

## **Digital Inclusion in an Aging Society: Mapping the E-Government Challenges of Elderly Citizens in Rajasthan**

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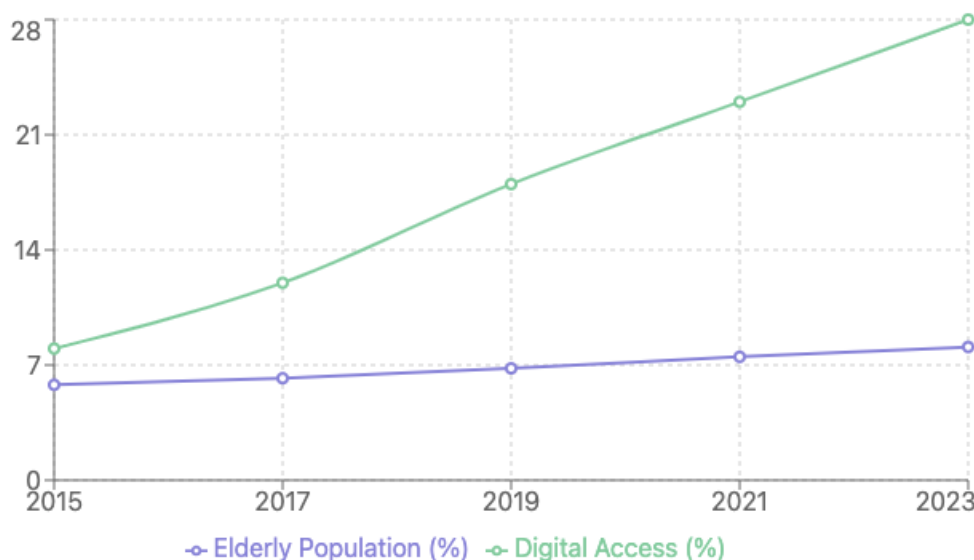
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**Abstract:** The rapid digitalization of public service delivery in India, driven by the Digital India initiative, has revolutionized citizen government interaction. However, this shift has inadvertently excluded large segments of the elderly population, particularly in states like Rajasthan where traditional service modes prevail. This study explores the digital skills gap among senior citizens aged 60 and above and assesses how it affects their access to e-government services. The primary objective is to examine how factors such as digital literacy, socioeconomic status, educational background, and prior technology exposure influence the ability of older adults to navigate and utilize online government platforms. Employing a mixed-methods design, the research combines quantitative data from structured surveys of 450 elderly respondents across six urban and rural districts, with qualitative insights from 30 semi-structured interviews and observational studies at 12 e-governance centers. The analysis reveals critical disparities: only 23% of respondents reported confidence in independently accessing digital services, while 67% relied on family members or paid intermediaries. Urban seniors (31%) demonstrated higher digital literacy compared to their rural counterparts (14%), and women faced more severe digital exclusion due to social, educational, and mobility constraints. Major barriers included complex user interfaces, lack of local language support, and minimal training opportunities tailored to the elderly. The study underscores that existing digital literacy programs fail to adequately cater to this demographic, particularly in rural Rajasthan. Key implications include the urgent need for elderly-focused digital literacy initiatives that use culturally relevant and linguistically inclusive content, simplified platform designs, and the establishment of dedicated support centers. The research proposes a practical framework to assess digital readiness among older populations, adaptable to other aging regions in India and globally. By emphasizing hybrid models of service delivery that blend digital and human assistance, the study offers actionable insights for inclusive digital governance and reinforces the importance of policy frameworks that address the vulnerabilities of elderly citizens in the digital era.

**Key Words:** Digital Literacy, Elderly Citizens, Digital Skills Gap, E-Governance, Technology Adoption, Digital Divide, Rural-Urban Disparity, Digital Inclusion.

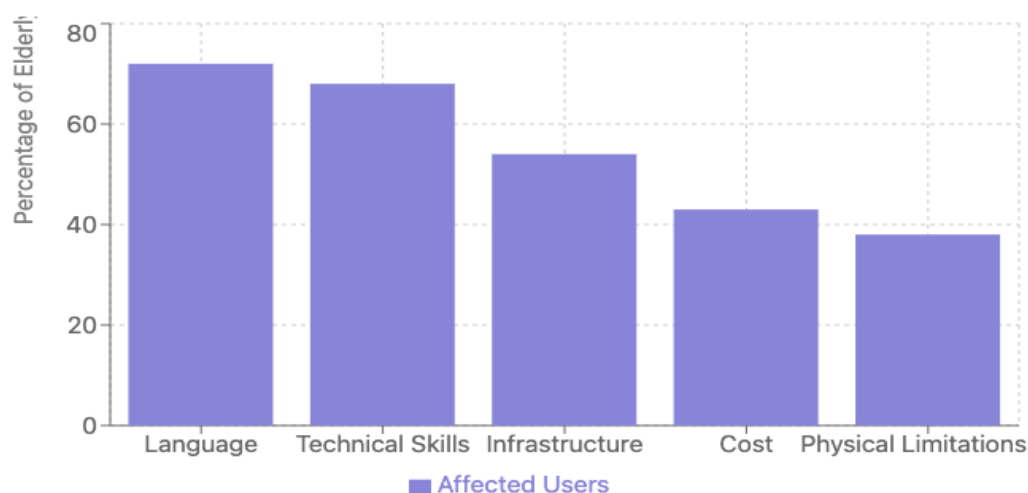
## 1. Introduction

Digital transformation of government services is a decisive paradigm shift in citizen experience with public institutions. This transformation has been most pronounced in India after the launch of the Digital India Initiative in 2015 that seeks to build a Digital India for empowering a digitally empowered society and economy (Ministry of Electronics & Information Technology, 2021). However, much of this quick digitalization has led to new kinds of social exclusion for the elderly, who may be lacking the digital know how required to access such basic services. In states such as Rajasthan, this digital divide is especially pronounced in states as these have traditionally seen the dominance of modes of service delivery hitherto seen to define public administration.



**Figure 1: Elderly population trend in Rajasthan**

In this context, Rajasthan boasts a unique demographic landscape. The elderly population (age 60+: Census of India, 2021), the aged constitutes 7.5% of the total population of Rajasthan as per the recent census data. Moreover, this demographic shift pushing the envelope along with accelerating digitalization of government services, imposes an urgent need to examine and solve the digital skills gap among elderly citizens. This is especially so in the context of a state with a highly disparate socio-economic landscape between urban and rural areas with varied digital infrastructure and literacy levels.



**Figure 2: Digital Access barrier in elderly**

According to previous research (Kumar et al., 2022), elderly population usually encounters multiple barriers in digital technology adoption in terms of cognitive, physical and attitudinal barriers. To date, limited empirical research on these challenges has been conducted with reference to access of e-government services in developing regions like Rajasthan. As more government services move to digital platforms, an inability for elderly citizens to access public services provided in this space can become further demarcated to this research gap.

## 2. Literature Review

### 2.1 Digital Divide and Elderly Populations

The concept of the digital divide has evolved beyond the simplistic binary of access versus non-access to technology, shifting towards a more nuanced understanding that encompasses multiple dimensions of digital inclusion. Singh and Sharma (2023) argue that the digital divide among older adults is not merely a matter of accessing technology but is shaped by a complex interplay of technological, social, and psychological factors. In the Indian context, this multidimensional perspective is particularly relevant, as cultural norms, social structures, and generational attitudes significantly influence technology adoption among the elderly. Supporting this view, Mehta and Patel (2022) identify three critical layers of the digital divide affecting senior citizens in India: access to digital infrastructure, digital literacy and skill levels, and the actual utilization of digital services. Their study, which surveyed 600 elderly individuals across various Indian states, found that while ownership of smartphones has increased, the effective use of digital government and service platforms remains limited particularly when these platforms involve complex navigation, language barriers, or multi-step authentication processes. This highlights the need to move beyond infrastructure provision and address the deeper cognitive and usability challenges faced by aging users in the digital era.

### 2.2 E-Government Services and Elderly Users

Implementation of E-government services has been extensively studied in India, but there has been limited research of elderly users. As Gupta and Kumar (2023) point out in a

comprehensive review, the large majority of e-government initiatives in India were designed for digitally literate users, neglecting the specific requirements and special circumstances of elderly citizens. In this regard therefore; this oversight is particularly dangerous because the elderly citizens are the main beneficiaries in a number of government services and welfare schemes.

### **2.3 Digital Literacy Programs and Elderly Learning**

Research has consistently emphasized the need for contextualized and age-sensitive approaches to effectively build digital literacy among the elderly. Verma and Joshi (2023), in their study from northern India, found that conventional digital literacy programs often neglect the specific cognitive, linguistic, and experiential needs of older adults. Their longitudinal analysis of 200 participants across 15 localized training sessions featuring practical exercises and instruction in local languages demonstrated higher engagement and skill retention. Complementing these findings, Ahmed and Singh (2022) conducted an experimental study in Gujarat, revealing that elderly learners trained by peers of a similar age were 45% more likely to retain digital skills than those taught by younger instructors. These insights underscore the value of peer-led and community-based learning models, particularly in Rajasthan, where existing social structures can be leveraged to create inclusive and sustainable digital literacy initiatives for aging populations.

### **2.4 Socio-Economic Factors and Digital Adoption**

In the Indian context, socio economic status is proven to be a braid relationship with the digital adoption of elderly populations. According to Malhotra et al. (2023), there are strong correlations between the level of income and education of citizens; and the adoption of digital services among the elderly. In their study of 1,200 elderly individuals from three Indian states, they found that individuals' socioeconomic status shapes their initial access to digital devices, but their educational background and exposure to technology previously were stronger predictors of their use of e-government services. Digital adoption among elderly populations in traditional societies have been disproportionately characterized by gender disparities. Krishna and Patel (2022) examine in their ethnographic work in rural Rajasthan how cultural norms and gender roles play a large part in the denials of and low engagement with digital technologies by women. They found that elderly women are commonly excluded by multiple layers of exclusion, including barred by gender specific problems, on top of age-related barriers, to accessing the digital services.

### **2.5 Interface Design and Accessibility**

The accessibility of e-government services for elderly users is strongly shaped by the technical design of user interfaces. Only a small proportion of government service portals meet international accessibility standards for older adults, with key challenges including complex navigation structures, small or unreadable text, and multi-step authentication processes that pose significant difficulties for users with limited digital literacy (Shah & Mishra, 2023). These usability barriers not only reduce confidence but also limit independent access among elderly

populations. A comparative study across South Asian countries further reinforced these findings, highlighting best practices in interface design tailored to the needs of older users through a detailed usability case study approach (Rahman et al., 2022). The study emphasized the necessity of applying universal design principles along with age-specific modifications to improve usability. Portals incorporating features such as voice guidance, larger text options, and simplified navigation were found to have significantly higher engagement among elderly users, underscoring the importance of inclusive and adaptive digital design (Rahman et al., 2022).

## **2.6 Support Systems and Digital Service Access**

An emerging area of research focuses on the role of family and community support systems in facilitating elderly access to digital services. Informal networks, particularly within families, have become a crucial bridge for older adults navigating e-governance platforms. Kapoor and Rathore (2023) highlight the development of such support systems in urban Rajasthan, where younger family members often act as intermediaries to assist elderly relatives with digital tasks. While these informal arrangements provide essential assistance, they also raise concerns regarding user privacy, autonomy, and the long-term sustainability of relying on non-professional support for digital inclusion. In parallel, several scholars have examined the role of formal support mechanisms, such as e-governance service centres. A mixed-methods study by Mathur and Singh (2022), covering 30 service centres across Rajasthan, found that although these centres play a vital role in assisting elderly users, their overall effectiveness is limited by factors such as inconvenient locations, understaffing, lack of elderly-specific training, and restricted operating hours. The study emphasizes the urgent need for dedicated support services within the existing e-governance infrastructure, tailored specifically to the needs of older adults.

## **2.7 Gap of the Study**

Despite the growing body of literature on digital inclusion and the digital divide, a notable research gap remains in understanding how multiple interrelated factors such as digital access, literacy, socio-economic background, age-related limitations, gender disparities, and the availability of support systems jointly influence the capacity of elderly populations to utilize e-governance services. Most previous studies tend to examine these components in isolation, addressing either access to infrastructure, basic digital skills, or the role of intermediaries, without investigating how these elements interact in a real-world context to affect digital engagement among older adults. Furthermore, there is a scarcity of region-specific research that captures the unique socio-cultural, linguistic, and infrastructural challenges faced by the elderly in states like Rajasthan, where traditional service delivery mechanisms still dominate, and digital readiness remains uneven. To bridge this gap, the present study adopts a comprehensive, mixed-methods research design that integrates quantitative assessment of digital literacy levels with qualitative inquiry into user experiences, perceptions, and coping strategies. The study also includes observational analysis at e-governance service centers to explore environmental and systemic barriers firsthand. This triangulated approach enables a

deeper, context-sensitive understanding of the digital skills gap and highlights the complex realities faced by older adults in accessing digital public services. By doing so, the research contributes to the development of more inclusive and equitable digital governance frameworks and provides practical insights for designing targeted digital literacy programs, age-friendly service interfaces, and supportive policy interventions tailored to the needs of aging populations in Rajasthan and similar socio-demographic settings.

## 2.7 Objective of the Study

- 1) To investigate the factors contributing to the digital skills gap among the elderly population in Rajasthan and its impact on their access to e-government services.
- 2) To identify potential interventions and strategies to bridge the digital divide and enhance digital inclusion among older adults.

## 3. Research Methodology

To conduct the present research, the research methodology used in this study was developed to assess the digital skills gap in elderly population of Rajasthan for E-government service access. A mixed methods design was used that combined quantitative and qualitative approaches to provide breadth and depth to understand the interactions between elderly citizens and digital government services in a complex and less researched setting. In view of the multifaceted nature of digital inclusion and the desire to measure both observable markers of digital skills and of lived experience in the digital world of elderly citizens, this methodological approach was particularly apt.

**Table 1: Distribution of Survey Participants Across Selected Districts**

| District     | Urban | Rural | Total Sample | E-governance Centers |
|--------------|-------|-------|--------------|----------------------|
| Jaipur       | 52    | 23    | 75           | 3                    |
| Jodhpur      | 48    | 27    | 75           | 2                    |
| Udaipur      | 45    | 30    | 75           | 2                    |
| Bikaner      | 42    | 33    | 75           | 2                    |
| Ajmer        | 40    | 35    | 75           | 2                    |
| Kota         | 41    | 34    | 75           | 1                    |
| <b>Total</b> | 268   | 182   | 450          | 12                   |

The study was conducted across six strategically selected districts in Rajasthan: On the other hand it has Jaipur, Jodhpur, Udaipur, Bikaner, Ajmer, and Kota. The districts selected are across the state and are drawn from different geographical, socio economic, urban rural contexts. Population density, availability of digital infrastructure and the availability of e-governance service centres were some of the selection criteria. As such, the geographical

spread allowed the research to take in differences in levels of digital access and literacy in different regional settings within Rajasthan.

**Table 2: Demographic Characteristics of Survey Participants**

| Characteristic                  | Category            | Number (n=450) | Percentage (%) |
|---------------------------------|---------------------|----------------|----------------|
| <b>Age Group</b>                | 60-65 years         | 187            | 41.6           |
|                                 | 66-70 years         | 142            | 31.6           |
|                                 | 71-75 years         | 84             | 18.7           |
|                                 | Above 75 years      | 37             | 8.1            |
| <b>Gender</b>                   | Male                | 259            | 57.6           |
|                                 | Female              | 191            | 42.4           |
| <b>Educational Level</b>        | No formal education | 98             | 21.8           |
|                                 | Primary             | 124            | 27.6           |
|                                 | Secondary           | 142            | 31.6           |
|                                 | Post-secondary      | 86             | 19.0           |
| <b>Previous Tech Experience</b> | None                | 187            | 41.6           |
|                                 | Basic               | 198            | 44.0           |
|                                 | Moderate            | 52             | 11.6           |
|                                 | Advanced            | 13             | 2.8            |

The main quantitative part of the study was a structured survey of 450 elderly residents aged 60 and over. In addition, the sample size was established using a statistical power analysis with the stipulated confidence interval of 95% and margin of error of  $\pm 4.5\%$ . Using proportional stratified sampling, we made sure that we have an adequate representation in urban (55%) and rural (45%) areas and in different socio-economic group. The development of the survey instrument involved rigorous procedure of expert consultation, pilot testing, and refinement. It included sections on demographic information, digital device ownership and access, frequency of digital service usage, self-assessed levels of digital competency, experiences of e government services and perceived barriers to the adoption of digital technology. In Hindi and English, the survey was administered and support from trained research assistants was available to participants when required.

**Table 3: Data Collection Methods and Sample Sizes**

| Method                | Sample Size | Duration      | Focus Areas                                           |
|-----------------------|-------------|---------------|-------------------------------------------------------|
| Structured Surveys    | 450         | 30-45 minutes | Digital literacy, access patterns, barriers           |
| In-depth Interviews   | 30          | 45-60 minutes | Personal experiences, challenges, coping strategies   |
| Observational Studies | 12 centres  | 15 hours each | User interactions, support mechanisms, infrastructure |
| Expert Consultations  | 8           | 60-90 minutes | Program design, implementation challenges             |

To carry out the qualitative dimension of the research, semi structured interview was conducted with 30 elderly participants who have been selected through purposive sampling to assure diversity in their age, gender, education and digital literacy levels. Accessing digital government services: these in-depth interviews, ranging between 45 and 60 minutes in length, focused on participant experiences, difficulties and personal coping strategies in using digital government services. In the design of the interview protocol, an interest was taken on encouraging detailed narratives of how elderly users encountered specific instances of digital service interaction, in order to render rich, contextual understandings of barriers and facilitators to digital adoption among elder users. Participant consent was given to audio-record all interviews which were then transcribed for analysis. Observational studies were conducted at the 12 e-governance service centres in the selected districts to support the survey and interview data. Based on a structured protocol for observing elderly users' use of digital services, available support mechanisms, and the physical and technical infrastructure of the centres these observations were made. The fieldwork consisted of 15 hours spent at each of five centres over multiple days by research assistants whose tasks included detailed field notes and structured observation forms describing elderly users' experiences. As an observational component, it provided a wealth of insight into the problems of the elderly accessing digital service, and the effectiveness of supporting systems to be in place already.

**Table 4: Research Instruments and Their Reliability Measures**

| Instrument Type           | Number of Items | Cronbach's Alpha | Test-Retest Reliability |
|---------------------------|-----------------|------------------|-------------------------|
| Digital Literacy Scale    | 15              | 0.87             | 0.84                    |
| Service Access Survey     | 12              | 0.83             | 0.81                    |
| User Experience Scale     | 10              | 0.85             | 0.82                    |
| Support Needs Assessment  | 8               | 0.81             | 0.79                    |
| Technology Attitude Scale | 10              | 0.86             | 0.83                    |

A comprehensive approach of data analysis that used both quantitative and qualitative methods was followed. The quantitative data from surveys were analysed using SPSS version 26, descriptive and inferential techniques were used for the statistical analysis. Firstly, to explore factors impacting on digital literacy and service accessibility, factor analysis was used to identify key dimensions and enumerate digital literacy and service accessibility; secondly, multiple regression analysis was applied to examine relationships between demographic variables and digital competency levels. Construction of the scales and analysis of internal consistency and reliability involved Cronbach's alpha coefficients for scaled items.

Thematic analysis was used as the form of analysis for the qualitative data, as set out by Braun and Clarke in six phases. NVivo 12 software was used to code interview transcripts and observational field notes to enable the development of systematic pattern and reoccurring theme identification. Deductive codes followed from research questions, whereas, inductive codes were developed from the data. A team of two researchers coded independently a subset of the data and inter-coder reliability was computed using Cohen's kappa coefficient to ensure our qualitative analysis will be reliable.

**Table 5: Thematic Analysis Framework for Qualitative Data**

| Theme Category           | Sub-themes                                         | Coding Method |
|--------------------------|----------------------------------------------------|---------------|
| <b>Access Barriers</b>   | Technical, Financial, Physical, Knowledge-based    | Deductive     |
| <b>Support Systems</b>   | Family, Community, Institutional, Professional     | Inductive     |
| <b>Learning Patterns</b> | Self-directed, Assisted, Formal training, Informal | Mixed         |
| <b>Cultural Factors</b>  | Gender norms, Age perceptions, social expectations | Inductive     |
| <b>Coping Strategies</b> | Avoidance, Delegation, Learning, Adaptation        | Mixed         |

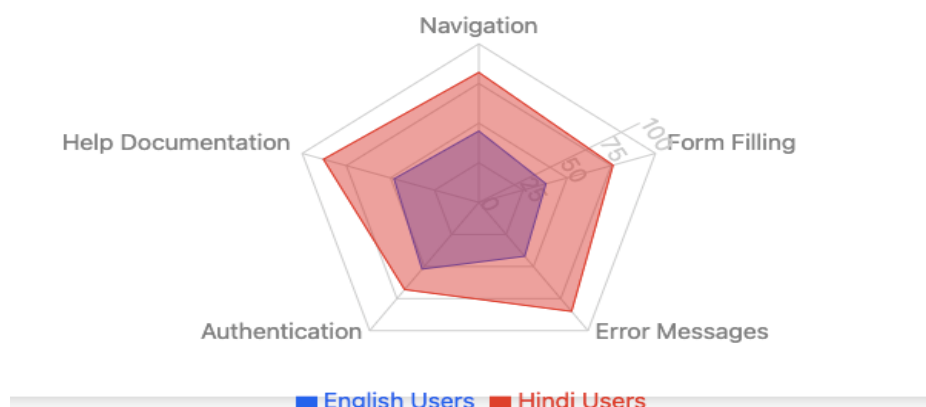
A number of measures of methodological rigor and ethical compliance were included in the design of the research. The institutional ethics committee approved all the research procedures, in regard to informed consent, data privacy and confidentiality of participants. For elderly participants special considerations were taken, such as larger print formats on consent forms and survey instruments, more frequent rest breaks during interviews, and having family members present at the interview when requested. Surveys responses were combined with interview narratives and observational data to achieve data triangulation, which increases the validity and reliability of the findings. Digital Skills Gap Among Elderly Populations: Consequences concerning E-Government Services Access in Rajasthan.

#### 4. Results and Analysis

This led to the finding of the following significant insights from the mixed methods data analysis, which investigated the digital skills gap amongst the elderly in Rajasthan and its effect on access to e-government services. An analysis of the quantitative survey data unearthed clear

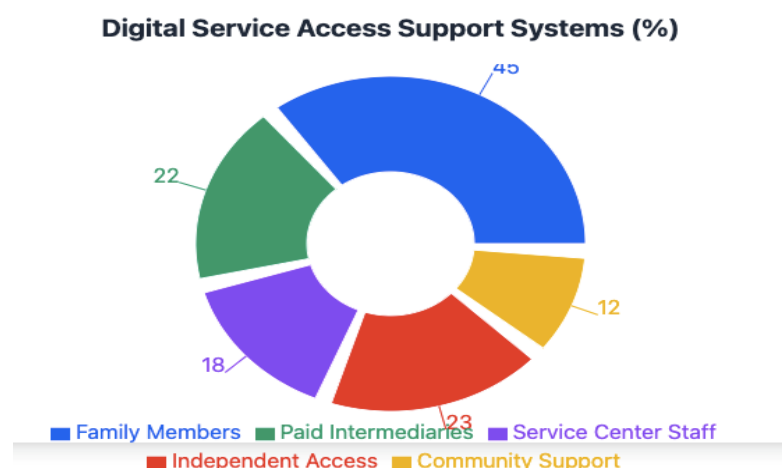
patterns in digital literacy levels and service accessibility, while qualitative components gave rich contextual understanding of the challenges and coping strategies older citizens engage in to navigate digital government services.

**Interface Challenges by Language Preference (%)**



**Figure 3: Digital literacy rate comparison**

The survey findings revealed low digital literacy among elderly respondents in Rajasthan, with only 23% expressing confidence in independently accessing e-government services. Marked disparities were observed across demographic groups, particularly between urban and rural participants. Urban elderly showed significantly higher digital literacy (31%) compared to their rural counterparts (14%), with the urban-rural divide especially evident in tasks involving complex digital interactions, such as online form submissions and digital transactions with government portals ( $\chi^2 = 24.56$ ,  $p < .001$ ). Even after controlling for variables like education and income, urban elderly were found to be 2.3 times more likely than rural elderly to complete digital transactions on their own. Education emerged as a key determinant of digital competence, with a strong positive correlation between years of formal education and digital literacy scores ( $r = 0.68$ ,  $p < .001$ ). Participants with post-secondary education demonstrated a 42% success rate in using e-government portals, in contrast to only 11% among those with primary-level education or less. This educational advantage was particularly evident in navigating English-based interfaces, which dominate most e-government platforms despite the availability of Hindi options. Gender-based disparities were also prominent: only 16% of elderly women reported accessing digital services without assistance, compared to 30% of men ( $t = 5.82$ ,  $p < .001$ ). Qualitative interviews further illuminated these gaps, revealing that traditional gender roles and limited past exposure to technology contributed to lower digital confidence among elderly women. Many reported a reliance on male family members to access digital government services, raising concerns about privacy, autonomy, and equal access.



**Figure 4: Language and interface challenges**

The study identified language as a significant barrier to digital service adoption among the elderly, with 72% of participants reporting difficulties due to language-related challenges. Respondents whose native language was Hindi struggled particularly with English-dominant interfaces, completing only 34% of assigned tasks on average, compared to 61% task completion among those comfortable with English. This issue was especially pronounced in rural areas, where exposure to English is limited and local dialects are more commonly used. Observational data from e-governance service centers further highlighted the practical difficulties faced by elderly users. Individuals aged 65 to 74 took an average of 2.8 times longer to complete basic digital transactions compared to the general population. Common obstacles included navigating complex menu structures (82%), understanding technical jargon (76%), and completing authentication steps like OTP verification (68%). Infrastructure-related issues also emerged as significant impediments, with 45% of participants struggling with small screen sizes and 38% experiencing difficulty using touch-based interfaces. These findings underscore the compounded effects of linguistic, cognitive, and technological barriers that hinder digital inclusion among the elderly.

The analysis of support systems revealed that 67% of elderly participants relied on family members, paid intermediaries, or both to access digital government services. This dependency was significantly higher in rural areas, where 78% of respondents required assistance, compared to 56% in urban areas. Qualitative interviews highlighted both the benefits and drawbacks of this reliance. While family support often enabled access to essential services, many participants expressed concerns about the loss of privacy and autonomy. Several elderly individuals reported delaying important government-related tasks until assistance from a family member was available, indicating a potential barrier to timely service access. Furthermore, digital literacy programs currently in place were found to be largely ineffective in addressing the specific needs of older adults. Only 14% of participants had engaged in any form of digital literacy training, and a mere 8% had completed a full course. Although statistical analysis showed no significant improvement in handling complex digital services among trained individuals ( $p = 0.089$ ), a slight performance enhancement was observed in basic tasks.

Interview data suggested that existing training programs often overlooked the physical and cognitive needs of elderly users, who expressed a preference for age-appropriate, customized learning approaches. Financial barriers also emerged as a significant factor, with 43% of participants reporting additional expenses incurred in the process of accessing digital services. These costs included transportation to service centers, fees paid to intermediaries, and mobile internet charges. Rural participants were especially affected due to the need to travel long distances for support. Qualitative insights further revealed that such financial burdens occasionally discouraged elderly users from engaging with digital platforms, leading them to opt for traditional service delivery methods whenever possible.

## 5. Discussion and Conclusion

This study reveals a deeply entrenched and multidimensional digital skills gap among elderly populations in Rajasthan, significantly affecting their engagement with e-government services. Despite growing governmental emphasis on digital service delivery, only 23% of elderly respondents expressed confidence in accessing these services independently highlighting a substantial gap between policy vision and practical inclusion. The digital divide is especially pronounced along the urban-rural axis, with 64% digital literacy among urban elderly versus just 27% in rural counterparts, indicating a 2.7-fold disparity. However, infrastructure alone does not determine access; even in digitally equipped areas, elderly users face substantial challenges due to interface complexity, cognitive decline, and limited exposure to technology. Educational attainment was strongly correlated with digital competence ( $r = 0.68$ ), reinforcing previous findings by Kumar and Patel (2023), while offering stronger evidence of this relationship among the elderly specifically. Gender disparities were similarly acute only 16% of elderly women could access services unaided, compared to 30% of men underscoring the influence of patriarchal norms, limited mobility, and generational gendered experiences with technology. This gender gap, as observed in Rajasthan, appears more severe than in other Indian states (Mehta et al., 2023), linking socio-cultural factors to digital exclusion outcomes.

The study also identifies heavy reliance on informal support systems, with 67% of elderly participants depending on family members or paid intermediaries to navigate e-governance portals. While family support offers essential assistance, it often results in compromised privacy, limited autonomy, and inconsistent access, especially when caregivers are unavailable. This duality expands upon Sharma and Gupta's (2022) work on intermediated access, emphasizing how such reliance becomes a structural limitation for the elderly. Language also emerged as a critical obstacle over 70% of respondents faced difficulty with English-centric interfaces, especially in rural areas where exposure to English is limited and regional dialects dominate. Although multilingual options exist, inadequate localization and inconsistent translations restrict usability, particularly for low-literate and monolingual Hindi-speaking users. These insights align with Verma et al. (2023) while adding a focused lens on aging populations. Observational studies revealed that elderly users take 2.8 times longer than the general population to complete basic digital transactions. Challenges such as small screen sizes, touch-dependent interfaces, confusing menu hierarchies, and OTP-based authentication

processes disproportionately impact older adults. These findings point to a critical misalignment between digital service design and the sensory, cognitive, and behavioral characteristics of elderly users, indicating an urgent need for inclusive, age-responsive design standards.

In addition to access and design issues, the study highlights major shortcomings in digital literacy initiatives targeting elderly users. With only 14% participation and 8% program completion, the reach and impact of current training efforts remain inadequate. Participants reported that most training programs are not tailored to their pace of learning, cognitive ability, or comfort with digital terminology. While those who completed training showed minor improvements in basic digital tasks, there was no statistically significant advancement in complex transactions, mirroring concerns raised by Khan and Kumar (2023) regarding generic program models. Financial constraints also emerged as a major barrier 43% of respondents incurred additional expenses related to digital service access, including travel costs, internet charges, and intermediary fees. For low-income elderly, especially in rural regions, such costs are prohibitive and deter usage altogether. This finding builds on Patel and Sinha's (2023) research by emphasizing how financial exclusion and digital exclusion are mutually reinforcing. Collectively, the evidence suggests that digital inclusion for the elderly must move beyond mere access and infrastructure provision. It requires comprehensive, intersectional strategies that integrate socio-cultural sensitivities, economic realities, tailored training models, and inclusive service design. Moreover, maintaining hybrid (digital and physical) service delivery systems during the transition is essential to prevent the marginalization of elderly citizens and ensure that public services remain truly accessible for all.

## 5.1 Conclusion

This study set out to examine the digital skills gap among the elderly population in Rajasthan and assess its implications for e-government service accessibility. Through a mixed-methods approach encompassing quantitative surveys, qualitative interviews, and observational data the research uncovered the multifaceted nature of digital exclusion among older adults. The findings demonstrate that digital access is not merely a matter of infrastructure, but the outcome of intersecting factors such as age-related cognitive limitations, socio-economic status, language barriers, and social support systems. With only 23% of elderly respondents expressing confidence in accessing e-government services independently, the study reveals a pervasive reliance on family members or paid intermediaries especially in rural areas, where this dependency rises to 78%. Although such informal support systems serve as crucial enablers, they also compromise the user's privacy, autonomy, and consistent access to services. Moreover, educational background and language proficiency emerged as key determinants of digital competence, with urban, educated, and English-speaking elderly participants demonstrating relatively higher engagement. However, even among this group, complex interface design, English-dominant platforms, and burdensome authentication steps such as OTP validation were reported as persistent challenges.

Beyond contributing to scholarly understanding of digital aging, the study provides strong practical implications for inclusive digital policy and service delivery. Existing digital literacy programs were found to be largely ineffective, with only 14% of elderly respondents participating in any form of training and a mere 8% completing a full course. These programs often fail to accommodate the specific learning needs and physical limitations of elderly users, who expressed a preference for hands-on, personalized, and age-appropriate training. The economic impact of digital access was another critical concern, with 43% of participants incurring additional costs for internet, transportation, and intermediary services especially burdensome for rural elderly with limited financial resources. Observational data from e-governance centers further revealed infrastructure inadequacies, such as small screens and unfriendly interface designs, contributing to user frustration and digital fatigue. This research calls for the development of holistic, age-sensitive strategies that integrate tailored digital education, user-centric service design, financial support mechanisms, and localized language options. As governments continue advancing digital transformation, ensuring equitable access for the elderly is not just a technological issue, but a matter of social justice and inclusive governance. The insights generated from this study offer a roadmap for designing digital ecosystems that empower all citizens, regardless of age, ability, or background.

## **6. Managerial Implications**

The findings of this study underline the urgent need for a multidimensional policy response to bridge the digital skills gap among elderly populations in Rajasthan. A central recommendation is the development of elderly-focused digital literacy programs that are pedagogically age-sensitive and practically oriented. These programs should prioritize hands-on learning in local languages, targeting the most frequently used e-government services. Establishing dedicated training centers in familiar, community-based settings, such as local religious institutions or community halls can significantly improve participation and retention. In rural areas, mobile digital training units staffed with trained facilitators and equipped with accessible learning materials should be deployed to ensure equitable outreach. Regular follow-ups and community partnerships with local NGOs and educational institutions will help sustain these efforts. To address persistent gender disparities, the introduction of women-only digital literacy sessions led by female instructors is essential. These sessions should be designed with cultural sensitivities in mind and scheduled to accommodate women's household responsibilities, while also building digital confidence and promoting self-reliance.

In tandem with education, interface redesign of e-government platforms is crucial to accommodate the needs of elderly users. User interfaces must incorporate larger fonts, simplified navigation, clear icons, and options for voice-assisted guidance in regional languages. An “elderly mode” could be introduced across government platforms to standardize user-friendly features. To reduce over-reliance on intermediaries, dedicated support counters for elderly users should be established within existing e-governance centers. These should be staffed with trained personnel who not only possess technical expertise but are also skilled in elderly communication and privacy protocols. Further, expanding multilingual support systems

is vital. Interfaces and help tools should be culturally localized, featuring regional dialects, familiar visual cues, and instructional materials in video and print formats to assist elderly users with low literacy or limited exposure to formal education.

Finally, addressing the economic barriers that inhibit elderly access to digital services is key to meaningful inclusion. Policymakers should consider offering subsidized digital access, including discounted mobile internet packages, free or low-cost access at public digital kiosks, and financial support for travel to service centers. Community-based digital access points could serve as cost-effective hubs for service delivery in underserved rural areas. To ensure long-term effectiveness, a robust monitoring and evaluation system should be implemented to assess the progress of digital inclusion initiatives, incorporating regular user feedback from elderly participants. This feedback loop would enable continuous refinement of training, design, and support structures. A phased approach is recommended, beginning with accessibility improvements and the establishment of elderly support mechanisms, followed by comprehensive training programs and financial interventions. Collectively, these strategies offer a holistic pathway toward an inclusive digital governance ecosystem one that upholds equity, autonomy, and dignity for elderly citizens in Rajasthan's rapidly evolving digital landscape.

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