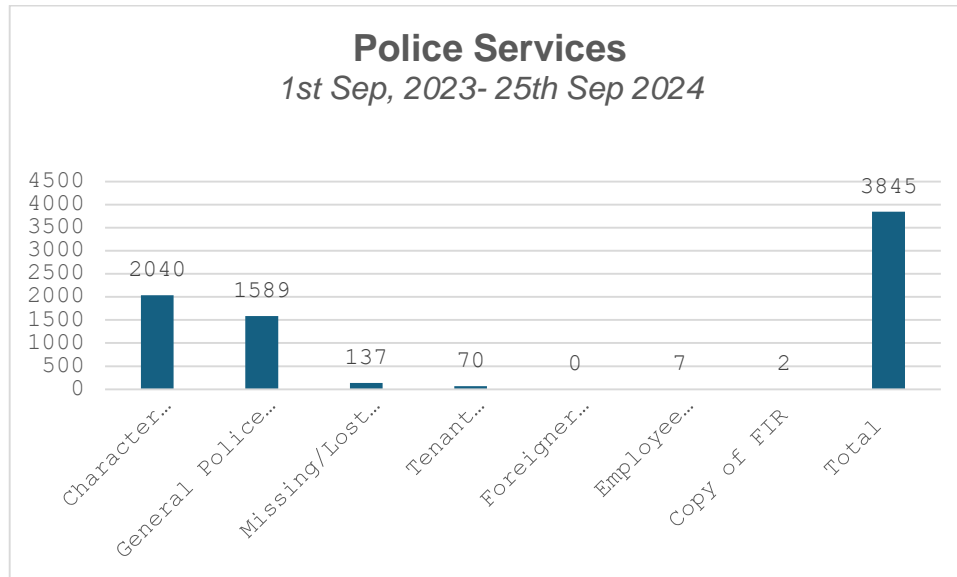


Source: DC Office Islamabad, Databank

The graph illustrates the monthly issuance of Domicile and IDP documents from January to September 2024, with the blue line representing IDP and the orange line representing Domicile. The issuance of IDPs shows a steady increase from 489 in January to 1472 in September, with no extreme fluctuations, suggesting a consistent demand or processing capacity for IDP documents. On the other hand, Domicile issuance experiences significant variation, starting at 1559 in January, dipping to 819 in February, and then rising to a peak of 3781 in July before declining to 1955 in September. This fluctuation suggests that there are seasonal or other factors driving the demand for domicile certificates, particularly the sharp increase in the middle of the year. The difference between Domicile and IDP issuance narrows over time, with IDP issuance steadily increasing and Domicile issuance dropping after its July peak. The steady growth in IDP applications and the fluctuating nature of Domicile issuances indicate that automation would be beneficial in managing unpredictable

surges and ensuring efficient processing. This would help maintain accuracy, reduce manual workload, and meet the growing demand for these documents.

Police Services



Source: DC Office Islamabad, Databank

The graph represents the various police services provided from 1st September 2023 to 25th September 2024, detailing the number of cases processed under different service categories. The largest number of services provided were for Character Certificates, with a total of 2040 cases. Following that, General Police Certificates accounted for 1589 cases. Missing/Lost Report services were significantly fewer, with 137 cases, and Tenant Registration had 70 cases processed. There were no recorded instances of Foreigner Registration, while Employee Registration accounted for 7 cases and Copy of FIR services had just 2 instances. The total number of all police services provided during this period amounted to 3845. This graph highlights a clear concentration of services in Character Certificates and General Police Certificates, with relatively few cases in the other categories, suggesting that these two services are in the highest demand within the police department. AI automation can greatly enhance the efficiency and accuracy of processing police services, especially high-demand ones like **Character Certificates** and **General Police Certificates**, which dominate the workload. By automating data validation, cross-referencing, and form filling, AI reduces processing time and errors. It also manages varying volumes by scaling operations, ensuring faster service even during peak periods. Additionally, AI improves security by verifying identities and

automating record-keeping for better management and retrieval. Furthermore, it allows citizens to submit and track requests online, freeing up police personnel for more critical tasks, while predictive analysis helps allocate resources efficiently. In short, AI automation streamlines operations ensures accuracy and enhances service delivery for both high and low-demand police services.

For all these reasons, AI must be incorporated at the level of Pakistan government offices for the enhancement of productivity and efficiency, as well as for most considerably streamlining processes. AI adoption can make Pakistan extremely advanced; it captures foreign investments and nurtures the spirit of innovation in many sectors so that there can be sustainable development and an improved quality of life for its citizens. Moreover, that the country can become advanced in adopting AI technologies, attract foreign investments, and promote innovation across different areas to achieve sustainable development and a better quality of life for its citizens.

Case studies of successful AI- governmental Model

Several countries use advanced technology, such as artificial intelligence, to reduce their government footprints and make work more efficient. This paper discusses Estonia's e-governance system as one of the best examples for Pakistan of how Pakistan can also rely on artificial intelligence to make public dealing more efficient.

With the help of AI Estonia has adopted a full array of e-government services like e-identification, e-signatures, e-tax filing, e-medical prescriptions and even e-voting through the Internet. These services are popular among Estonian people, they increase convenience and have efficient results.

The success of Estonia is closely connected with e-ID or electronic identification card, which works as a common personal identification device, both, for identification in the physical and the digital world. The biometric ID cards that Scheer et al (2002) claim have been in circulation since 2002 have since evolved into key identity cards for accessing electronic services. Despite the effective protection of personal data, it also guarantees the possibility of data exchange between different authorities.

The Estonian X-Road is a distributed transaction processing system that provides methods and protocols for secure data exchange between governmental and other private institutions. This leads to the removal of redundancy in data storage so that institutions offering multiple services do not have to duplicate such services. Consequently, facilities introduced under the X-Road structure bring about critical fiscal savings since digital queries eliminate traditional services that used to demand a lot of administrative efforts from both civil servants and citizens.

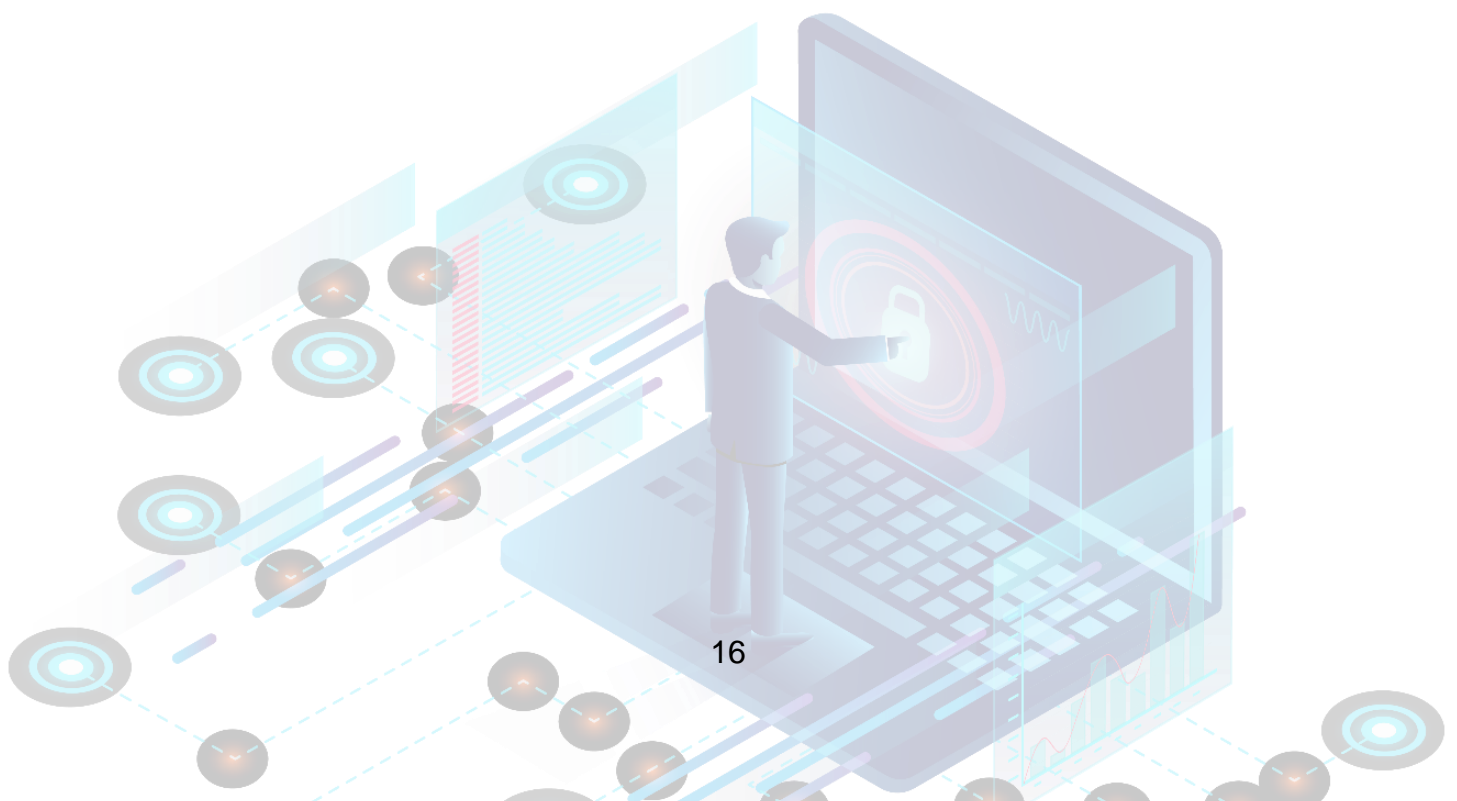
Different governmental and private actors have established a large number of e-services based on the digital identification and X-Road environment. These services include among others voting through the Internet, and access to health records services that offer real-time advantages to citizens. One is that internet voting has been implemented and about a third of voters have cast their vote online in recent polls.

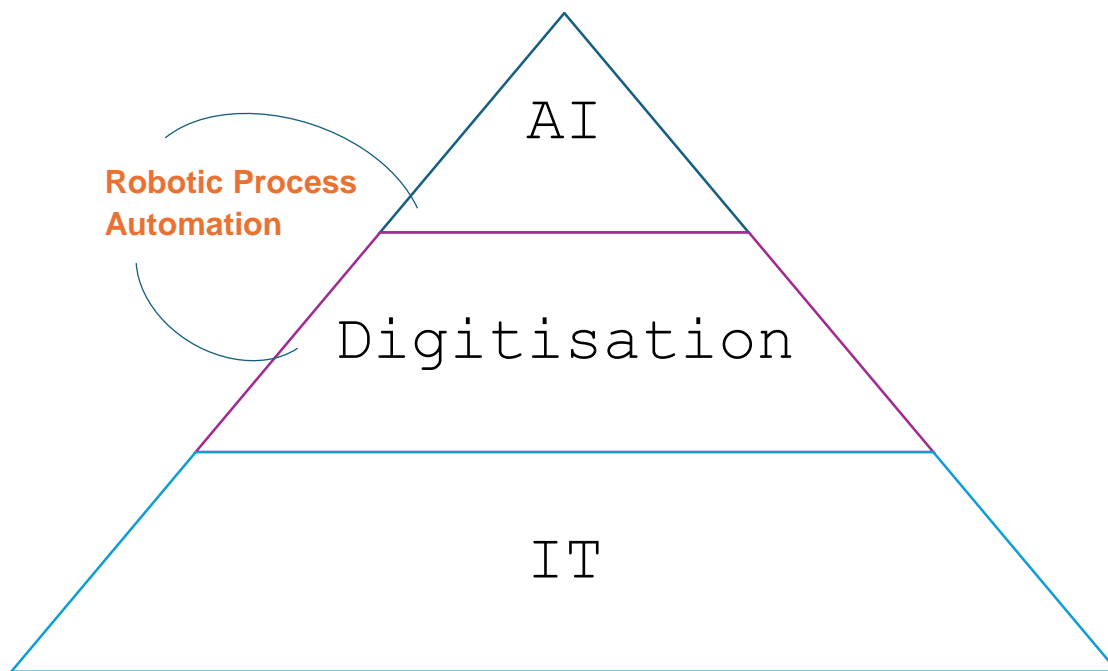
The consequent formation of an e-government ecosystem has aimed at enhancing effectiveness and reducing costs. In the case of for instance, in 2014, over 3,200 years of work time was saved in the formats of X-Road digital interaction. Voter turnout has been on the rise since the implementation of internet voting and Estonian e-governance services have improved the ways people interact with the government.

A key characteristic of the e-governance system in Estonia has been based on technology solutions reinforced by proper legislation and mainly Tri-Lateral public-private partnership.

Triangulation Matrix for Artificial Intelligence:

AI has a vast regulatory framework which starts with information technology. Further steps that lead the country towards AI are digitisation and robotic process automation (RPA). After RPA, AI comes which can change the whole dimensions of how work is done. AI can enhance the work more efficiently and in less time. Machine learning and Deep learning are also involved in these steps. For example, in 2017 chat GPT became known worldwide which changed the way of thinking and the way of doing work for humans and it has a huge impact on human society. Chatbots nowadays work on these frameworks too.





Source: Author's Construct

This diagram illustrates the hierarchical framework of digital transformation, comprising three key players: IT and digitisation, with AI as the middle ground, and which is also the link between non-manual, Cognitive Automation such as Robotic Process Automation (RPA). At the base is IT (Information Technology) supports basic technology needs like hardware, software and networks that are core to companies' digital capabilities. On this premise, Digitisation converts traditional work processes to digital form, allowing optimization and metrics adoption. SAP at the top, which stands for self-aware processing, uses digitised data for intelligent work such as predictive analysis and decision-making, making it the ultimate level of improvement. RPA is between Digitisation and AI as it tends to improve the business workflow by performing repetitive processes, thus building a bridge to full AI integration. Each of these layers is integrated into the next to collectively form a coherent system such that IT makes more of digitisation to support AI, digitisation forms more automation to support RPA and industries reap efficiency and intelligence.

“Before embedding AI in a system, three important steps need to be completed. The first step is to integrate information technology into national policies. The second step focuses on digitizing data and converting it into easy-to-use formats. The third step is to create a connection between digitalization and AI to bridge the gap and ensure a good match. The intelligence model provides a good foundation for

continuous development and one-time investment by the government. The cost of using AI depends on many factors, including software costs, maintenance costs, programming, and construction. Fees also vary depending on the specific regulations of the office or department that may require permits. In addition to financial considerations, the country needs to establish a regulatory framework that will benefit the use of AI and help reduce the government's workload. One of the main problems in the use of cognitive models is the resolution of ethical issues. Ethics and privacy are mandatory and should be prioritized to establish trust and protect public data throughout the AI integration process.” (Ali Humayun)³¹

Guidance Framework for AI-Driven Governance in Pakistan

Objective

To provide a structured pathway for leveraging Artificial Intelligence (AI) to modernize governance, reduce the government's operational footprint, enhance time efficiency, and improve service delivery in Pakistan's public sector, particularly in high public-dealing departments like the Chief Commissioner’s Office.

Main Steps	Sub steps	Practical implication
Foundational Steps	Data Digitisation IT Infrastructure Development Ethical AI Policy	Order digitisation of records in a government office starting with those that generate many requests, such as marriage certificates, domicile, and police clearance certificates. Focus on safe and efficient IT solutions with the cloud storage feature and have reliable connections across the country. Partner governments should create rules that cover; privacy, fairness, and transparency, which include guidelines that reduce the chance of ethical problems such as algorithmic discrimination.
Institutional Arrangements	National AI Authority Public-Private Partnerships	One of the measures may be the organization of an effective central regulatory agency for the management of AI or programs that are related to the development of artificial intelligence

³¹ chief technical officer (cto), blinkitech technology

	Chief Data Officers (CDOs)	technology that will also oversee the requirement of capacity-building programs that will be instituted to support AI. Source partnerships with private firms, support AI startups and establish CDOs in important departments for data quality and data integration.
Phased Implementation	<p>Phase 1: IT Infrastructure Setup</p> <p>Phase 2: RPA Deployment</p> <p>Phase 3: AI Integration</p>	Adopt Estonia X-Road-like connections for the interconnections or interconnections of various departments and incorporate Protected Digital ID to allow the citizens access to the e-services. The first areas of focus should be dominantly requested services entropy conducive to automation such as domicile issuance and police certificate. Employ an AI platform for predictive modelling, for identifying resource requirements, for interactive and near real-time decisions, and for embedding or chatbot-like asks to further improve citizen services.
Capacity Building	Training Programs Citizen Awareness Campaigns	Teach the principles of Artificial Intelligence for the government employees where they enhance knowledge in data security, ethic use and practicality of applications. Engaging citizens on the benefits of AI and the requirement to undertake sensitization of the risks that come with AI applications such as job loss and invasion of privacy.
Efficiency Enhancements	Document Processing Automation Data Interoperability	Develop an efficient computerized system for issuing out documents to reduce blunders and time wastage. Implement e-ID systems for easy identification and verification process, abreast with a central repository for the record to improve information exchange for better accuracy and elimination of duplicity.

<p>Citizen Feedback Mechanism Pilot Projects</p>	<p>AI Feedback Loops</p>	<p>Create feedback channels for citizen complaints on the AIs to improve the systems’ design on the way forward.</p>
<p>Drawing Inspiration</p>	<p>Chief Commissioner’s Office Evaluation Metrics</p>	<p>Automate firm registration tenant verification, and character certificates, and use the findings and results for policy formulation. Measure success by the optimisation of the processing times, costs, as well as satisfaction of the citizens.</p>
<p>Drawing Inspiration</p>	<p>Estonia's E-Governance Model India’s “AI for All” Strategy</p>	<p>Learn lessons from Estonia’s e-governance particularly X-Road on secure information exchange, e-ID platforms and India especially current approach to AI that involves partnerships with private sectors and solutions that can be easily scaled.</p>

“In Pakistan, integrating AI into government is the beginning of a transformative innovation that will significantly reduce human effort while enabling the company to operate more efficiently. This integration will save time, reduce costs, and significantly reduce operational issues. However, the main challenge in implementing AI into government systems is the lack of large language models (LLMs) in Pakistan. This challenge can be overcome by sourcing these designs from other countries. Public-private partnerships will be needed to facilitate such purchases, as the private sector has the financial resources to purchase related structures and domains, so these partnerships provide great benefits to the government”. (Dr Basit Raiz)³²

Regulatory Framework for AI-Driven Governance in Pakistan

1. Foundational Principles

They should set a policy that every single governmental organisation should adopt digitized record and work processes within a specified period to support automation and artificial intelligence. Restore the public confidence in the administration by using AI techniques that aim at establishing transparency, availability, and account of setups. They pointed to four forms of ethical/legitimacy challenges and called for the definition of clear rules on privacy, fairness as well as non-discrimination concerning AI services.

³² CEO and founder of forloops, pakistan

2. Institutional Setup

Establish an AI Supervisory Authority, responsible for overseeing the AI adoption in government sectors concerning the standards and organizing the training. Promote partnerships with AI technology providers, innovative startups, and academic institutions to enhance development and reduce costs. Creation of CDOs (Chief Data Officers) to work in significant ministers responsible for data digitalization, data quality and AI model implementation across the large departments.

3. Implementation Phases

Phase 1: IT Infrastructure and Connectivity

Enhance IT infrastructure nationwide, focusing on secure digital systems and interdepartmental connectivity (similar to Estonia's X-Road). Ensure affordable and universal internet access to support e-governance and digital records.

Phase 2: Digitisation of Public Services

Begin with high-demand services such as marriage and divorce certificates, domicile and IDP issuance, and police services (character certificates and general police certificates). Adopt secure cloud platforms for data storage and retrieval.

Phase 3: Robotic Process Automation (RPA)

Deploy RPA for repetitive and rule-based tasks like data validation, document issuance, and tracking requests, reducing human effort and errors.

Phase 4: AI Integration

Implement AI algorithms for predictive analytics, resource allocation, and decision-making. Use AI-powered chatbots and virtual assistants for citizen interactions to handle queries and complaints in real time.

4. Capacity Building

Work on setting AI skill development programs for government personnel to enable easy implementation and running of the innovations. Promote state and civic consciousness regarding protecting and storing personal and state-owned information among people.

5. Governance and Accountability

A new approach to AI governance requires these systems to be audited periodically to assess their outputs for bias, effectiveness, and optimality. AI-particular legislation should regulate the sharing of data used to train models, usage of AI, and misuse for the rightful use AI.

6. Service Efficiency Enhancements

Online digital modes should be incorporated for frequently sought services such as domicile certificates, police verifications, etc., and ensure these require the least processing time. Synchronise data transfer in the various departments barely repeating their processes to speed up the work.

7. Citizen Feedback Mechanism

Develop means through which people can input to the AI system so that developers can take corrective action on the problems such as job loss and privacy breaches.

8. Benchmarks and Key Performance Indicators (KPIs)

Stakeholders should set quantifiable goals (For example, cutting the time it takes to issue documents in half over two years). Track and communicate efficient cost savings cut by the administration through AI and RPA. Survey the clients frequently to determine advancements in providing public services.

10. Pilot Projects for Proof of Concept

Resume automation of services such as firm registration, tenant registration and police verification services and start pilot projects in the office of Chief Commissioner Islamabad. To build AI policies, which can be implemented across the country, the above results need to be further refined.

Artificial Intelligence has become the standard for both reliability and efficiency in many industries, promising unparalleled levels of accuracy, speed, and adaptability in decision-making and business operations. This makes an AI system dependable because it's capable of analysing large datasets with accuracy, detecting patterns, and developing meaningful insights to decrease human error. Automation increases efficiency by helping to optimize workflows, reduce operational costs, and focus resources on strategic activities. In addition, the effective deployment of artificial intelligence requires a clear framework covering technical, organizational, and ethical considerations, with strong data governance and scalable infrastructure,

constant monitoring, and a trained workforce, in order to maintain and improve the AI systems. Some of the necessary ingredients in building trust and ensuring accountability include definitive policies, openness, and active participation of stakeholders. An all-inclusive implementation framework would not only maximize the potential of artificial intelligence but also address questions of bias, security, and adaptability, thus making the incorporation into current systems both sustainable and meaningful.

“Human intervention becomes crucial to monitor automated processes and correct any mistakes that might be made. Considerable financial investment is required in the development of Large Language Models (LLMs) and related AI technologies. Another important aspect is the availability and accuracy of data, which are essential preconditions for any successful deployment of AI solutions. Comprehensive training programs should be conducted to ensure effective implementation. After such programs, predictive analysis will be necessary in order to assess their effectiveness in facilitating the adoption and integration of AI.” (Iva Gumnishka³³, Founder, Humans in the Loop)

Conclusion

Artificial Intelligence is the need of the hour. It is evident from the study that practical application of emerging technologies has been successfully implemented in various parts of the world. Many countries are now not only doing research in Artificial Intelligence, but introducing it into the public sphere for efficient use of resources as well as reducing the resource burden.

While digitisation is the first step, Artificial Intelligence in public offices can be implemented by first introducing Robotic Process Automation. Part of the overarching emerging technologies, RPA is rules-based as opposed to learning-based AI technology. RPA follows pre-defined instructions to perform tasks and cannot “learn” or “adapt” from experience. AI on the other hand is the next step, where its algorithms allow it to learn from data.

Where RPA works best with structured data, AI can handle unstructured data as well. The scope of application is also slightly different, where RPA is ideal for repetitive routine tasks, AI can be utilized for a wide range of complex problems that can help decision makers recognize patterns in data to make key strategic decisions.

It has been observed that Pakistan lacks digitisation of its public record in many offices, however, manual record is maintained. In such a scenario, the

³³ interview from iva gumnishka, founder, humans in the loop

recommended solution is to first digitize the data, in the case of this empirical study, the various sections of the Chief Commissioner's office, such as police verification records, arms license data and domiciles should be sorted, aggregated and stored in a central repository.

It is only after this first step of data digitisation has occurred, can public offices move towards the second step of Robotic Process Automation. It has been observed that any repetitive task can be automated through the use of Information Technology and Artificial Intelligence. This leads to increased efficiency, minimal chance of corruption and the freeing up of human resource.

However, based on our findings, it is evident that many public offices lack the capacity, training and resource to implement such solutions. Not only do they lack the funding, they are also restrained by a lack of technological awareness and time. In such a case, the Federal Government through its various departments and the Ministry of Information Technology should take the lead in implementing these solutions to secure the need of the future.

A task-force or a national committee on artificial intelligence should be formed with the task of identifying which offices and departments are best suited for these new technologies; which data is available; and how it can be digitized to implement RPA and AI solutions on a national scale.

Integrating Artificial Intelligence in the public offices of Pakistan will have a dual impact of increased efficiency and reduced human resource. The nature of many repetitive jobs will eventually change, which is why it is recommended that timely trainings and capacity building of the available workforce is implemented on a national scale.

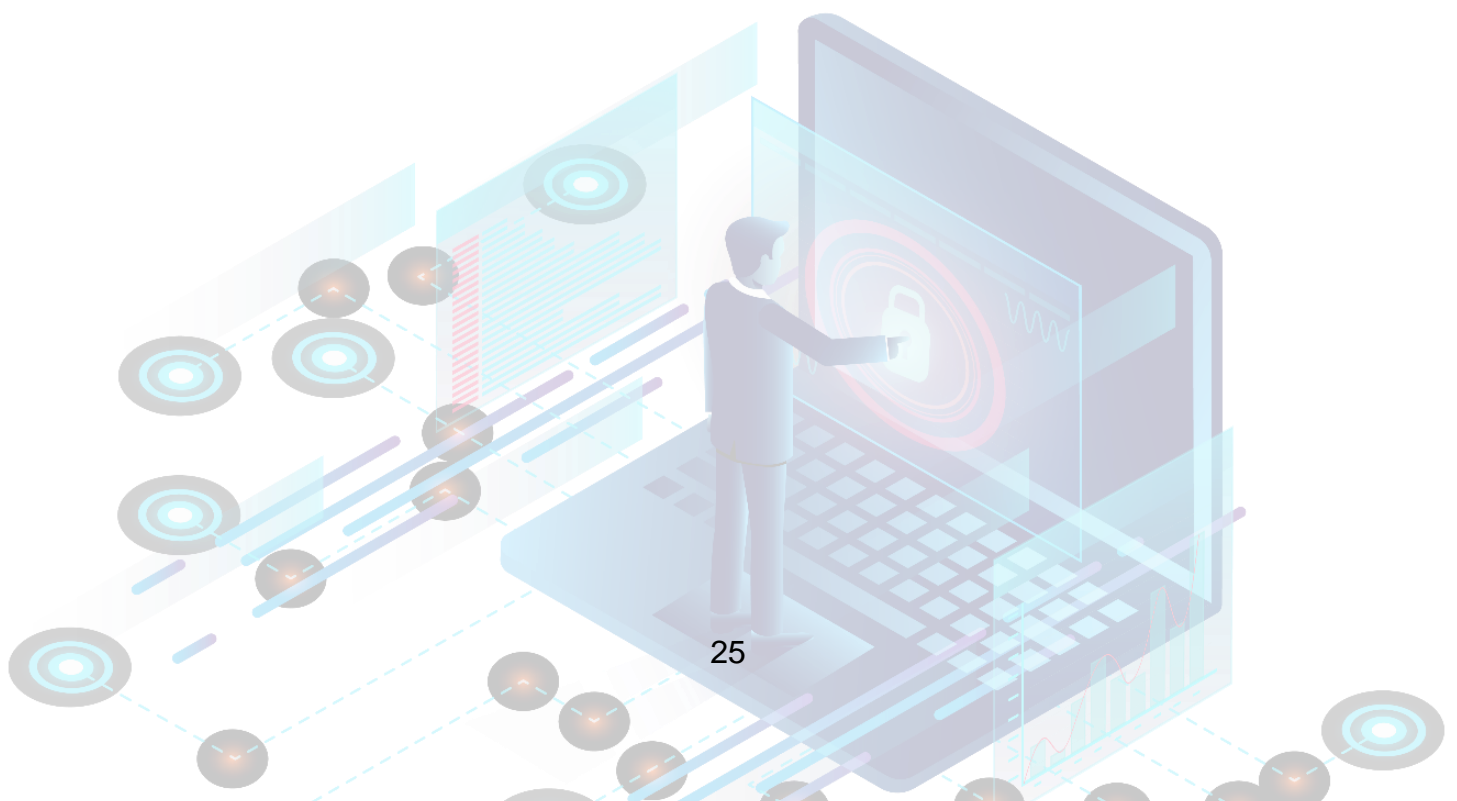
Policy Recommendations

Based on interviews and findings of this study, we propose the following policy recommendations to leverage artificial intelligence in order to reduce the footprint of the Federal Government of Pakistan, increase work efficiency and equip public offices with future-proof technology.

- Allocate budget to counter resource constraint in public-offices in order to digitize available public record.
- National Information Technology Board and the Ministry of Information Technology should create Intervention Teams to help create RPA Models based under national AI authority on the requirements of different public

offices. A pilot team should be assigned to the Chief Commissioner's Office for this purpose.

- Capacity building of Civil Servants should be done at the Civil Service Academies to introduce them to the concepts of RPA and AI for a generational change.
- Public-Private Partnership should be explored where the private sector can help create models of RPA for public offices to counter government's resource constraint.
- To equip the nation with these emerging technologies and secure the future, higher education institutes and think-tanks should be encouraged to research and explore areas of Artificial Intelligence.



Action Matrix

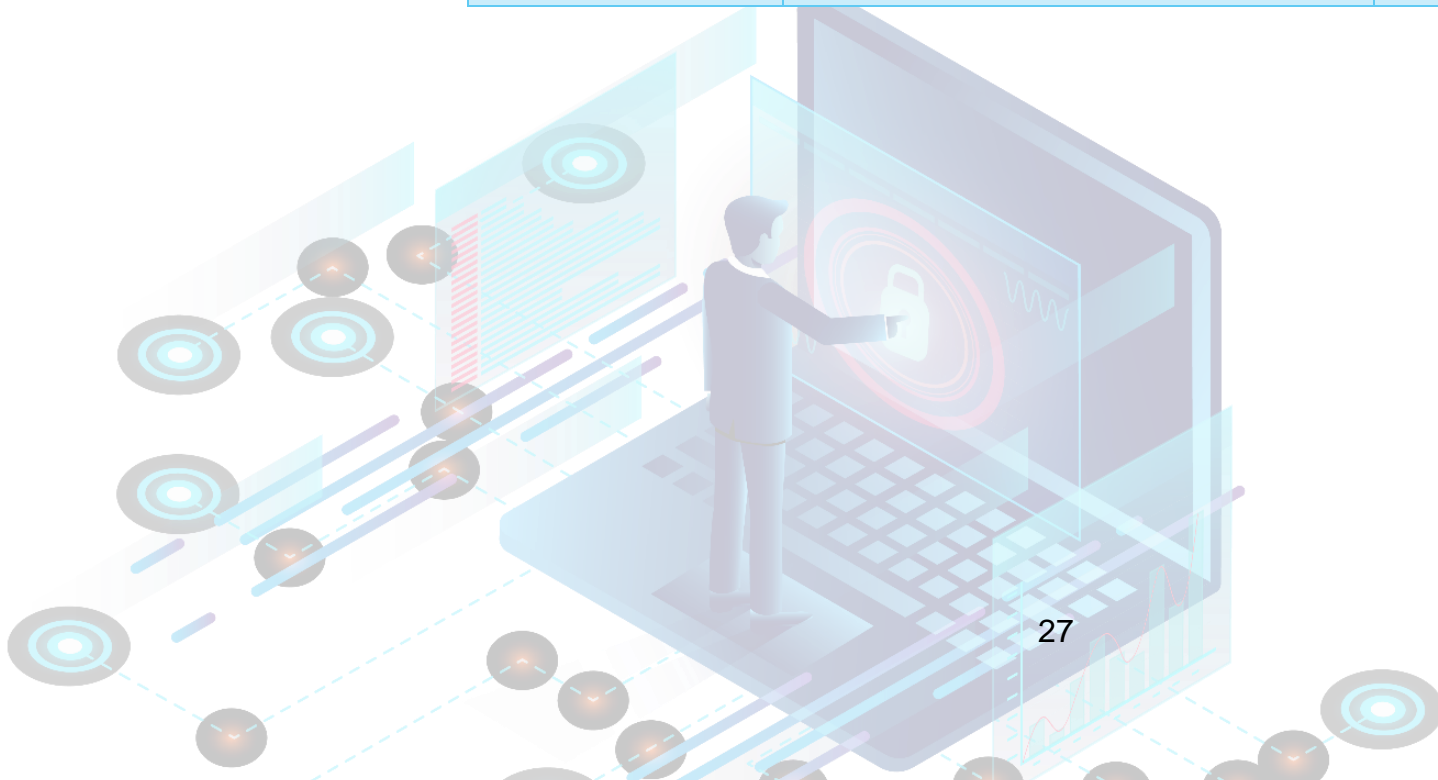
Action Area	Pathways to Solution	How to Implement Each Solution	Actor Responsible	Implementation Timelines
Data Digitization	Convert existing public records into digital formats.	1. Conduct an audit to identify manual records.	Chief Commissioner's Office, Ministry of IT	6-12 months
		2. Digitize high-demand records such as marriage certificates and domicile issuance.		
		3. Implement secure cloud storage.		
IT Infrastructure Development	Develop nationwide IT infrastructure and connectivity.	1. Establish interdepartmental connectivity similar to Estonia's X-Road.	Ministry of IT, National Telecom Authority	12-18 months
		2. Enhance internet accessibility across urban and rural areas.		
		3. Deploy cybersecurity measures.		
RPA Deployment	Automate repetitive and rule-based processes.	1. Identify repetitive tasks such as document issuance.	Ministry of IT, Public Offices	6-12 months after digitization
		2. Develop RPA models tailored to departmental needs.		
		3. Train staff for RPA adoption.		

Leveraging IT to Reduce Government Footprint

AI Integration

Implement AI systems for predictive analytics and decision-making.	1. Develop AI-powered chatbots for citizen interactions.	Ministry of IT, Academia, Industry	12-24 months after RPA
	2. Use AI algorithms for resource allocation and real-time service delivery.		
	3. Test and refine AI models.		
Train civil servants and engage citizens in AI awareness.	1. Conduct training programs on AI ethics, data security, and application.	Civil Service Academies, Ministry of IT	Ongoing; phased by region
	2. Launch public awareness campaigns highlighting AI benefits.		
	3. Address citizen concerns.		

Capacity Building



About the Authors

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