MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages: 2552-2554

ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING SECURITY FOR SUSTAINABLE E-GOVERNMENT SERVICES

Dr. D. Vimala, Shyam Vignesh K, Sree Jaya Devi S, Shakthi Priya
Department of Management Studies, Easwari Engineering College, Ramapuram, Chennai, Tamil Nadu, India- 600089.
E-Mail:vimala.d@eec.srmrmp.edu.in

Abstract
The past few years have shown how incorporating artificial intelligence(AI) technologies into e-government services allows for greater efficiency, accessibility, and sustainability. This paper provides a detailed assessment of the impact of AI on e-government services and analyzes how the combination of AI technologies and e-government services can impact public administration, boost civic engagement, and protect the environment. AI algorithms can personalize interactions with citizens, automate repetitive tasks, and transform resource optimization, thereby significantly improving service delivery in e-government services. Additionally, the paper illustrates the positive long-term impact of AI, emphasizing the importance of responsibly incorporating ethical artificial intelligence, the preservation of the environment, and the protection of personal data in the development of AI technologies applied to e-government services.The researchers have developed a conceptual model that aims to integrate the different literature reviews on Artificial Intelligence and Sustainability relating to E-government services. The report reviews several outstanding case studies to support the conceptual model and best practices in the world to highlight the successful use of AI in the healthcare, education, transport and public safety industries. It also analyses the challenges of AI integration, including algorithmic bias, cyber security issues, and the digital divide. The paper proposes a model to ensure the sustainable development of AI e-government services through the development of legislation, capacity building, and the fostering of partnerships at the global level. It argues that the use of AI's potential and minimising the challenges posed by the use of AI requires a multi-layered approach involving governments, the private sector, and civil society.The findings of the study provide practitioners, researchers, and policymakers with valuable information on how to construct a sustainable future, in which AI also helps integrate e-government services, especially in achieving sustainable development goals. AI can transform the e-government sector by making it more inclusive and efficient, and it will enable societies and citizens on the global level to benefit. The success will come from fostering an innovative, collaborative, and accountable environment.

Keywords: Artificial Intelligence, Citizen Satisfaction,E-government Services, Sustainability.

4. Introduction

AI's implementation has become a primary factor in how new digital technologies change the ways governments interact with citizens and deliver services, broadly known as digital governance.[1] When combined with the paradigm shift brought by Artificial Intelligence (AI), e-governance can achieve unparalleled heights in operational effectiveness, user-friendliness, and long-term viability. As countries of the world progress toward Sustainable Development Goals (SDGs), the application of AI in e-governance is of utmost importance. [2]

This research examines the consequences of AI on the future of e-government services. Using new algorithms and machine intelligence, governments can optimise processes, streamline the delivery of services, and adopt a more user-centric approach. This added value, however, also brings a series of challenges, especially ethical ones, which merit further investigation. [3] Considering the growing pace of technological evolution and the increased demand globally for user-centric governance, the value of AI in e-governance is self-evident. [4] The subsequent sections will discuss the ways in which AI can enable governments to become more sustainable and responsive, and the associated ethical and green concerns of this disruptive technology. [5]

The capability of artificial intelligence to mimic intelligent actions has the potential to fundamentally change the scenario of e-government services. By implementing AI algorithms, governments can streamline internal processes, enhance their decision-making, and offer tailored services to their constituents. The AI-driven transformation of public services not only improves customer service, but is also critical to advancing the customer service sustainability agenda. Sustainability is a development goal that encompasses economic development, social equity, and environmental protection. Artificial intelligence, when applied to public service, has the ability to transform all of these pillars, thereby enhancing e-government services' sustainability. [8]

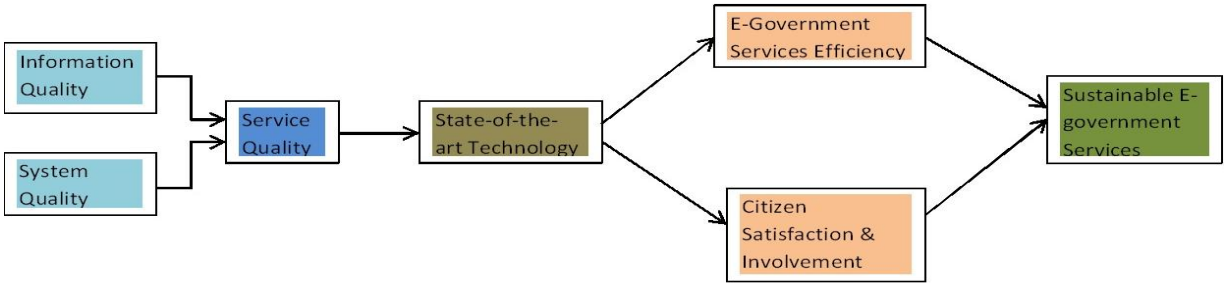
This article attempts to examine the impact of AI on the future of digital government services. AI's potential to fulfill the future goals of the intersection of technology, governance, and sustainability is arguably of great importance. [9] To contribute to the discourse, the authors examine the potential uses, challenges, and AI best practices in e-governance. This paper will also examine the ethical, data, and environmental impacts of AI in public services. [10]

2. Objectives

1. To provide a comprehensive understanding of the use of artificial intelligence in the delivery of government services, in addition to the many existing applications within the field.
2. To identify AI practices and applications in e-government services which incorporate the use of environmentally sustainable technology.

3. Conceptual Framework

The researchers formulated a conceptual framework aimed at establishing specific legal and regulatory frameworks concerning the use of AI in e-governance, taking into account privacy, data protection, and accountability concerning AI errors and/or wrongdoing. [11]



This conceptual framework outlines the various aspects necessary for the sustainable integration of AI into e-government services. [13] When addressing the integration of technology, ethical integration, environmental sustainability, inclusivity, capacity building, policy and legislation, and ongoing evaluation, governments can ensure that AI initiatives improve service delivery, and ensure social equity and environmental protection. [14]

5. Literature Review

With respect to AI in the field of health care, there has been considerable advancement. Researchers are examining AI applications for analysis of medical images and for the prediction of diseases and discovery of medicines. [15] Disease prediction using Machine Learning

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages: 2552-2554

algorithms has been employed to diagnose and treat cancer earlier, which is a great advancement. There is considerable research concentrating on the use of Natural Language Processing for various purposes including language translation, sentiment analysis, and creation of chat bots. [16] Researchers are working on the development of contextual Deep Learning models for precise language translation and sentiment analysis. The use of Conversational Artificial Intelligence is being explored in customer service and in interactive interfaces. [17]

E-government Services

Studies emphasize the significance of environmental sustainability in the provision of e-government services. Researchers focus on the energy-efficient computing, use of renewables, and green IT practices for sustainable computing and sustainable e-government, in particular, the carbon footprint of data centers. [18] Sustainable e-government initiatives aim to minimize e-waste and to foster the use of green technology. Scholars highlight the inclusive e-government services that provide accessibility to all citizens, especially the disabled and the people of low socioeconomic status. To address the digital divide, researchers explore user-inclusive design, digital literacy, and assistive technology to meet the needs of different end users. [19]

Sustainability

The sustainability literature is vast and multidisciplinary, encompassing the integration of environmental protection, social justice, and economic viability. [20] As societies grapple with increasingly complex challenges, the combination of multidisciplinary approaches, innovative technologies, robust governance, and international collaboration is essential to achieving the various components of sustainability. A deeper understanding of these factors will enable interdisciplinary collaboration among policymakers, businesses, and communities to foster a more sustainable and equitable future.

The focus of social sustainability research includes social justice, equity, and inclusivity. The existing literature includes studies on social development, social cohesion, gender equity, accessibility to education, and availability of health services. [21] The literature reviews social policies and cultural practices that contribute to sustainable social structures.

Rating of Citizens

The literature of citizens as clients focuses on the phenomenon as an indicator of the quality of service provided by the government. [22] The government, acknowledging the multiplicity and complexity of the reasons for citizen satisfaction, can develop policies, services, and information channels that positively influence the experience and build confidence in the administration. The rapid development of digital technologies and the growing emphasis on increasing citizen satisfaction have led many scientists to talk about the importance of creating digital governance systems that are responsive and easy to use. [23] Interdisciplinary studies compare the citizen's satisfaction in different countries and cultures. Researchers are focused on the satisfaction of citizens according to cultural, governance, and other country-context factors. Comparative analysis, as a result of identifying the best practices, contributes to the study of cultural phenomena that influence the citizens' attitudes towards the quality of government services provided. [24]

6. Research methodology

In order to conduct the study, the researchers have designed an in-depth case study.

Researchers established the validity of the study by cross-referencing the findings from multiple data streams (surveys, interviews, case studies) which reinforces the credibility and reliability of their work.

Case Study 1: AI Applications In E-Government Services - Seoul, South Korea Seoul, the capital of South Korea, is famous for having a remarkable level of technological development. Over the last few years, the city has led the development of Artificial Intelligence (AI) technologies aimed at enhancing the efficiency, accessibility, satisfaction, and sustainability of e-government services. AI-based chatbots are located on the website and mobile application of the city. Citizens were able to pose questions to AI. The chatbots were able to quickly and accurately answer questions regarding city services, permits, and other related information, thereby decreasing the burden on call centers and increasing participation from the general public. AI-based algorithms were able to assess real-time traffic data that was collected via strategically deployed cameras and sensors. To help alleviate traffic congestion, these algorithms were able to predict traffic flow, adjust the timing of traffic signals, and provide alternative route suggestions. This improved the environmental sustainability and reduced carbon emissions associated with the transportation congestion. To predict the level of service demand, Seoul utilized predictive analysis. Using these projections, the city optimised employee scheduling and direction of resources, further enhancing the efficiency of the service provided and minimising the running costs.

For example, Seoul has introduced AI-based language translation services at government offices, public transport centres and tourist information centres. The service assisted in the inclusivity and accessibility of communication for the tourists and the multilingual people in the city. The city also employed AI-based sensors to monitor and record the level of air pollution, the contamination of water, and the level of waste. The city also used AI-powered sensors that, through machine learning, pattern analysis, and intelligent decision systems, optimised and assisted the city’s environmental and waste management policies to promote sustainability.

Citizens appreciated the speed of response offered by AI chatbots, and the waiting times and overall satisfaction increased. The individual approach to services and the rapid resolution of problems has also increased citizen satisfaction. Smart traffic management systems also reduced average travel time by 15%, and increased productivity and reduced inhabitants stress. Improved traffic management reduced fuel consumption and carbon emissions by 10%, predictive analytics facilitated the efficient distribution of resources in public services, and operational costs were reduced by 20%. Employee shifts coincided with the expected peak periods of demand for services, to ensure that services were available at the right time and place.

Translation services enhanced the accessibility for foreign language speakers and tourists, creating a friendlier atmosphere. Improved communication services resulted in a 25% increase in the revenue generated by the city from tourism. The launch of the Environmental Monitoring System (EMS) facilitated the creation of proactive and focused policies. Targeted initiatives resulted in a 30% increase in Air Quality (AQ) over 5 years and a 40% improvement in the efficiency of waste management, leading to a decrease in landfill waste.

Seoul’s implementation of AI in e-governance services enhanced public satisfaction, sustainability and inclusivity. The city successfully demonstrated the effective use of AI technologies to optimise resource use and reduce environmental impacts, therefore creating a more citizen-friendly space, establishing itself as a world leader in AI enabled e-governance.

AI-Enabled Healthcare Services in Estonia

Estonia, a Baltic nation with a reputation for adopting innovative digital governance solutions, has also embraced advanced Artificial Intelligence (AI) technologies in its e-government services, particularly in the healthcare domain. The integration of AI into healthcare services was aimed at improving operational efficiency, enhancing patient outcomes, and ensuring the sustainability of healthcare services delivery over time.

Estonia also deployed an AI-driven system that evaluates patients' health records, medical history, and genetic information. This system offers personalized health recommendations and notifications to both patients and healthcare providers.Patients have the ability to view their

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages: 2552-2554

recommendations and records on online portals that prioritize their data protection and hold their records in a safe place. This gives them the ability to manage their health proactively.

AI algorithms provide data on health records, environments, and lifestyles of individuals to researchers to determine disease predictors. This information helps researchers identify patterns and possible risk factors to health. Researchers then notify health care providers of potential risks for illnesses, which allows them to take steps prior to illnesses developing. This strategy helps health care systems by preventing illnesses from worsening.

Estonia's e-health services as part of its e-government services, have incorporated AI-powered virtual health assistants. These health assistants, which are chatbots that use NLP technology, help people with health-related questions, help them make health-related appointments, and send them reminders to take their medications. They have also added telehealth services that allow people to speak with their health care providers through their health assistants. AI ensures better health care by accurately evaluating the symptoms of the patient. For evaluating the barriers of safe and effective pharmaceutical care, and evaluating the patient's compliance with touchpoint services and providing educational materials, AI algorithms use the patient's current medications and other health information to determine the possible drug interactions and allergies. This promotes safe and effective pharmaceutical care.AI in Healthcare Research: Estonia uses AI in medical research.AI algorithms can find patterns, potential risks, and results of treatments by analyzing anonymized health data. Researchers use this anonymized data to create evidence-based health policies, refine treatment guidelines, and further advance health technologies. The use of artificial intelligence in research accelerates innovation in health science.

7. Results

The use of AI in health systems, especially personalized health systems, and early action strategies, has resulted in positive health improvements. Patients receive timely guidance which leads to early action, and better management of health issues. This ultimately results in a lower rate of occurrence for many chronic illnesses.

Virtual health assistants, telemedicine solutions, as well as other AI-enabled technologies have improved health services accessibility; especially to rural communities. Patients do not have to worry about their location, as they can consult with health services. They can do that without having to travel a long distance to contact a health services' geographical location. AI-enabled systems can schedule their services, and faster services are available.

The research that AI has made available has positive implications for population health and other health services offered. This research has also positively impacted analysis to address treatment provision. This data, in addition to research, technology, and analytics in a real-time basis, has created a positive impact on policy making through focused evidence based decision making in health systems.Promising Sustainable Healthcare Practices: Estonia has adopted Sustainable Healthcare with the early use of predicting analytics and early interventions to prevent disease. These early prevention steps also help mitigate unnecessary strains on the healthcare system, enabling long-term support and optimal use of available resources.

The use of AI in Estonia's health care services exemplifies the potential impact and durability of AI in e-government services. AI makes it possible for Estonia to develop a health care ecosystem that not only enhances individual health results, but also helps preserve the future sustainability of health care services. This attention to personalized, preventive, data-driven, and accessible health care services offers a great example for other countries. [25]

8. Conclusions

The application of Artificial Intelligence (AI) within e-government services mark a dramatic shift that will transform the way government, citizens, and service delivery are structured. This research analyzes the impact, durability, and viability of AI in e-government. AI technologies have brought speed and efficiency to e-government services in a way that has never before been possible. Through the use of smart technologies and the application of AI and predictive analytics, service delivery has been streamlined and citizens are able to receive quick, personalized, and targeted services. This kind of positive change fosters satisfaction and creates a strong foundation for the digitization of governance.

Data has become integral to informed decision-making. AI-based data analytics can assist governments in making informed policy decisions based on identified trends and patterns in large data sets. This approach to policy-making optimally allocates resources and ensures focused measures to improve the effectiveness and sustainability of public service. Implementing AI has ethical implications. Components related to transparency, equity, and the privacy of individuals are critical. Adoption of 'green AI', which uses energy-efficient algorithms and renewables, merges technical progress and responsible environmental stewardship. Governments can ensure the ethical and sustainable use of AI by adhering to these principles.

Overall, the potential of Artificial Intelligence in e-government services is broad and deep. In the context of ethical data governance and citizen engagement, AI can enable Public Sector Innovation that upholds democracy and supports social equity and environmental protection. The journey to sustainable AI-enabled e-government services is a shared one, requiring foresightedness, stewardship and a strong commitment to serving and empowering people in a rapidly evolving digital environment.

9. References

1. Alagappa, Muthiah. 2004. Civil Society and Political Change in Asia: Expanding and Ontracting Democratic Space. Redwood: Stanford University Press.
2. Alawneh, A., Al-Refai, H., &Batiha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. Government Information Quarterly, 30(3), 277-288. doi: http://dx.doi.org/10.1016/j.giq.2013.03.001
3. Bertot, John, Paul Jaeger, and Justin Grimes. 2010. Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. Government Information Quarterly 27: 264–71.
4. Chen, Yi-ning, Hong-ming Chen, Wang Huang, and Russell Ching. 2006. E-government strategies in developed and developing countries: An implementation framework and case study. Journal of Global Information Management 14: 23–46.
5. Dunleavy, Patrick, and Christopher Hood. 1994. From old public administration to new public management. Public Money & Management 14: 9–16
6. Gauld, R., Goldfinch, S. and Horsburgh, S (2010). Do They Want It? Do They Use It? The ―Demand-Sidel of e-Government in Australia and New Zealand. Government Information Quarterly, 27, 177-186
7. Heeks, Richard. 2001. Understanding E-governance for Development. Manchester: Institute for Development Policy and Management.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages: 2552-2554

8. Ibrahim, Abdullah B., Wu Jing, and Da Wenge. "Key performance indicators supporting decision-making affecting Malaysian enterprise‘ project performance in China." American Journal of Applied Sciences 7.2 (2010): 241.
9. Kudo, Hiroko. 2010. E-governance as strategy of public sector reform: Peculiarity of Japanese IT policy and its institutional origin. Financial Accountability & Management 26: 65–84
10. Le Roux, Abraham Albertus. Integrated customer experience management at the North–West University. Diss. North-West University, 2011.
11. Lewis, John, and Xue Litai. 2003. Social change and political reform in China: Meeting the challenge of success. The China Quarterly 176: 926–42
12. Madon, Shirin. 2008. Evaluating the developmental impact of e-governance initiatives: An exploratory framework. In ICTs and Indian Social Change: Diffusion, Poverty, Governance. Edited by Ashwani Saith, M. Vijayabaskar and Vasudevan Gayathri. New Delhi: SAGE Publications India, pp. 268–81
13. Minka, T.P., 2012. Algorithms for maximum-likelihood logistic regression.
14. Oliver, R. L. (1999). Whence customer loyalty? Journal of Marketing. 63. 33–44
15. Potnis, Devendra. 2010. Measuring E-governance as an innovation in the public sector. Government Information Quarterly 27: 41–48
16. Przeworski, Adam, and Fernando Limongi. 1997. Modernization: Theories and facts. World Politics 49: 155–83
17. Seifret, Jeffrey W., and Jongpil Chung. "Using EGovernment to Reinforce Government—Citizen Relationships: Comparing Government Reform in the United States and China." Social Science Computer Review 27.1 (2009): 3-23
18. Shahin, Arash, and M. Ali Mahbod. "Prioritization of key performance indicators: An integration of analytical hierarchy process and goal setting." International Journal of Productivity and Performance Management 56.3 (2007): 226-240.
19. Sharma, B. & Dyer, P. (2009). An Investigation of Differences in Residents' Perceptions on the Sunshine Coast: Tourism Impacts and Demographic Variables. Tourism Geographies, Vol.11, No.2, pp.187-213.
20. Tolbert, Caroline J., and Karen Mossberger. 2006. The effects of E-government on trust and confidence in government. Public Administration Review 66: 354–69
21. UNESCO. 2016. The Concept of Governance. Available online: http://www.unesco.org/new/en/education/ themes/strengthening-education-systems/quality-framework/technical-notes/concept-of-governance/ (accessed on 26 February 2017).
22. Verba, Sidney, Norman H. Nie, and Jae-on Kim. 1987. Participation and Political Equality: A Seven-Nation Comparison. Chicago: University of Chicago Press
23. W. Hu, Y. Qian, and F. K. Soong, ―A new Neural Network based logistic regression classifier for improving mispronunciation detection of L2 language learners,‖ Proc. 9th Int. Symp. Chinese Spok. Lang. Process. ISCSLP 2014, pp. 245–249, 2014.
24. Zaki, Nesma M., Ahmed Awad, and Ehab Ezat. "Extracting accurate performance indicators from execution logs using process models." Computer Systems and Applications (AICCSA), 2015 IEEE/ACS 12th International Conference of. IEEE, 2015.
25. Zhang, Junhua. 2006. Good governance through E-governance? Assessing China’s E-government strategy. Journal of E-Government 2: 39–71