E-Governance and Welfare Distribution: Enhancing Accessibility through Technological Platforms

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Abstract

This study examines the intersection of e-governance and welfare distribution in India, with a focus on Scheme Shakti, a proposed mobile-based platform aimed at improving equitable access to government schemes. By addressing barriers such as information asymmetry, procedural complexity, and low adoption among marginalised communities, the platform seeks to enhance transparency, streamline access, and optimise the efficiency of welfare delivery. Emphasising mobile accessibility, the approach targets both rural and urban populations, fostering inclusivity and reducing spatial and administrative hurdles. Although current limitations include restricted multilingual support, a lack of integrated analytics, and limited assistance for digitally challenged users, future enhancements incorporating AI-driven guidance and real-time feedback mechanisms can further improve effectiveness. Overall, this study highlights the transformative potential of technology-driven e-governance tools in bridging the gap between policymakers and citizens, offering a roadmap for sustainable and inclusive welfare delivery.

Keywords: E-governance, Welfare distribution, Digital accessibility, Citizen inclusion, public policy

I. Introduction

E-governance, globally, is the use of technology to facilitate government services and citizen interactions. It is a global phenomenon that has been adopted in varying ways across different countries. For example, in India, e-governance is defined as the application of Information Technology and Communication (ITC) for governance (Acharya, 2025). An example of this is India's Aadhar Card system - it efficiently uses ITC to store, process, and collect data of over 1.2 billion citizens (Goswami, 2020). Considering its prevalence, especially highlighted through its use in the Aadhar card system, e-governance is now resonating with the idea of good governance in India. Figure 1 below highlights the timeline of such innovations, depicting them on a timeline that provides a sense of chronology to these turning points in India's e-governance evolution. Academic literature emphasises the importance of technology in the transformation of governance by tailoring services to the population, highlighting how, by placing citizens at the core, passive service delivery can be transformed into active engagement (Pislaru et al., 2024). The financial service sector of India has been depicted to be at the centre of India's digital revolution. Kickstarting financial inclusion with the launch of the Aadhar card, the sector then progressed onto establishing the PMJDY, Pradhan Mantri Jan-Dhan Yojana, leveraging the Aadhar card system to open bank accounts, setting the foundation for pensions, insurance, and credit schemes. Financial inclusion in India is based on the JAM trinity (Jan Dhan, Aadhar, Mobile), built on the pillars of digitising India's governance (Nair, 2020).

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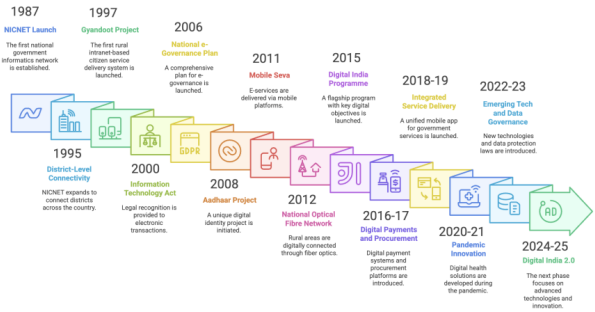


Figure 1: A timeline of E-governance's evolution in India

Welfare distribution in India is essentially the government's efforts to provide social and economic support to its citizens through various initiatives (Sharma et al., n.d.). It is the distributional effects of government spending aimed at providing welfare services. This paper focuses on the digitalisation of welfare distribution in India. While e-governance levels the gaps in the digitalisation of government services, infrastructural limitations, digital illiteracy, and data security concerns exist. This paper identifies the key areas of improvement and implementation, using AI-driven platforms to bridge and correct these issues (Reji et al., 2025). Through such schemes, 13.5 crore citizens have been alleviated from multidimensional poverty over the course of 5 years, and the rate has decreased from 24.85% to 14.96% between 2015-2016 and 2019-2021. Overall, these schemes have played an important role in increasing the nutritional standards, sanitation, and education (*13.5 Crore Indians Escape Multidimensional Poverty In 5 Years.*, n.d.). Welfare distribution enables citizens to reap the benefits of multiple schemes, including schemes such as the Pradhan Mantri Jan Arogya Yojana, which provides health insurance up to INR 5,00,000 (*Search Schemes*, n.d.) and the Mudra Yojan, which provides up to INR 10,00,000 loans to help micro businesses to help develop and expand their enterprises, to name a few (*JanSamarth - National Portal for Government-Sponsored Schemes*, n.d.). India's welfare ecosystem encompasses diverse sectors, including housing, employment, food security, and education, supported by large-scale schemes that have transformed millions of lives, particularly among rural and underserved populations.

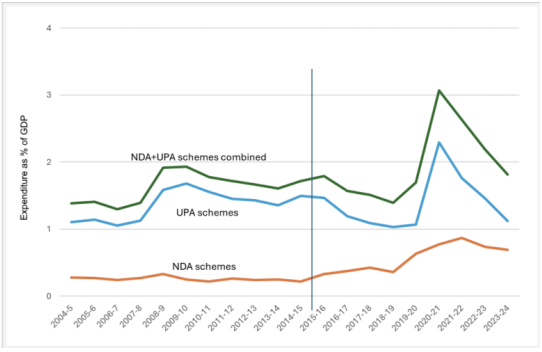


Figure 2: Welfare spending in India from 2004 to 2024 as a percentage of GDP

As Figure 2 shows above, Welfare expenditure has been growing slowly and steadily, with a spike in 2021. In the graph above, NDA schemes refer to schemes launched by the National Democratic Alliance, while UPA schemes refer to those launched by the United Progressive Alliance. This growth in welfare spending as a % of GDP highlights India's constant dedication towards supporting its citizens. While these government schemes have created change, as supported by the statistics in point 2, there have been multiple lapses in implementation. From a lack of awareness to poor documentation, digital illiteracy, and an absence of multilingual support, these issues obstruct the use of these schemes. E-governance can be used to directly create change and improvement in this field through the incorporation of Information, communication, and technology (ICT) to enhance government operations (Neupane, 2024). According to a UN E-government survey done in 2024, the global average of the E-government development index has depicted a decrease in the population lagging in digital development from 45% to 22.4% between 2022-24 (*EGOVKB | United Nations > Home*, n.d.). This improvement has also been reflected in India through programmes such as 'Direct Benefit Transfer', which aims to directly transfer subsidies through bank accounts to reduce fraud. Furthermore, the use and development of AI is also propagated through its role in creating a multilingual chatbot to aid customers through online payments in relation to the Aadhar-enabled payment system (*Six Ways Government of India Uses AI for Governance*, n.d.). However, despite robust welfare infrastructures, many eligible citizens - particularly rural women and marginalized groups - are unable to access these benefits due to a lack of information, procedural complexity, and digital exclusion. E-government is the use of Information, Communication, and Technology by governments to deliver services. However, this differs from e-governance, which is defined as the digitalization and transformational adaptation of the government to enhance the relationship between citizens and public institutions. There is a gap between the two, highlighted by provision, usage, and evaluation. When analysing this gap, it is seen that e-governance is heavily dependent on the specific context, for example, geographical regions and institutional settings. This creates an obstacle for the evaluation of e-governance, leaving it limited to certain tools and initiatives (Umbach & Tkalec, 2022b).

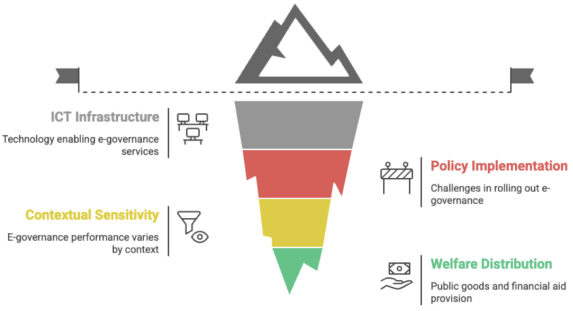


Figure 3: Elements behind India's digital transformation

As Figure 3 above shows, welfare distribution, ICT infrastructure, contextual sensitivity, and policy implementation serve as pillars and obstacles of digital transformation. While welfare distribution can enhance digital transformation by digitalising government services, policy implementation can be a slightly more tedious and effortful task. The Internet of Things refers to a network of physical devices interconnected and embedded with software, sensors, and network connectivity to allow them to share data (Ibm, 2025). Concerning e-governance, it can be used to enhance traditional government systems through the utilisation in fields such as health care and voting. Furthermore, e-governance can also be extended into "smart" governments through the Fog-of-Things, a computing method used to

improve efficiency and performance by decentralising the computing architecture and bringing data processing closer to the devices that generate it (Bansal et al., 2021). Welfare distribution, defined as the provision of merit goods such as public goods, financial aid, healthcare, subsidies, etc., requires public funding due to the sole reason that the citizens of India are not offered equitable opportunities. To alleviate this issue, the government utilises redistribution policies, along with macroeconomic stabilisation policies, to achieve economic growth in the long run. Additionally, funds are invested in merit goods, i.e,. education, health, and infrastructure. This is to encourage and opportune people to participate in the economy, gaining jobs. The government also utilises progressive taxes to steadily redistribute wealth (Mukherjee & Badola, 2021c).

To ensure fair and equitable distribution of welfare, governments can harness ICT to enhance welfare delivery by using e-governance as an enabler. E-governance can improve efficiency and responsiveness by eliminating excess and unnecessary workflows. By doing so, it enables digital interaction between Government and Citizens (G2C), Government and Businesses (G2B), or between Government agencies (G2G) themselves (Iyer & Rao, 2017). E-government services have the potential to increase access and decrease the cost of providing services to the citizens of a country; this benefits not only the citizens but the government as well. However, the government faces obstacles in its implementation. These obstacles must be tackled, and artificial intelligence (AI) and the Internet of Things (IoT) must be developed to improve the effectiveness and efficiency of the benefits for citizens. E-governance offers a new form of communication between citizens and their institutions, but if not implemented correctly, it can lead to failure and multiple threats, such as data breaches and security concerns. Artificial Intelligence and the Internet of Things can both help prevent such threats, justifying the need for their development (Al-Besher & Kumar, 2022b). Scheme Shakti is a digital tool offering personalised scheme discovery, providing the citizens of India with benefits at no cost. As an online platform, it can reach a large audience efficiently, providing easy access and an easy-to-use user interface. Emerging technologies such as artificial intelligence (AI) and mobile-first platforms offer transformative potential to democratize welfare access, personalise service discovery, and streamline application processes. Streamlining systems reduces corruption and delays, incentivising and attracting governments. India's Aadhaar-based DBT (Direct Benefit Transfer) system is a significant step in this direction. Figure 4 below is a visual representation of the various factors linked to smart governance, from efficient administration, welfare distribution, and even smart healthcare for citizens.

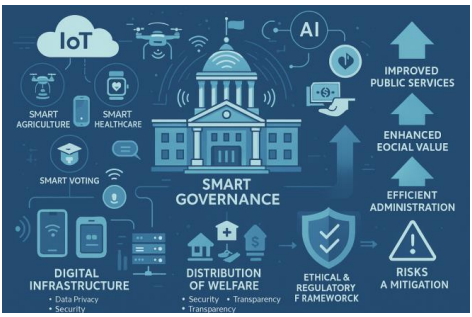


Figure 4: Smart governance and its factors

Already published research lacks focus on AI-powered platforms tailored to rural citizens. There is an absence of scalable, user-centric models for scheme discovery. Furthermore, digitisation and digitalisation are often used interchangeably, but incorrectly. Digitisation is simply the conversion of data into an online database/ software, essentially, the conversion of information from analogue to digital, while digitalisation goes beyond digitisation.

Digitalisation is the transformation of a business or information system that completely incorporates technology. With reference to government schemes, digitisation would refer to the ease of accessibility to documents and information, while digitalisation refers to the leveraging and use of citizen data to improve services. Digital transformation in e-governance can promote transparency, accessibility, and citizen participation, but unequal access to digital tools causes inequity (Aygün & Çekiç, 2025). Platform governance through technology provides a level of simplicity unlike any other. This is due to several reasons, including the easy accessibility through its remote nature as well as the lack of intermediaries, which decreases their cost. While many scientific fields have explored digital platforms, political science is particularly focused on their impact on macroeconomics, fiscal policy, and public relations - yet there remains a lack of clear medium- or long-term predictions on how platforms will reshape governance and public policy.

Governments are sensitive to this platform trend and have developed on it by creating easily accessible applications that provide citizens with information on various topics. Digital transformation is being used to re-architect the government's relationship and contact with citizens. Several countries like Germany, India, and Singapore are actively adopting blockchain in the public sector, drawn to its promise of simplicity, trust, and transparency - though its full potential remains uncertain. The challenge lies in shifting from rigid, state-controlled digital hierarchies to decentralised models that empower citizens. While private players are already offering faster, cheaper alternatives, the true opportunity may lie in integrating blockchain into unified public platforms, showing governments how to regulate and collaborate effectively. Blockchain-based decentralised platforms may well shape the future of governance, with early models already in operation (Kud, 2021). E-governance can also be used to serve and bridge the gap of marginalisation in India. However, simultaneously, gender, cultural, and caste divides can serve as an obstacle in cyberspace. If utilised correctly, platforms can be positioned to serve as tools for inclusion rather than mere marketplaces of ideas (Gupta, 2024b). Existing research has largely focused on top-down digital policy frameworks, with limited attention to AI-enabled, citizen-facing platforms designed for last-mile service delivery in rural contexts. Figure 5 below depicts the hierarchy and steps of addressing these gaps from initially identifying the gaps, to then developing scalable models, enhancing digital literacy, personalising interfaces, and finally ensuring accessibility. This figure simplifies and breaks down the process into 5 comprehensive steps.

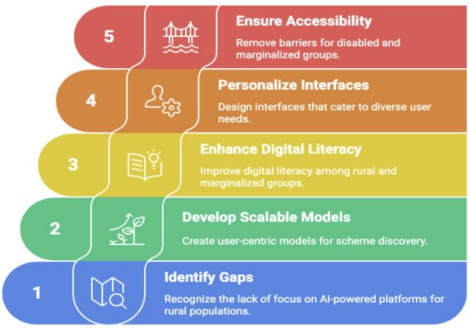


Figure 5: Addressing gaps in existing literature and identifying solutions.

There is limited research on AI-powered personalisation in welfare tech. Technology is transforming governance, and while artificial intelligence enhances efficiency and improves personalisation, it also holds unexplored threats with regard to data privacy, transparency, and algorithmic bias (Gomes & Cardoso, 2025). While e-governance is playing an uprising role in the obtaining of information for citizens, they expect access to this information through government

websites and other up-to-date sources. In order to confirm the effectiveness of these e-governance services, various parameters such as the Multi-Criteria Decision Making (MCDM) techniques are used. The focus of the methods is to find out the best alternatives among available features to make the e-Governance Services successful in the upcoming scenarios (Sahoo et al., 2022). The primary objective of this research is to examine how e-governance platforms, exemplified by Scheme Shakti, can enhance accessibility, awareness, and effective delivery of government welfare schemes in India. The study aims to assess the role of such platforms in simplifying application processes, increasing scheme uptake among diverse and marginalised populations, and promoting equitable access. The study also seeks to identify operational frameworks and impact evaluation methods that ensure transparency and accountability, and data security in AI-enabled welfare distribution.

The remainder of this paper is organised as follows. Section 2 reviews the relevant literature on technological advances in the context of e-governance and welfare distribution. Section 3 describes the research methodology, including the mobile application 'Scheme Shakti.' Section 4 presents the results and analysis of the data. Section 5 discusses the findings in the context of technology and e-governance. Finally, Section 6 concludes the study with implications, limitations, and suggestions for future research.

II. Literature Review

E-governance, referring to the digital transformation of public administration, aims to enhance transparency, citizen engagement, and service delivery. It is critical for improving government efficiency, transparency, and accessibility by digitizing public services and processes (Balaji, 2025). Traditional governance can be transformed into smart governance by big data, defined as large and complex data sets that conventional processing systems cannot handle due to their variety and volume (*Big Data Defined: Examples and Benefits | Google Cloud*, n.d.). Big Data should be integrated into public institutions due to several benefits that can be incurred, including its improved efficiency rate, reduced errors and costs, and increased transparency and accountability. It can be used to effectively increase sustainable economic growth through the effective delivery of services (*Smart Governance Through Bigdata: Digital Transformation of Public Agencies*, 2018). According to a UN survey done in 2022 on E-governance, 64% of the countries surveyed offer digital governance, highlighting a strong trend towards the integration of technology in administration, underscoring the evolution of E-governance. Furthermore, the E-Government Development Index (EGDI) shows global progress, with the percentage of the population lagging in digital government development decreasing from 45% in 2022 to 22.4% in 2024 (*UN E-Government Survey 2024*, n.d.). This is justified by ICT's ability to reinvigorate democracy and improve the quality of public services, coined as the "saviour" of the 21st century. It has also been used to change citizen-government relationships through political and administrative communication, and in collaboration with remote internet access, it can be used to increase service reach (Milakovich, 2021).

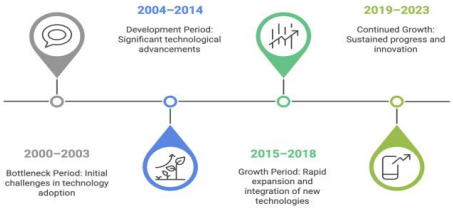


Figure 6: The evolution of technological advancements in e-governance

AI is increasingly embedded in e-governance, automating bureaucratic processes, supporting data-driven policymaking, and enabling real-time public service delivery. The development of the E-government field is divided into four distinct phases, as depicted by figure 6 above: the bottleneck period (2000–2003), the development period (2004–2014), the growth period (2015–2018), and the continued growth period (2019–2023), each of which can be differentiated by various technological advancements. Initially, technology was used to simply digitise government services. Figure 6 highlights this progression. After, it progressed to focusing more on improving transparency, decreasing corruption, and promoting E-governance. Lastly, 2019 onwards, the attention shifted to technological innovation opportunities and the improvement in infrastructure (Song et al., 2024). Through such efforts, the integration of AI has been linked to improvements in administrative efficiency, a reduction in corruption, and enhanced public accountability. A study concluded that AI can create significant benefits in citizen-centric services and municipal processes. However, a gap remains due to a lack of infrastructure that can support such technological advancements. It was approximated that only about 25% of organizations have appropriate infrastructure for the adoption of AI. (Kulal et al., 2024)

AI-driven welfare platforms utilize machine learning algorithms for eligibility prediction, personalized scheme recommendations, and automated application assistance. Through this, it improves the delivery of social welfare by promoting justice, equality, and overall quality of life. Artificial Intelligence (AI) holds transformative potential in advancing social welfare across several sectors. It can help eliminate poverty by analyzing data to identify vulnerable populations and design targeted interventions. In healthcare, AI enhances diagnostic accuracy, reduces costs, and enables personalized and preventive care. In education, AI tools support adaptive learning and personalized teaching, promoting equity and access. AI also aids crime prediction and prevention by analyzing data to identify high-risk zones and suspicious activities. In governments, AI is used to streamline processes, create virtual chatbots, and provide a line of emergency response. Essentially, it is meant to bring the people closer to their government. However, ethical concerns-such as algorithmic bias, privacy, and accountability be addressed. The successful implementation of AI in social welfare depends on trustworthy data, robust digital infrastructure, and upskilling the workforce (Nayak & Tiyadi, 2024). AI can also be used to build multilingual chatbots with the purpose of support and guidance. For example, in Taiwan, the rate of digitalization is among the highest in the world, adopting AI-driven technology as well. However, to keep up with the rapid technological advancements, government agencies must enhance organisational members' understanding of artificial intelligence through education and training to help cross-domain communication and coordination activities with the allotted units (Wang et al., 2024). E-governance, as defined earlier, is the use of Information and Communication Technology (ICT) to transform governance structures and processes in ways that would not be possible without digital tools. With the evolution of the internet from Web 1.0 (simple, static systems) to Web 4.0 (powered by Artificial Intelligence and the Internet of Things), e-governance has progressed from basic digital systems to more sophisticated algorithmic governance. Despite such technological advancements, many processes remain manual and paper-based, limiting efficiency and scalability. Hyperautomation has the potential to resolve such problems through the integration of a combination of advanced technologies like AI, machine learning, robotic process automation (RPA), and analytics to automate complex business and administrative processes (Das et al., 2023).

As technology advances, digital innovations such as big data, the Internet of Things, machine learning, and AI have accelerated the growth of e-governance. However, this growing dependence on digital systems has raised concerns about data reliability, precision, and security. A possible solution to minimising such issues is Blockchain Models & Optical Character recognition, more specifically, called the SECHash Model system. The SECHash model aims to preserve the integrity of document data by making it impossible to alter the documents after they have been accepted into the system. It also ensures that once documents are accepted, they cannot be destroyed or lost, addressing concerns around data retention and accountability. A study done on this model has proven that it can significantly reduce fraudulent activities by automating document handling and storing verified documents securely on a blockchain. In conclusion, it can mend the issue at hand by improving trust, efficiency, and transparency in the system (Azzam et al., 2023). In today's era, e-governance has become a competitive advantage because of its strategic use of data.

Governments often rely on data collected from diverse and heterogeneous sources, which are combined for deeper insights and better policy-making with the aim of improving the services and digital applications they provide to both citizens and businesses. Additionally, governments are using big data - defined as extremely large data sets - to enhance fraud detection and tax monitoring, along with various other regulatory activities. However, the integration of such large and diverse datasets remains a major challenge and must be addressed at multiple levels of government and infrastructure (*Big Data for E-Governance*, 2018). A recent NITI Aayog report (June 24, 2025) estimates that inaccurate or duplicate beneficiary records inflate welfare spending by 4–7%, underscoring how poor data quality directly undermines fiscal efficiency (Y. S. Sharma, 2025b).

While AI-powered platforms have the potential to drastically change efficiency in government systems, they also face issues of a digital divide between urban and rural populations, emphasizing challenges in equitable e-governance. This divide is a cause of differences in infrastructure, culture, and socio-economic background. However, through policy recommendations, AI, blockchains, 5G, and awareness on digital literacy can bridge this gap (Maurya et al., 2025). Furthermore, voice-integrated assistants, specifically technology that allows vocal interactions and is not meant to be confused with chatbots and intelligent speakers, can enhance and simplify user experiences. They use Natural Language Processing to interpret input, adhering to their purpose of listening and responding promptly. Despite their convenience, there are growing concerns about privacy and data security, particularly about how voice data is collected, stored, and used. This alludes to the fact that studies have proved that there are users who avoid using such voice assistants due to privacy concerns (Acikgoz et al., 2023). Secondly, AI has also revolutionized welfare distribution through different initiatives such as AI-based Direct Benefit Transfers (DBT) and Aadhaar-enabled systems, which have reduced fraudulent transactions by 50% and ensured benefits reach intended recipients. By the utilisation of AI, political communication has been restructured. Initiatives such as the SUPACE system used by India's Supreme Court, AI-driven analytics by the National Informatics Centre, and Umang's AI-based services - all contribute to more transparent and responsive governance and indirectly expand access to government information, increasing transparency. However, concurrently, AI initiatives have their setbacks, including data privacy risks, algorithmic biases, and unequal access to digital technologies (Srivastava & Sharma, 2025).

Accessibility to AI also enhances efficiency by allowing a streamlined and simplified interface for addressing grievance redressals, avoiding past issues such as slow responses, a lack of openness, and inefficiency. By harnessing digitalisation tools such as Natural Language Processing (NLP) and Machine Learning (ML), the grievance filing system can be organised into a shortened process that can guide them through the complaint submission process and provide real-time updates on the status of their grievances. The system can also be developed to assign grievances on priority through an automated escalation model and monitor the resolution process through an integrated dashboard, ensuring transparency and efficiency. AI has been reported to save $3.3 to $41.1 billion in potential savings by saving between 96.7 million and 1.2 billion hours annually by automating US Government work, Deloitte reported (Wikipedia contributors, 2025b). Furthermore, in the UK, the Department for Work and Pensions' AI system saved £2.2 billion by preventing fraudulent benefit payments in 2023, while also reducing processing time for valid claims by 30% (MbaPgDipPgCertCMgr, 2025). Doing so, interdepartmental coordination improves through the connection of various databases, which enables the detection of bottlenecks in advance through the application of predictive analytics. While challenges such as system-wide integration and data privacy concerns exist, its ability to improve government accountability and productivity trumps its challenges (P. Gupta et al., 2025b). E-governance uses chatbots such as the Aaple Sarkar bot, which, for example, gives the citizens of India access to over 400 services and provides platforms for application tracking, secure payments, and grievance redressals (*Aaple Sarkar | Rural Development and Panchayat Raj Department | India*, n.d.). AI can set the foundation for more informed decision-making and the creation of data-driven policies, creating more tangible and factually-rooted policies, improving effectiveness, and enhancing benefits. AI can improve overall governmental efficiency in social services by streamlining procedures to guarantee accurate and timely benefit distribution. Applications of AI include anticipating how to handle medical emergencies in the healthcare field and traffic flow management for less congested traffic. Nevertheless, AI also faces challenges, such as debating the ethical guidelines for it, which include algorithmic biases and cybersecurity in the

context of data privacy. Considering that a key component of preserving public confidence and accountability in AI decision-making processes is transparency, ethical and regulatory frameworks must be created to build a structure for the application of AI in governance. To successfully integrate AI into governance, the country needs to be equipped with employees who know how to appropriately function and use AI-driven platforms and initiatives. There must be adequate infrastructure, education, and training provided to the appropriate people to develop the skills needed to effectively use AI technology and enable faster adaptation. Studies such as Munoz (2022) introduce the ARMS of Technology framework, emphasizing how advanced technologies can transform public sector operations by improving efficiency, responsiveness, transparency, and citizen trust. The study also highlights the optimal way of integrating AI into governance - examples include data-driven analytical control and monitoring, and resource allocation, which underscore successful areas of AI deployment. These findings offer direction to public officials and lawmakers evaluating the use of AI technologies.

Another study by Munoz, highlighting the relationship between public policy and AI, addresses the social and ethical concerns associated with AI integration, underscoring the limitations of AI adoption in society. The study also highlights the foundation of AI adoption and integration as a future focus for predicting and planning AI (Munoz, 2024). While AI may be revolutionary for e-governance and the transformation of government services, it requires robust regulatory frameworks, transparency in algorithmic decision-making, and strategies to mitigate bias and digital divides. AI initiatives can create inclusive and intelligent governance systems that are flexible, future-ready, and people-focused. However, when integrating such initiatives, even those aimed at the betterment of society, the government may face cybersecurity threats and digital inequality, which can be exacerbated by a lack of technology in rural areas. Artificial Intelligence, considering that it operates digitally, can reach rural areas of India due to its existence in the form of a virtual model. Through this, it is able to benefit citizens who work in fields such as agriculture, healthcare, and education - providing them with the ability to gain the benefits of various government schemes and services remotely. This highlights the progress the government can make towards its Sustainable Development Goals (SDGs) through digitization. However, the full use of AI in rural areas is limited by challenges like a lack of technology infrastructure, low education levels, and restrictive policy environments. AI can also be embedded into rural development efforts by being integrated into policy reforms, educational investments, and collaborations between various stakeholders such as the private sector, the government, and local communities (Y. S. Sharma, 2025a).

Figure 7: SWOT analysis on tools for E-Governance

Table I. Extensive Literature Review done on E-Governance Welfare Distribution

Sr. No	Paper (year + source)	Key findings	Research gap	Policy implication	Technological tools / techniques discussed	Future scope
1	**Governing with Artificial Intelligence** OECD (2024).	AI can enhance public services and decisions, but needs governance in accountability, skills, and data use.	There is little empirical evidence from AI-driven welfare distribution pilots.	Need national standards for AI use in public services (transparency, auditability, procurement rules).	Broad: ML models, decision-support systems, automation tools.	Rigorous impact evaluations of AI in DBT schemes; standards for audits and redress.
2	**Artificial Intelligence for Citizen Services and Government** Ash Center (Harvard) (2024 PDF).	AI chatbots, triage, and analytics can enhance citizen services, but require user feedback and human oversight.	Few studies assess AI's scalability and its impact on marginalized groups' access.	Policies should mandate user-centered design, continuous feedback, and human-in-loop oversight.	Conversational agents, NLP for intent classification, and frontline dashboards.	Co-design pilots with vulnerable groups; accessibility benchmarks and measurement.
3	**Digital accessibility in the era of artificial intelligence Bibliometric review** (PMC) (2024).	AI methods like computer vision and NLP are increasingly used to enhance digital accessibility, such as screen readers and alt text.	Research rarely covers accessibility AI in welfare platforms for multilingual, low-literacy users.	Accessibility standards must be integrated into e-gov procurement and platform design..	Computer vision (image captioning), speech-to-text, and NLP for multilingual support.	Develop multilingual, low-bandwidth AI accessibility modules for welfare portals; usability trials.
4	**Digital Transformation and Social Inclusion in Public Services** MDPI (2025).	Digitalisation can boost inclusion, but barriers like literacy, infrastructure, and trust require combined policy and tech solutions.	Few AI interventions have been tested to close digital literacy and access gaps in welfare.	Invest in digital literacy and offline support, and create inclusive service models.	Data analytics, personalization engines, voice interfaces.	Develop hybrid AI-human service models for low-literacy users and assess cost-effectiveness.
5	**Elevating e-government: AI & IoT for better services. ScienceDirect (2024). ScienceDirect**	Integrating AI with IoT allows real-time monitoring and targeted resource allocation, aiding welfare logistics.	Operational issues - interoperability, privacy, and ID/authentication - are poorly quantified in welfare contexts.	Set standards for data interoperability and privacy in IoT/AI public services.	Predictive analytics, sensor data fusion, anomaly detection.	Pilot AI+IoT for last-mile welfare delivery, emphasizing data security and ROI.
6	**AI for Citizens: A Framework,** SSRN (policy/framework paper).	Outlines seven citizen-centric AI principles and government case studies.	Frameworks must be adapted into welfare-specific implementation guides.	Develop playbooks linking principles to procurement, monitoring, and grievances.	Governance-focused: explainability and privacy tools.	Operational toolkits with checklists and KPIs for welfare agencies.
7	**Leveraging AI & ML to Reform India's Social Protection / DBT** ResearchGate (2025).	AI/ML can cut leakage, detect fraud, and improve DBT targeting via anomaly detection.	Few studies address fairness, false positives, and the social impacts of automated exclusions.	Policies should require fairness tests, human appeals, and safeguards before automated delisting.	Anomaly detection, classification, and record-linkage algorithms.	Create explainable ML pipelines with dispute resolution and field-tested safeguards.
8	**Using AI to Enhance E-Government Services (book chapter)** (Dec 2023)	ML pipelines personalize services, forecast demand, and automate tasks for faster delivery.	Few longitudinal studies track citizen outcomes post-AI adoption.	Promote frameworks measuring outcome equity, not just efficiency.	Data pipelines, supervised ML, dashboards, and NLP for citizen engagement.	Longitudinal studies with open datasets and reproducible ML for public research.

Following an extensive review of relevant literature, a comprehensive literature review table was constructed to synthesize existing work on key findings, policy implementation, and future scope. This synthesis enabled the identification of key gaps. Building upon these insights, the subsequent stage of this study focuses on formulating a rigorous research methodology designed to address the stated research questions and hypotheses. The proposed methodology encompasses systematic data acquisition, multi-source feature engineering, and model development. By aligning the methodological framework directly with the gaps revealed in the literature, this approach ensures that the

empirical analysis is both targeted and capable of generating reproducible, evidence-based conclusions suitable for real-world application.

Research Questions:

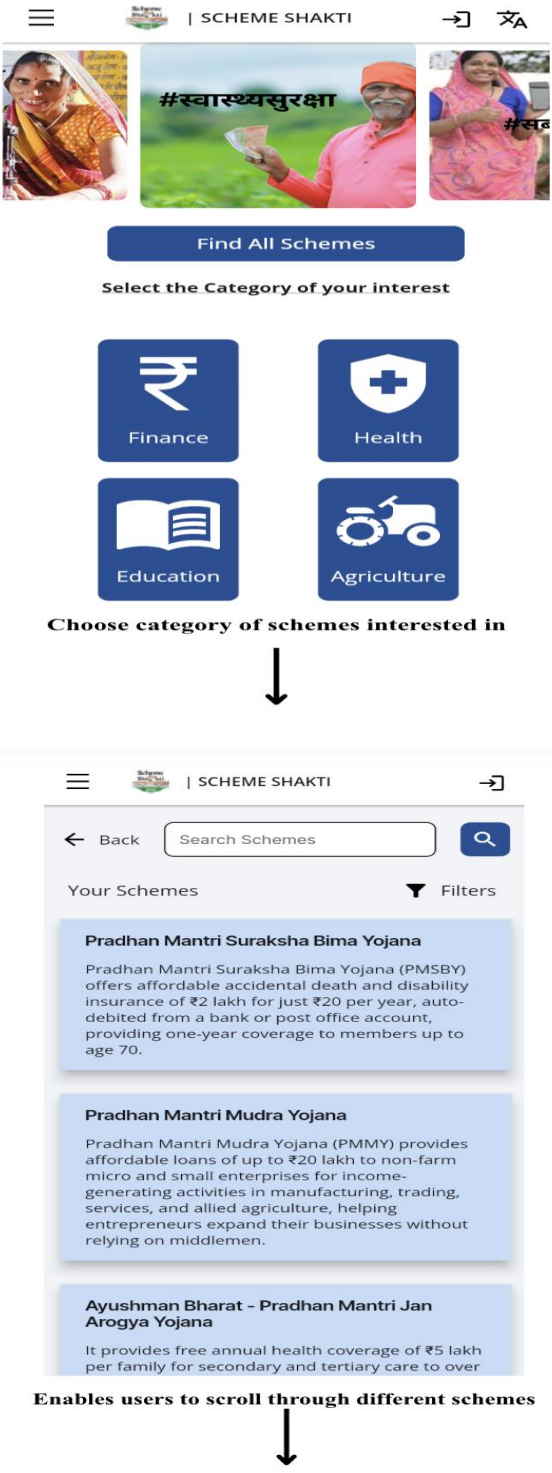
1. How can an online application such as Scheme Shakti reduce information asymmetry and procedural complexity in the welfare distribution ecosystem of India?
2. To what extent does the integration of user-centric features improve adoption and equitable access to government schemes?

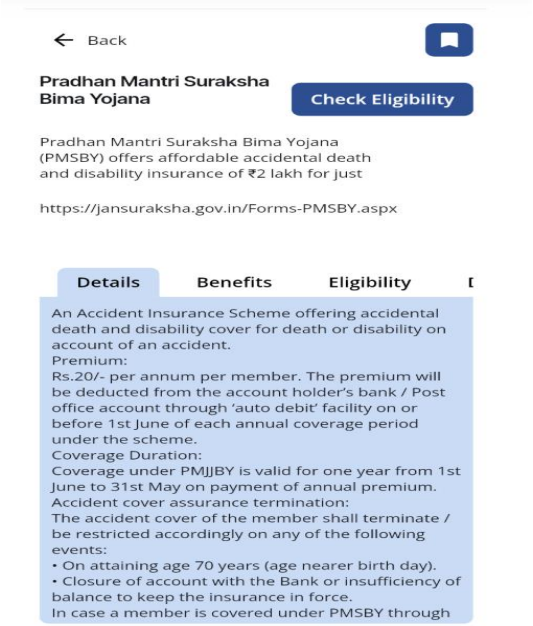
Hypotheses:

H1: Online applications such as Scheme Shakti accessibility tools significantly improve citizens' awareness and participation in government schemes compared to traditional portals.
H2: Features such as multilingual support, personalized eligibility filters, and hybrid AI–human delivery models positively influence adoption rates among users.

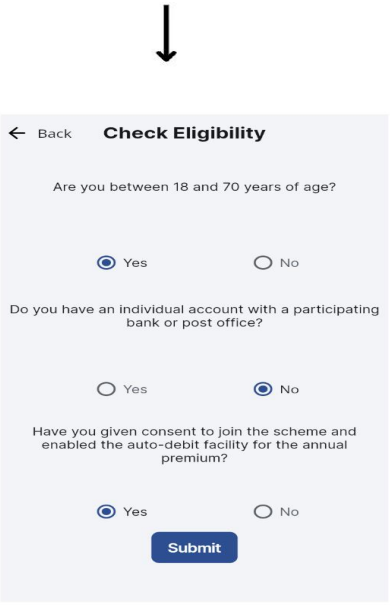
III. Research Methodology

The theoretical contribution of this study lies in proposing an integrated model that combines AI and e-governance to enhance welfare distribution, guided by the principles of accessibility, inclusivity, and transparency. Early research on the digital divide conceptualised it largely as a binary - individuals either had or lacked physical Internet access - with the implicit assumption that merely providing access would ensure digital inclusion (Newhagen & Bucy, 2005; van Dijk, 2005). As Internet penetration increased globally, however, scholarship began to focus on more nuanced inequities, examining not just access but also digital skills, patterns of use, and attitudes towards technology (Goldfarb & Prince, 2008; Hilbert, 2011; Selwyn, 2004). Contemporary models now treat the digital divide as a multidimensional phenomenon, incorporating indicators such as awareness, attitudes, physical and material access, skill levels, and usage patterns (Attewell, 2001; Chen & Wellman, 2004; DiMaggio et al., 2004; Livingstone & Helsper, 2007; Mossberger, Tolbert, & Stansbury, 2003; Ono & Zavodny, 2007; Warschauer, 2003). Studies frequently examine these indicators as dependent variables and explore their relationship with sociocultural, socioeconomic, and demographic determinants (Hargittai & Hinnant, 2008; van Deursen & van Dijk, 2014). Importantly, recent research recognises that attitudes, skills, and material resources interact in complex ways to shape patterns of digital inclusion, suggesting that a holistic approach is necessary to capture the dynamics of inequity (Helsper & Eynon, 2013; Pearce & Rice, 2013; Wei & Hindman, 2011). By situating technology-linked welfare platforms within this multidimensional framework, this study contributes to advancing e-governance theory beyond mere infrastructure provision, highlighting the need for systems that actively account for skill gaps, usability barriers, and socio-technical contexts to ensure equitable participation (Van Deursen & Van Dijk, 2015). The Scheme Shakti framework, depicted below, can be used.


| SCHEME SHAKTI
#स्वास्थ्यसुरक्षा
Find All Schemes
Select the Category of your interest
Finance
Health
Education
Agriculture
Choose category of schemes interested in
| SCHEME SHAKTI
Back
Search Schemes
Your Schemes
Filters
Pradhan Mantri Suraksha Bima Yojana
Pradhan Mantri Suraksha Bima Yojana (PMSBY) offers affordable accidental death and disability insurance of ₹2 lakh for just ₹20 per year, auto-debited from a bank or post office account, providing one-year coverage to members up to age 70.
Pradhan Mantri Mudra Yojana
Pradhan Mantri Mudra Yojana (PMMY) provides affordable loans of up to ₹20 lakh to non-farm micro and small enterprises for income-generating activities in manufacturing, trading, services, and allied agriculture, helping entrepreneurs expand their businesses without relying on middlemen.
Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana
It provides free annual health coverage of ₹5 lakh per family for secondary and tertiary care to over
Enables users to scroll through different schemes



Users can easily access the data of schemes, from details to the benefits and even eligibility



Users can test themselves for elgibility

Figure 8: The flow of the 'Scheme Shakti' framework

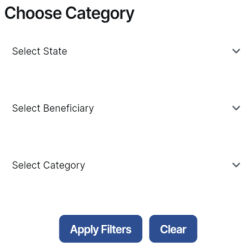


Figure 9.1: Scheme Filters

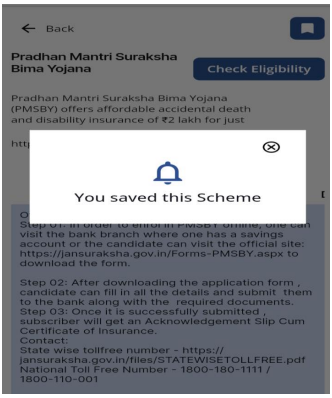


Figure 9.2: Saved schemes feature

The framework, as depicted above in figure 8, improves welfare distribution by improving access to government schemes through a user-friendly interface. First, the user can select a category of schemes, then, they can browse through schemes in that category. Next, they can skim through the details, documents, benefits of the scheme before

taking a quick 3-question eligibility test to determine whether the scheme is meant for them. The app also also has other features such as a save button, enabling user to save schemes for a later date, as well as filters which make user's interactions much more efficient by taking them directly to the schemes they can be eligible for.

Data for building the app was taken from various government resources, ranging from national websites to ones local to the state. To ground the app's design and evaluation in empirical evidence, secondary sources such as government policy documents, DBT (Direct Benefit Transfer) datasets, scheme statistics, and relevant academic literature on e-governance and digital public infrastructure were systematically reviewed and synthesized. In the accessibility and awareness dimension, baseline and follow-up surveys measure how far users' awareness of welfare scheme eligibility has changed, while timestamped logs assess reductions in the time needed to search, identify, and initiate applications. This helps quantify the app's role in lowering informational barriers. In the DEI (Diversity, Equity, and Inclusion) dimension, structured usability testing sessions are conducted with elderly users, women, and low-literacy groups; qualitative feedback and task success rates across language variants provide insight into whether the interface is equitable. The app's multi-lingual modules are evaluated for satisfaction and adoption across users whose first language is non-English, helping ensure linguistic inclusivity. In the efficiency and transparency dimension, administrative workflows before and after app adoption are compared to assess how many procedural steps (e.g., document submission, verification loops, in-person visits) have been eliminated or automated. Beyond these dimensions, the future scope of AI-driven enhancements centers on deploying intelligent chatbots and NLP modules as guided assistants. These components are evaluated in controlled trials, measuring success rates in correctly answering scheme queries, resolving application bottlenecks, and steering users through decision trees. In doing so, the app aspires not just to disseminate information, but to act as an active assistant that supports users through the entire lifecycle of scheme adoption, thereby operationalising the promise of AI-enhanced e-governance.

Table II. Featuring the Scheme Shakti Advantages and Impact

Digital Divide Dimension (Van Dijk)	Barrier in Welfare Access	Scheme Shakti Features Addressing	Expected Impact
Motivational Access Willing ness to use it	Lack of knowledge about schemes; many fail to see the advantages of using the internet.	Central repository for schemes, propagation of multilingual knowledge, and storage of schemes for future use.	Features include a loan calculator, direct links to scheme applications, a save-for-later function, and integration with the DBT interface.
Material Acess (Infrastructure Connectivity Devices)	Many people struggle with patchy internet connections, subpar gadgets, or financial limitations.	A lightweight app structure built with FlutterFlow, supported by a Firebase cloud database, with low-bandwidth modules currently in progress.	Enhanced inclusivity for rural and low-income populations, with minimized infrastructural barriers.
Skills Access (digital literacy and ability)	Complex, text-heavy portals are difficult for elderly and less literate consumers to use.	3-question Eligibility Quiz; simplified UI/UX; AI chatbot for guidance;bilingual support	Reduces mental effort, makes navigation easier for users with low literacy, and fosters trust in digital governance platforms.
Usage Access (effective, outcome driven use)	Broken and unorganised portals, along with complicated processes, hinder actual welfare uptake.	Loan calculator, direct scheme application links, save-for-later option, DBT-interface alignment	Converts awareness into tangible action, leading to measurable growth in applications, financial planning, and scheme participation.

IV. Results & Discussions

Several scholars have underscored the transformative potential of e-governance in broadening access to public services. For example, Misuraca (2020) demonstrates that digital governance platforms can significantly streamline bureaucratic processes while enhancing citizen engagement, whereas Singh (2021) provides evidence that mobile-based governance applications reduce information asymmetry and improve operational efficiency in social welfare programs. Furthermore, academic research such as "E-Governance Initiatives and ICT for Good Governance: A Study of Public Service Delivery in India" investigates the extent to which e-governance initiatives have improved public service delivery in India. It highlights the role of Information and Communication Technology (ICT) in enhancing transparency, accountability, and efficiency within government operations. The research emphasizes the significance of digital platforms in bridging the gap between citizens and government services, thereby fostering good governance (Gajendra), while papers such as "Digital Transformation and Social Inclusion in Public Services" explore the challenges and strategies associated with digital inclusion in e-government services. It identifies key obstacles such as limited digital literacy, infrastructural gaps, and institutional barriers that hinder widespread adoption, especially among marginalized populations. The study proposes technology-driven and policy-based solutions, including multilingual support, interactive AI-driven guidance, and data-driven analytics, to build more adaptive welfare systems and ensure equitable access to digital public services (Hery Djatmiko and Sinaga).

Building upon this foundation, our study evaluates the context-specific efficacy of **Scheme Shakti**, a mobile-centric initiative that centralizes welfare schemes while fostering inclusivity across India. The results indicate that design elements prioritizing user experience - such as intuitive navigation and consolidated scheme information - directly improve adoption rates. Distinct from earlier governance models, Scheme Shakti represents a novel approach by providing citizens with a unified digital touchpoint to access multiple welfare programs. Nevertheless, while prior research has primarily emphasized digital scaling as a mechanism for inclusion, our findings indicate that true inclusivity necessitates addressing linguistic and technological skill gaps. The limited language offerings of Scheme Shakti constrain participation among non-native speakers, and the lack of AI-driven assistance diminishes usability for groups with lower technological literacy, particularly older adults. From a policy perspective, these findings imply that governments must move beyond merely expanding digital distribution. To achieve equitable access, there is a need for multilingual interfaces, targeted user education, and AI-supported guidance systems. By integrating such measures, public institutions can build a resilient and inclusive welfare ecosystem that leverages citizen engagement to promote social equity, thereby advancing the broader objectives of digital democracy and equitable governance.

V. Conclusion

This research highlights that e-governance platforms, exemplified by Scheme Shakti, function as critical instruments for promoting equitable and accessible welfare distribution. By mitigating information asymmetries, simplifying bureaucratic procedures, and facilitating remote access, the application significantly enhances the efficiency of welfare delivery across India. Concurrently, the study acknowledges current limitations, including constrained language offerings and the absence of advanced AI-driven functionalities, which restrict the platform's broader scalability and applicability.The proposed framework underscores that future development should prioritize inclusivity through multilingual support, interactive AI-guided assistance, and the incorporation of data-driven analytics to create more responsive and adaptive welfare systems. Such a framework not only strengthens the citizen–state interface but also carries important policy-level implications for advancing digital inclusion and governance. In this context, Scheme Shakti exemplifies the broader potential of citizen-centric technologies to address structural inequalities, optimize service delivery, and reinforce the principles of participatory and equitable governance.

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