



International Journal of Advanced Mass Communication and Journalism

E-ISSN: 2708-4469
P-ISSN: 2708-4450
IJAMCJ 2025; 6(1): 100-110
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www.masscomjournal.com
Received: 02-01-2025
Accepted: 05-02-2025

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The effectiveness of voice assistants in bridging the digital literacy gap: A study among older adults in Karnataka

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DOI: <https://www.doi.org/10.22271/27084450.2025.v6.i1b.102>

Abstract

With the increasing ubiquity of digital technology, numerous obstacles emerge from insufficient digital literacy, impeding individuals' ability to effectively utilize digital services. This research focuses on how voice assistants, to interpret spoken commands, can enhance digital accessibility for this demographic. The study includes quantitative analyses from a survey of 69 individuals with limited technological knowledge who use these technologies, gathering insights into their experiences voice assistants. These findings suggest that voice assistants can reduce the digital literacy gap among digitally illiterate individuals in Karnataka. By promoting digital inclusivity and enhancing quality of life, voice assistants offer a potential solution to challenges faced by this demographic. The research reveals varying levels of awareness and usage of voice assistants among Gen X and baby boomer participants. While smartphone ownership is high, daily internet use is lower. Many participants are unaware of voice assistants, and only a fraction uses them regularly. Those who do use voice assistants primarily for searching information and watching videos. Challenges include difficulty understanding responses, local accents, privacy concerns, and limited local language functionality. Despite these challenges, many participants believe voice assistants help bridge the digital literacy gap. However, many are hesitant to recommend them, highlighting a need for improved accuracy, local language support, and enhanced privacy features to boost acceptance among older adults. This study contributes to understanding how NLP technologies can facilitate digital literacy and provides insights for developing strategies to leverage voice assistants in promoting digital inclusivity in Karnataka.

Keywords: Natural language processing, voice assistant, digital literacy, digital illiterate, digital divide

Introduction

The advancement of AI technology is empowering individuals to enhance their technological interactions and delegate both intricate and routine tasks to machines. A significant concern is the digital literacy gap, particularly among older adults, leading to social exclusion and limited access to essential services. How technologically illiterate individuals interact with VA technology for their benefit remains unclear (Chattaraman *et al.*, 2019) ^[9]. This study explores the potential of Natural Language Processing (NLP) technologies, specifically voice assistants, in bridging this digital divide for older adults in Karnataka, India. The growing prevalence of voice assistants in various devices has made them more accessible to older adults. The digital divide among older adults includes access to technology and the skills and confidence required to use it effectively. Factors such as education level, socioeconomic status, and prior exposure to technology significantly influence digital literacy.

Prior research highlights that older adults often face difficulties in adopting digital technologies due to limited exposure, cognitive barriers, and a lack of localized resources (Charness & Boot, 2016) ^[3]. Studies on digital literacy have emphasized the role of voice-assisted technologies in mitigating these challenges by providing intuitive, hands-free interactions (Liu, M., Wang, C., & Hu, J, 2023) ^[8]. Additionally, NLP-driven voice assistants have been identified as potential tools for increasing digital engagement, particularly among

seniors unfamiliar with text-based interfaces (Dowding et.al, 2023) [7]. This research focuses on understanding the experiences, challenges, and perceptions of older adults in Karnataka regarding digital technology and voice assistants. Quantitative data will be collected through surveys to assess current levels of digital literacy, technology usage patterns, and attitudes towards voice assistants.

This study recognizes the importance of cultural sensitivity and localization in technology adoption. By focusing on Karnataka, this research provides insights into how local contexts influence the acceptance and effectiveness of voice assistant technologies among older adults.

This localized approach can serve as a model for similar studies in other regions, contributing to a nuanced understanding of digital inclusion strategies across diverse populations. As digital technologies continue to evolve, it is crucial to ensure all segments of society benefit from these advancements. This research seeks to address recent demands for investigations that narrow the technological gap between seniors and the digital world (Duque *et al.*, 2021) [6] in Karnataka and beyond. By examining the intersection of aging, technology, and linguistic accessibility, this research contributes to the goal of creating a more equitable and inclusive digital future.

Literature Review: The integration of voice-activated assistants has revolutionized the way individuals interact with technology, particularly among diverse demographic groups. Recent studies have highlighted the significant potential of voice assistants to enhance digital literacy and inclusion among older adults, less tech-savvy populations, and regions with diverse linguistic backgrounds. Ammari *et al.*, (2019) [1] examines that voice assistants, when connected to the internet, execute various functions that older adults might find challenging to perform manually. Such tasks encompass web-based query resolution, provision of news and information, playback of audio and visual media, and management of communication platforms including email, telephony, and instant messaging services. Dinev & Hart (2005) [5] examined factors influencing Internet users' willingness to provide personal information online. The researchers found that Internet literacy was positively associated with willingness to provide personal information. Specifically, individuals with higher Internet literacy and technical knowledge were more likely to engage in e-commerce activities and disclose personal information online. This suggests that as people become more familiar and comfortable with Internet technologies, they develop greater trust and are more inclined to use online applications that require sharing personal data. Liu *et al.*, (2023) [8] study on older adults' intention to use voice assistants (VAs) presents significant implications for research and practice. The research extends the Technology Acceptance Model (TAM) by incorporating usability and emotional needs, providing a framework for understanding technology adoption among older adults.

The study reveals that perceived companionship is the strongest predictor of behavioural intention to use VAs, highlighting VAs' role in meeting the emotional needs of the elderly, particularly addressing loneliness and social isolation. The research confirms the importance of perceived usefulness, convenience, and internet self-efficacy in shaping older adults' acceptance of Voice assistant system.

Scope of Study

This research investigates the comprehension, adoption, and obstacles related to voice-activated digital assistants among individuals from Generation X and the baby boomer cohort, ranging from 44 to 85 years old. The investigation delves into their digital competence levels, the frequency of voice assistant utilization, and the impediments they face. Various demographic characteristics, such as educational background, professional field, and geographical location (urban or rural), are considered in the analysis. Additionally, the study explores the specific applications of voice assistants, their perceived advantages and drawbacks, and their potential to narrow the digital literacy divide. Through comprehensive examination, this research endeavours to offer practical insights and suggestions for enhancing voice assistant technology to more effectively cater to older adults and boost their digital participation and proficiency.

Statement of Problem

Voice assistants like Siri, Alexa, and Google Assistant are becoming more common, yet their capacity to reduce the digital literacy divide among older individuals is not fully realized. This study investigated the level of recognition, application, and obstacles related to voice assistants among Generation X and baby boomer participants. Initial results show low adoption rates, with major hurdles including difficulty comprehending responses and restricted functionality in native languages. The research aimed to uncover the root causes of these issues and suggest specific enhancements to improve the efficacy and acceptance of voice assistants in fostering digital literacy among older adults.

Objective

This research aims to assess the adoption and utilization of voice assistants among Generation X and Baby Boomers, with a focus on addressing the digital literacy gap for individuals aged 44-85. The study will examine both the obstacles and advantages associated with voice assistant use. Additionally, it seeks to uncover barriers to adoption and areas for improvement by exploring specific user challenges, ultimately proposing enhancements to boost the uptake and efficacy of voice assistants among older adults.

Methodology

This study uses quantitative approaches to comprehensively understand the awareness, usage, and challenges of voice assistants among Gen X and baby boomer participants.

Sample Selection: The study employed purposive sampling to select 69 participants, ensuring a diverse representation from urban and rural areas, various educational backgrounds, and different occupational statuses. The sample included individuals between 44 and 85 years old, categorized into two groups: Gen X (44-59 years) and baby boomers (60-85 years).

Data Collection and Analysis

A structured questionnaire was administered to gather quantitative data. The survey included questions on demographic information, ownership of smartphones and other devices, Internet usage, awareness, and usage of voice assistants as well as the perceived benefits and challenges of using these technologies.

Age of the Participant

According to the pie chart, 71% of the participants were baby boomers between the ages of 60 and 85, and 29% of the participants were GenX's between the ages of 44 and 59.

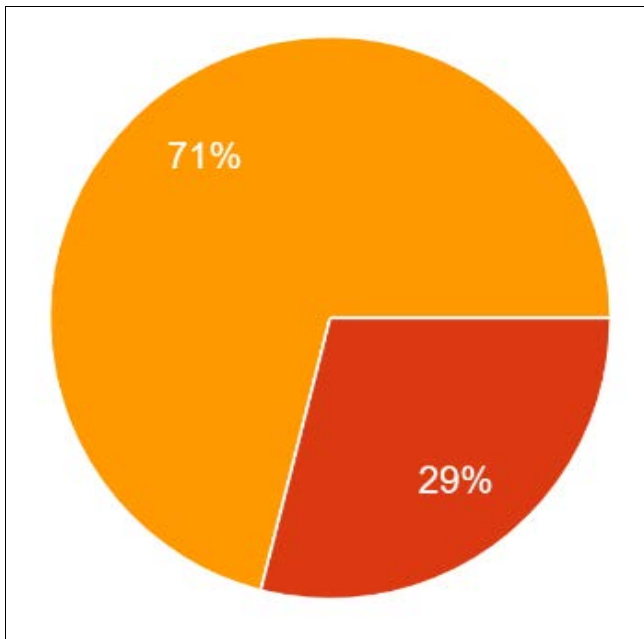


Fig 1: The Pie chart represents the ages of the participants in the survey.

Place of the Participant

59.4% of the Participants lives in urban are whereas 40.6% of the population lives in rural area
 52.5% of the participants are male and 47.5% of the participants are female.

Education Qualification

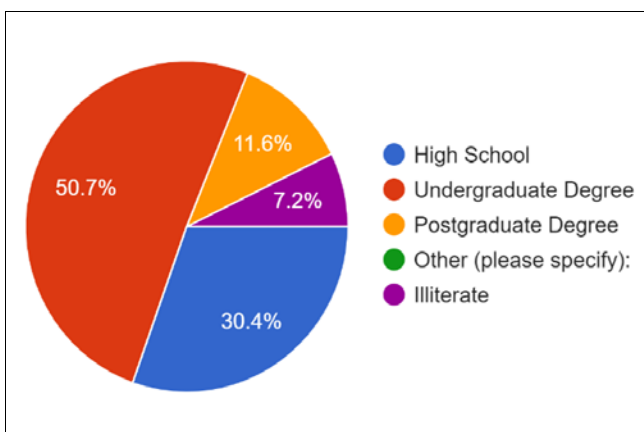


Fig 2: The chart shows the educational qualifications of the participants.

Among the participants, 6.6% were illiterate, 29.5% were high school graduates, 54.1% were undergraduates, and 9.8% were postgraduates.

Occupation

Among the respondents, 1.4% were business owners, 5.8% were unemployed, 8.7% were employed, 15.9% were self-employed, 39.1% were housewives, and 29% were retired.

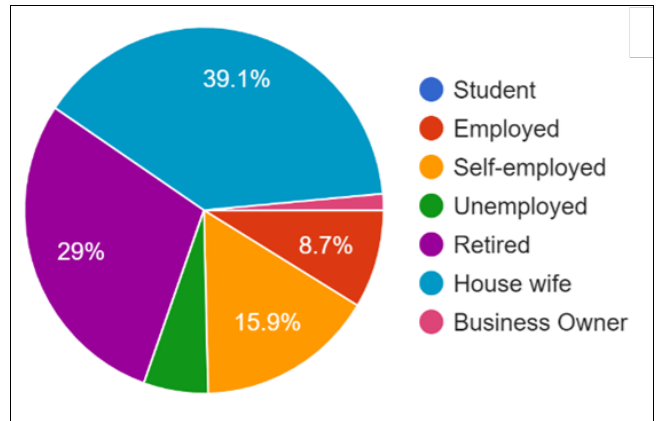


Fig 3: Pie chart representing respondents' occupation.

Evaluating the popularity and usage of voice assistants among Gen X and Baby Boomers in bridging the digital literacy gap among participants aged 44-85 years. This study aims to assess the popularity and utilization of voice assistants among Generation X and Baby Boomer populations, specifically focusing on individuals aged 44-85 years. The research seeks to explore how these technologies contribute to bridging the digital literacy gap within this demographic. By examining adoption rates, usage patterns, and perceived benefits, the study will provide insights into the effectiveness of voice assistants as tools for enhancing digital competence and accessibility among older generations.

Owning of Smartphone

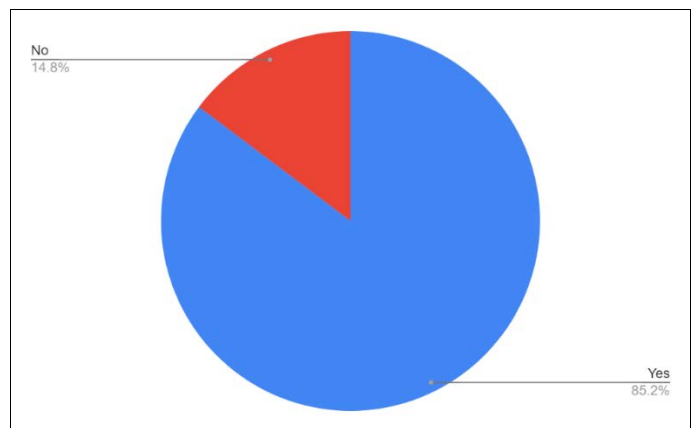


Fig 4: The pie chart represents smartphone ownership.

A substantial majority, comprising 85.2% of the participants, reported owning smartphones. This high percentage indicates the widespread adoption and integration of smartphone technology within the surveyed population.

In contrast, a notably smaller fraction of respondents, accounting for 14.8% of the total, did not possess smartphones. This minority group represents individuals who, for various reasons, have not acquired or chosen not to use smartphone devices.

The stark difference between these two groups highlights the prevalence of smartphone usage in the studied population. It suggests that smartphones have become an integral part of daily life for most respondents, while a smaller segment of the population remains without this technology.

The Usage of Internet

79.7% of the respondents used it on a daily basis, 18.8% never use internet whereas remaining 2.9% use it on weekly

basis. The data provided offers insights into the frequency of internet usage among a group of respondents.

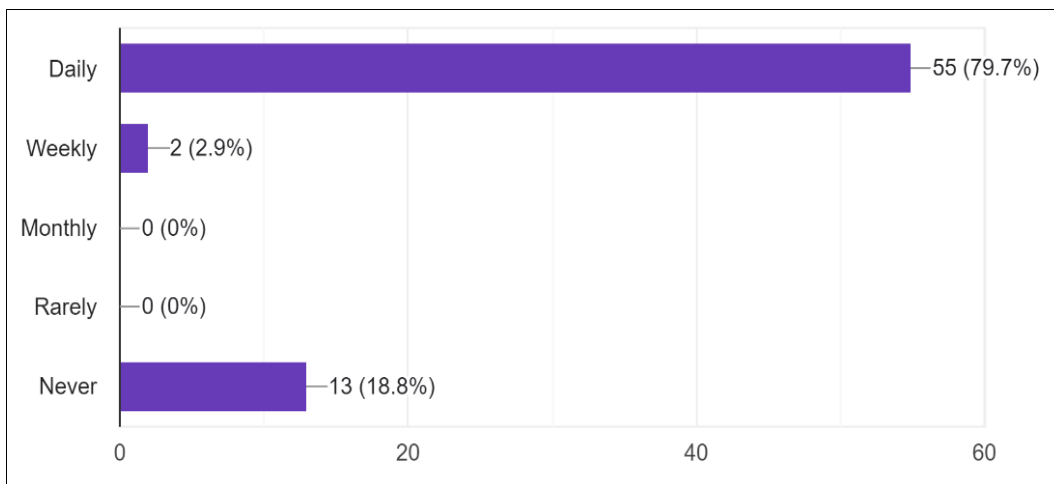


Fig 5: The pie chart represents internet usage.

Daily Users

A substantial majority, 79.7% of the respondents, report using the internet on a daily basis. This high percentage indicates that internet access and usage have become integral to the daily routines of most individuals in this group. Daily users likely rely on the internet for various activities such as work, communication, entertainment, and information gathering.

Non-Users

Interestingly, 18.8% of the respondents never use the internet. This segment represents a significant minority who, for various reasons, do not engage with online technologies. Possible explanations for this could include lack of access, personal preference, age-related factors, or socioeconomic constraints.

Weekly Users

The smallest group, comprising 2.9% of respondents, uses the internet on a weekly basis. These individuals may have limited access to the internet, specific weekly online routines, or may prefer to limit their online engagement to occasional use.

This distribution reveals a digital divide within the surveyed population, with a clear majority being highly connected and a notable minority completely disconnected from internet usage. The small percentage of weekly users suggests that internet usage tends to be polarized between frequent users and non-users, with few individuals falling into intermediate usage patterns.

Devices with the respondent

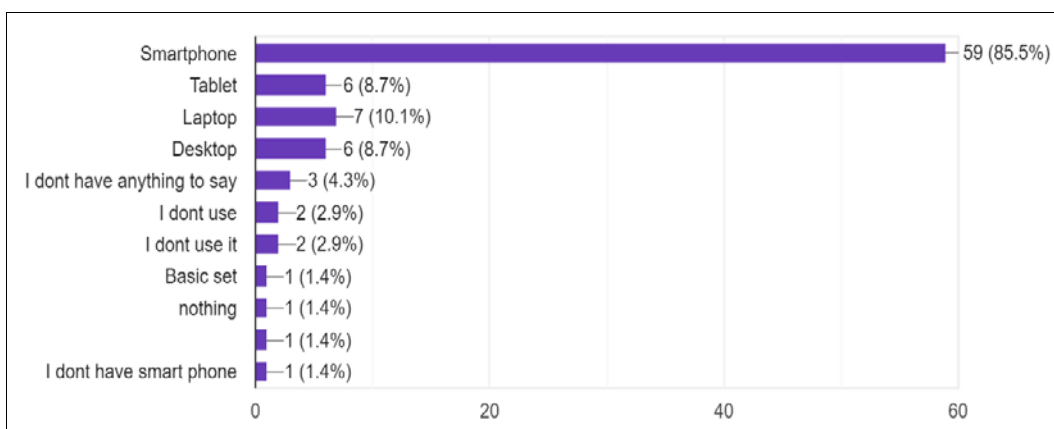


Fig 6: The pie chart shows the device used by the participants.

The data reveals a clear preference for smartphones, with a significant majority of 85.5% of participants reporting their use. This high percentage underscores the widespread adoption and reliance on mobile technology in contemporary society.

Tablets and desktops were used by a smaller proportion of respondents, each accounting for 8.7% of the sample. This suggests that these devices, while still relevant, are less commonly used compared to smartphones.

Laptops were utilized by 10.1% of the respondents. It's worth noting that this percentage is mentioned twice in the original statement, which may be a typographical error or indicate a need for data verification.

Interestingly, 19.4% of the respondents reported not using any gadgets. This subset of the population could represent individuals who prefer traditional methods of communication and information access, or those who may have limited access to electronic devices due to various

factors such as economic constraints or personal choice. The data presents a comprehensive picture of device usage patterns, highlighting the dominance of smartphones while also acknowledging the continued relevance of other electronic devices. This information could be valuable for various stakeholders, including technology companies, marketers, and policymakers, in understanding consumer preferences and digital engagement trends.

Awareness and Usage of Voice Assistants Section

43.5% of the respondents are aware of the voice assistants and 56.5% of the respondents are not aware of Siri, Alexa, or Google Voice assistants. The survey results reveal a notable divide in awareness regarding voice assistants among the respondents. Specifically, 43.5% of participants indicated familiarity with voice assistant technology, while a larger proportion, 56.5%, reported being unaware of popular voice assistants such as Siri, Alexa, or Google Voice.

This data suggests that voice assistant technology has penetrated the awareness of a significant portion of the population, with over two-fifths of respondents recognizing these AI-powered tools. However, it also highlights that there is still a considerable gap in awareness, as more than half of the respondents remain unfamiliar with these widely marketed voice assistant platforms.

The 43.5% awareness level indicates that voice assistants have gained substantial recognition, potentially due to their

integration into smartphones, smart home devices, and other consumer electronics. This group of respondents may have personal experience with voice assistants or have been exposed to them through media, advertising, or social interactions.

On the other hand, the 56.5% who are not aware of Siri, Alexa, or Google Voice assistants represent a majority that has yet to be reached by the marketing efforts of major tech companies or have not encountered these technologies in their daily lives. This could be due to various factors such as:

- Limited access to smart devices
- Demographic differences (e.g., age, location, or socioeconomic status)
- Personal preferences for traditional interfaces
- Lack of exposure to technology trends

The disparity in awareness levels presents both challenges and opportunities for companies developing and marketing voice assistant technologies. It suggests that there is still significant potential for growth in user adoption and market penetration. Companies may need to consider tailoring their marketing strategies to reach the unaware segment of the population and educate them about the benefits and applications of voice assistant technology.

Use of voice assistants

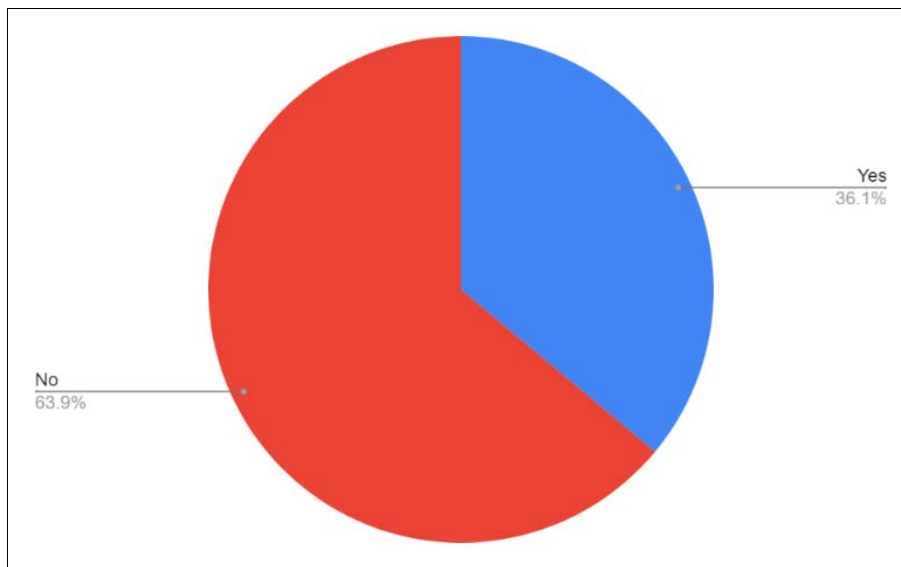


Fig 8: The pie chart represents the usage of voice assistants by Gen X and baby boomers.

The results reveal a significant disparity in the usage and understanding of voice assistants among the respondents. A minority of 36.1% demonstrated proficiency in utilizing voice assistants and incorporated them into their daily routines. These individuals likely leverage voice-activated technologies for various tasks, such as setting reminders, controlling smart home devices, or accessing information hands-free.

In contrast, a substantial majority of 63.9% of the respondents reported a lack of awareness regarding the proper use of voice assistants. This larger group may face challenges in adopting and integrating these technologies into their daily lives, potentially due to factors such as limited exposure, technological barriers, or a lack of

perceived necessity.

The stark difference between these two groups highlights a notable digital divide in terms of voice assistant adoption and utilization. This gap suggests potential opportunities for education and outreach initiatives to increase awareness and proficiency in using voice-activated technologies. Additionally, these findings indicate a need for voice assistant developers to focus on improving user-friendliness and accessibility to bridge the knowledge gap and encourage wider adoption among the general population.

Different types of voice assistants used by the participants

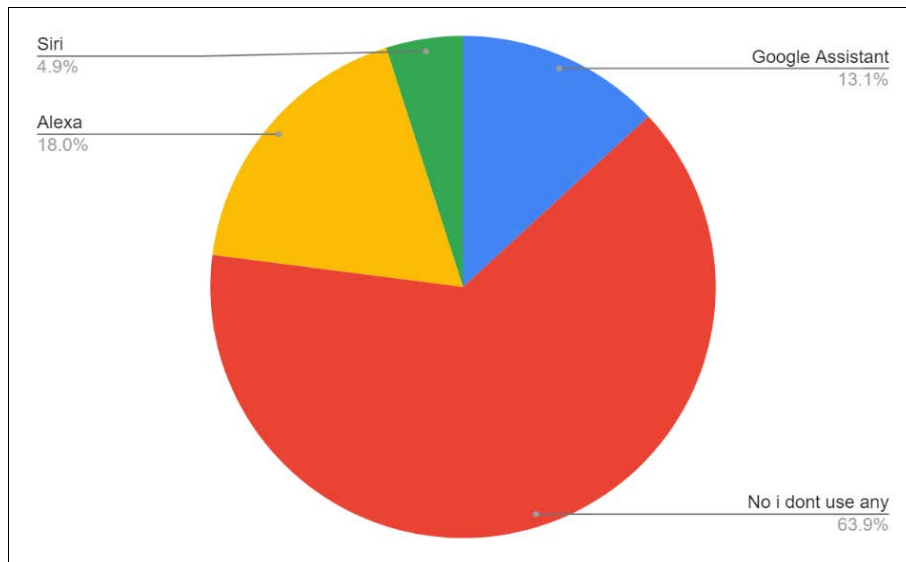


Fig 9: The pie chart shows the use of the different type of voice assistants used by the participants

The study revealed diverse usage patterns among participants regarding voice assistants. A small fraction (4.9%) reported using Siri, while Amazon's Alexa was more popular, with 18% of users. Google Assistant was utilized by 13.1% of the participants. Notably, a significant majority (63.9%) did not use any voice assistant devices at all. The study's findings highlight a significant disparity in the adoption of voice assistant technologies among participants. While Amazon's Alexa emerged as the most widely used voice assistant, with nearly one-fifth of the participants utilizing it, Google Assistant and Apple's Siri lagged behind in terms of user adoption.

Perhaps the most striking revelation from the study is that almost two-thirds of the participants did not use any voice

assistant devices. This substantial non-adoption rate raises important questions about the overall penetration of voice assistant technology in the general population. It suggests that despite the increasing prevalence of smart devices and the push towards more intuitive, voice-controlled interfaces, a significant portion of individuals either do not see the need for such technology or face barriers to adoption. These barriers could include concerns about privacy, difficulty in use, or simply a lack of perceived value in incorporating voice assistants into their daily routines.

Benefits of Voice Assistants
Purpose of using voice assistants

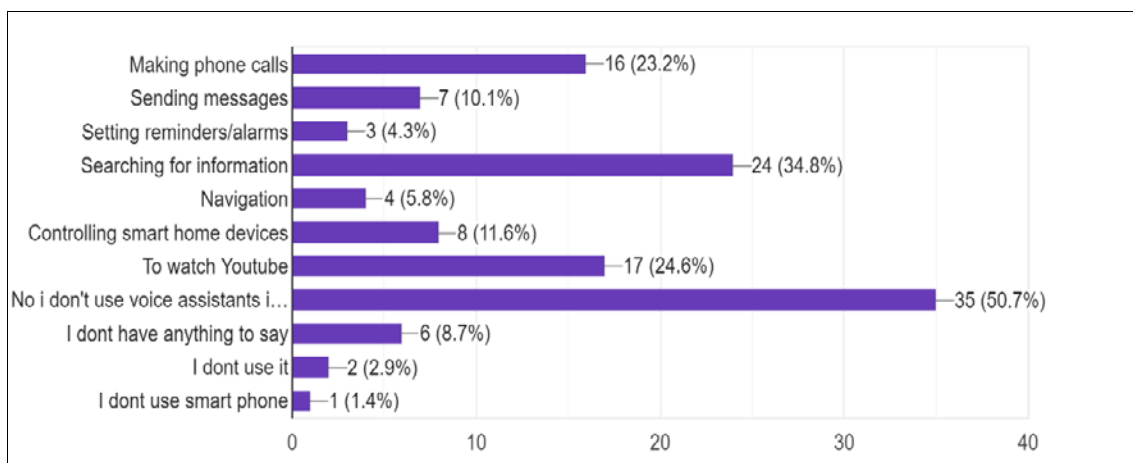


Fig 10: The pie chart represents the respondents' different uses of voice assistants.

23.2% used it to make phone calls, 10.1% for sending messages, 4.3% for setting alarms, 34.8% for searching for information, 5.8% for navigation, 11.6% for controlling smart home devices, 24.6% for watching YouTube, and 63.7% did not use any voice assistants at all. The data provided offers insights into the usage patterns of voice assistants among a surveyed group.

Non-usage: A significant majority, 63.7% of respondents, reported not using voice assistants at all. This indicates that despite the growing prevalence of voice-activated

technology, a substantial portion of the population has not yet adopted or integrated these tools into their daily lives.

Information search: The most common use of voice assistants among users was for searching for information, with 34.8% of respondents utilizing this feature. This suggests that voice-activated search is becoming an increasingly popular method for quick information retrieval.
Phone calls: Making phone calls was the second most frequent use, with 23.2% of respondents employing voice assistants for this purpose. This indicates that voice-activated dialling is a convenient feature for many users.

Video content consumption: A notable 24.6% of respondents used voice assistants to watch YouTube. This suggests that voice commands are becoming a common method for controlling media playback and navigating video content.

Smart home control: 11.6% of respondents used voice assistants to control smart home devices. While this percentage is lower than some other uses, it demonstrates the growing integration of voice technology with home automation systems.

Messaging: 10.1% of respondents used voice assistants for sending messages. This indicates that voice-to-text

functionality is being utilized for communication purposes, albeit to a lesser extent than some other features.

Navigation: 5.8% of respondents used voice assistants for navigation purposes. This suggests that while voice-activated navigation is available, it may not be as widely adopted as other features.

Alarm setting: The least common use among the listed options was setting alarms, with only 4.3% of respondents utilizing this feature. This could indicate that traditional methods of setting alarms are still preferred by most users.

Easy or difficult to use the voice assistant

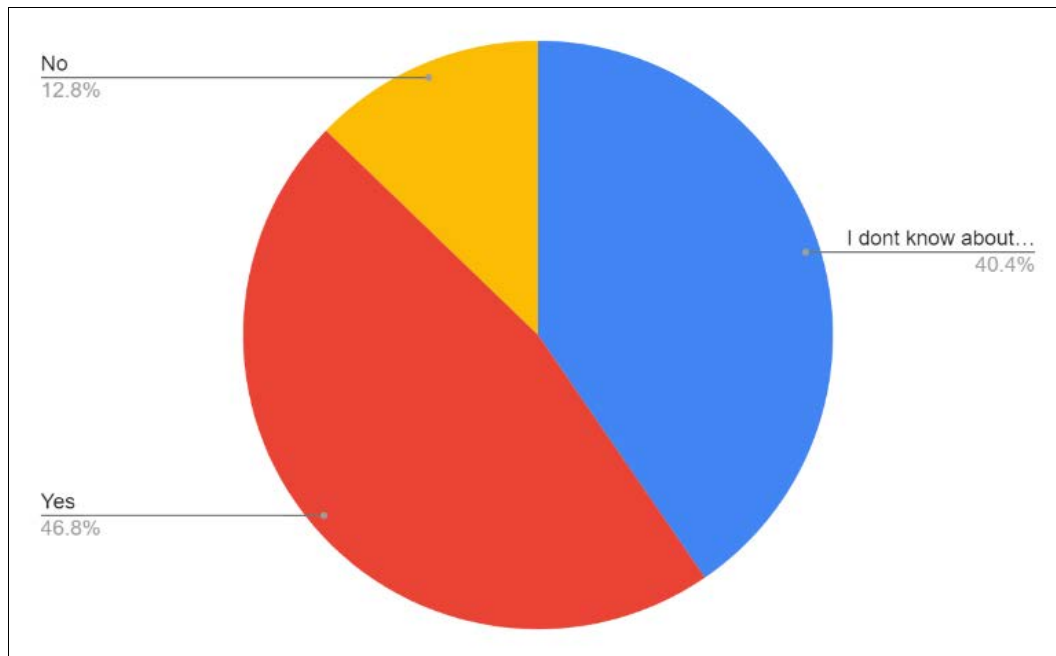


Fig 11: The pie chart represents the participants' responses regarding the ease and complexity of using voice assistants.

A total of 46.8% found it easy to use, 12.8% found it difficult, and 40.4% did not know about it at all. The data regarding the use of voice assistants reveals a mixed response among users.

Easy to Use

Nearly half of the respondents (46.8%) found voice assistants easy to use. This significant proportion suggests that a substantial number of users have successfully integrated voice assistants into their daily routines, finding them intuitive and user-friendly. These individuals likely appreciate the convenience and efficiency that voice-controlled technology offers.

Difficult to Use

A smaller portion of users (12.8%) reported difficulty in using voice assistants. This group may face challenges such as issues with voice recognition, trouble navigating the assistant's capabilities, or difficulty adapting to a voice-controlled interface. Their experience highlights the need for continued improvement in voice assistant technology and user education.

Unaware of Voice Assistants

A large segment (40.4%) of respondents were not aware of voice assistants at all. This substantial percentage indicates a significant gap in knowledge or exposure to this technology. There is a clear divide between those who find voice assistants easy to use and those who are unaware of the technology. The relatively low percentage of users finding it difficult to suggest that once people become aware of and start using voice assistants, they generally adapt well to the technology. There is substantial room for growth in the voice assistant market, given the large portion of people who are unaware of this technology. Manufacturers and developers may need to focus on both improving user experience for existing users and increasing awareness among potential new users. Further research could explore the reasons behind the difficulty experienced by some users and the factors contributing to the lack of awareness among a significant portion of the population. This information could be valuable in developing strategies to expand the user base and enhance the overall adoption of voice assistant technology.

The usage of Voice Assistant in simplifying the difficulties of performing the task

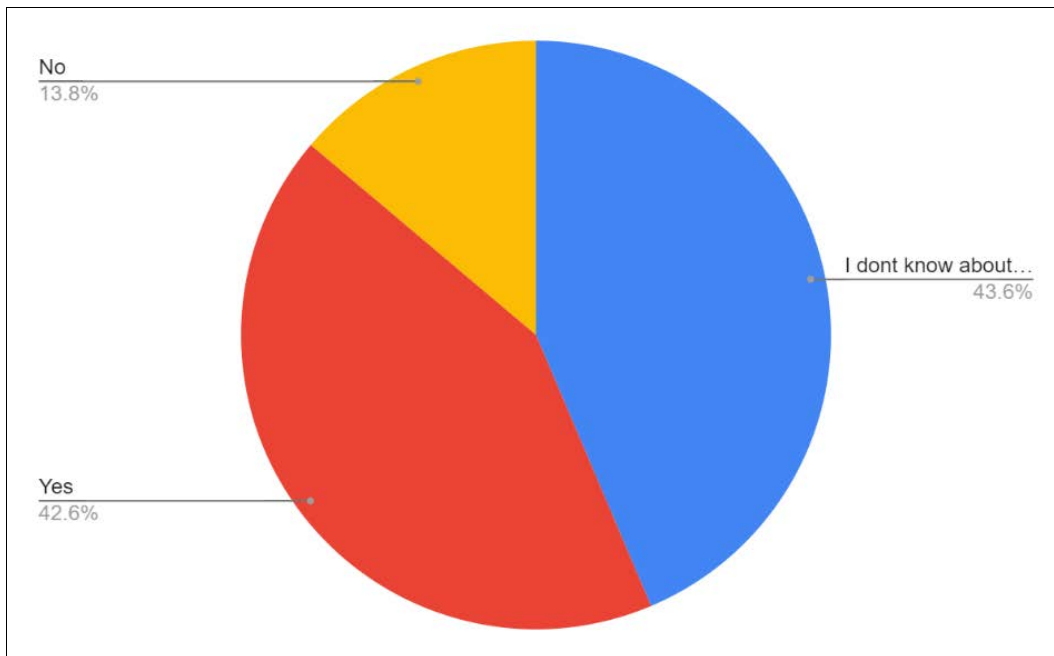


Fig 11: The pie chart represents the respondents' difficulties in using voice assistants.

The survey results revealed a diverse range of experiences and awareness regarding voice assistants among the respondents. A significant portion, comprising 42.6% of the participants, reported finding voice assistants highly beneficial in executing various tasks, highlighting the technology's effectiveness for a substantial user base. However, the data also uncovered some challenges, as 13.8% of respondents expressed difficulties in utilizing these digital aids, suggesting potential areas for improvement in user interface design or functionality. Perhaps most notably, the largest segment of the surveyed population, accounting for 43.6% of respondents, were entirely unaware of the existence of voice assistants

Voice assistant in bridging the digital literacy gap

The survey results revealed a diverse range of experiences

and awareness regarding voice assistants among the respondents. A significant portion, comprising 45.7% of the participants, reported finding voice assistants highly beneficial in executing various tasks, highlighting the technology's effectiveness for a substantial user base. However, the data also uncovered some challenges, as 10.6% of respondents expressed difficulties in utilizing these digital aids, suggesting potential areas for improvement in user interface design or functionality. Perhaps most notably, the largest segment of the surveyed population, accounting for 43.6% of respondents, were entirely unaware of the existence of voice assistants. This lack of awareness among a considerable portion of potential users indicates a significant opportunity for increased education and marketing efforts to broaden the reach and adoption of voice assistant technology.

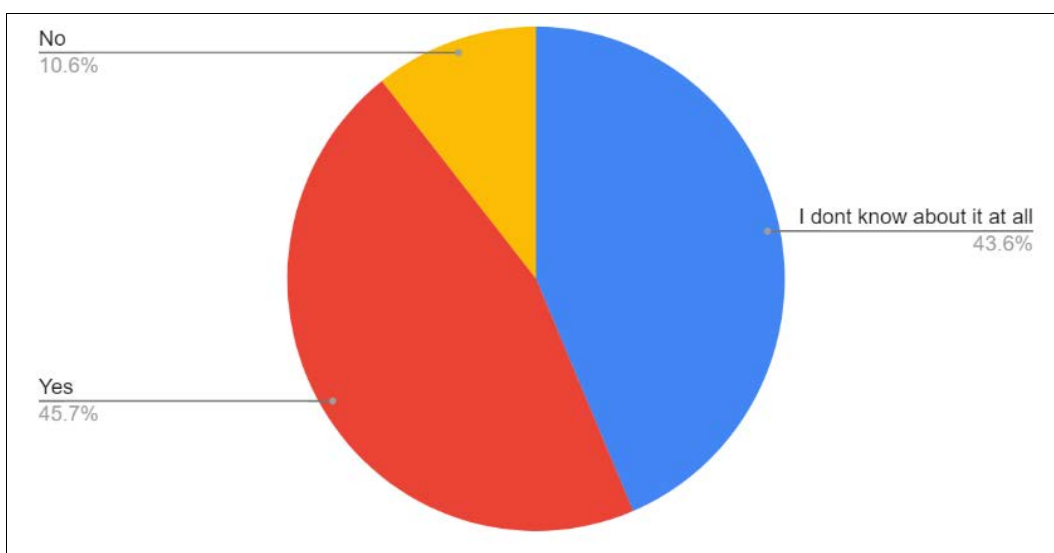


Fig 12: The pie chart represents the respondents' views about voice assistants in bridging the digital literacy gap.

Challenges and Suggestions

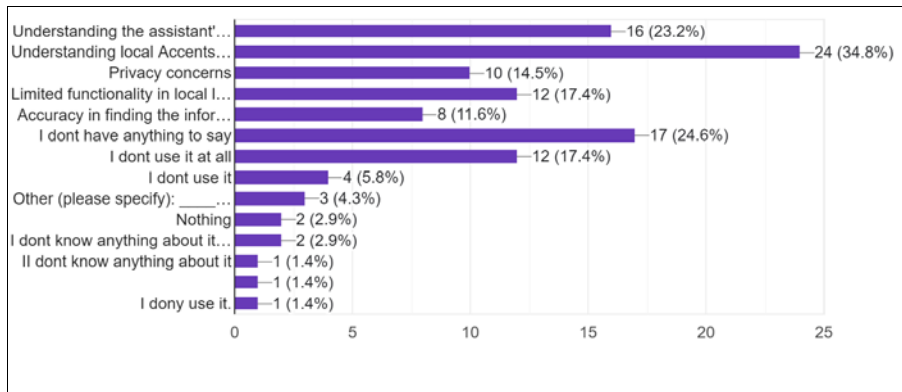


Fig 12: The chart represents the challenges faced by the respondents while using voice assistants.

The bar chart illustrates various challenges faced by users in utilizing voice assistant technology. The most frequently cited issue, reported by 34.8% of respondents, is the difficulty of the assistant in understanding local accents. This highlights a significant gap in linguistic diversity support, making it challenging for users with regional dialects to interact effectively with the technology. Additionally, 23.2% of users struggle with comprehending the assistant's responses, which could stem from unclear pronunciation, complex sentence structures, or a lack of contextual understanding. Another notable concern is privacy, with 14.5% of users expressing apprehensions about data security and potential surveillance risks. Language accessibility is another major barrier, as 17.4% of respondents report that voice assistants have limited functionality in local languages. This suggests a need for improved NLP models that cater to multilingual and dialect-specific interactions. Moreover, 11.6% of users find the assistant's information retrieval accuracy inadequate, raising concerns about the reliability of AI-driven responses. Beyond technical limitations, user engagement and awareness gaps are evident. About 24.6% of respondents

feel neutral about assistant, and 17.4% explicitly state that they do not use it at all, indicating either a lack of necessity or digital literacy barriers.

A smaller proportion of users (5.8%) also mention that they do not use the assistant, reinforcing the trend of limited adoption. Meanwhile, 4.3% of users provided unspecified concerns under "Other," while 2.9% indicated they had no issues. Additionally, a minor group (2.9%) admitted to lacking knowledge about voice assistants, emphasizing the need for better awareness campaigns. Overall, the findings emphasize the critical need for voice assistant improvements, particularly in regional language processing, accent recognition, accuracy, and privacy assurances. The data also suggests a broader challenge in digital literacy, where efforts to educate and engage users could enhance adoption rates. Addressing these issues will be crucial for making voice assistant technology more inclusive and effective, especially in linguistically diverse regions like Karnataka.

Features that can improve to voice assistants

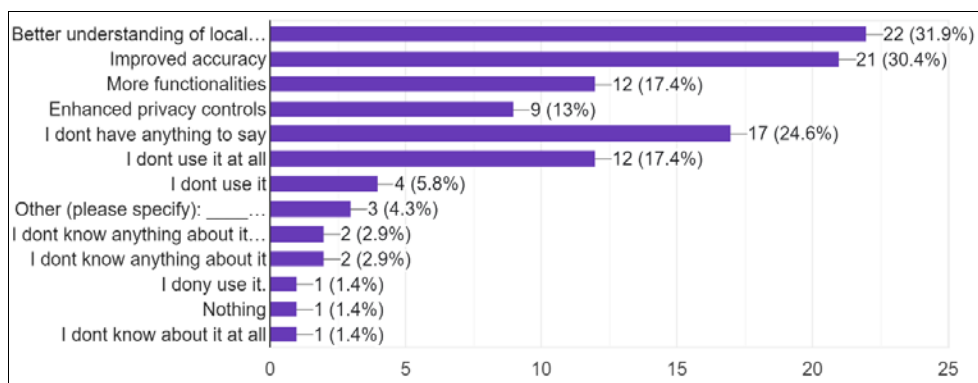


Fig 13: The chart represents the features that could be added to improve the experience of voice assistants.

The survey indicates diverse preferences among respondents regarding voice assistants. A significant portion, 31.9%, expressed a desire for improved understanding of local languages, highlighting the importance of linguistic diversity in voice technology. Closely following, 30.4% of participants prioritized enhanced accuracy, emphasizing the need for more precise and reliable interactions. Additionally, 17.4% of respondents sought expanded functionalities, indicating a demand for more versatile and capable voice assistants. Privacy concerns were also

evident, with some participants expressing a need for stronger privacy controls. Interestingly, 37.5% of the surveyed individuals reported having no knowledge about voice assistants, suggesting potential opportunities for education and awareness in this technological domain. These findings underscore the multifaceted nature of user expectations and the areas where voice assistant technology could be further developed to meet diverse user needs.

Personal Impact

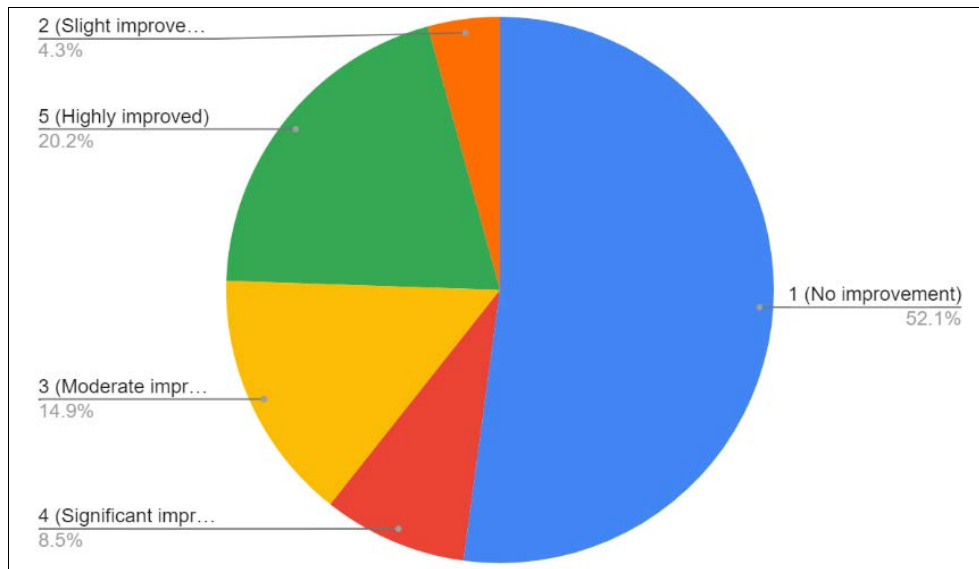


Fig 14: The pie chart represents the respondents view about the voice assistants in bridging the digital literacy gap.

The pie chart represents the perceived improvement in digital literacy among older adults following the adoption of voice assistant technology, categorizing responses into five levels ranging from "No improvement" to "Highly improved." The largest segment, accounting for 52.1% of respondents, reported no noticeable improvement, suggesting that voice assistants may not be intuitive enough or fail to address fundamental literacy challenges. A small portion (4.3%) experienced only a slight improvement, indicating that while some utility was found, it was not significant enough to boost overall confidence in digital tools. Nearly 15% of respondents reported a moderate improvement, suggesting that voice assistants provided some accessibility benefits, though other barriers to full adoption remain. Meanwhile, 8.5% of participants observed significant enhancements in their digital skills, showing that voice assistants played a meaningful role in helping them navigate digital platforms. Lastly, 20.2% of respondents experienced a high level of improvement, highlighting that for a portion of older adults, these technologies serve as effective tools in bridging the digital divide.

Recommending the use of voice assistant by the older citizens

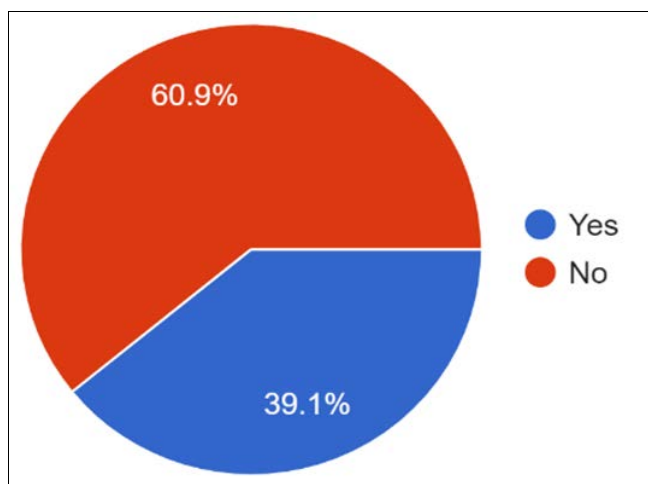


Fig 15: The pie chart represents the respondents view on recommendation of voice assistants to others

The survey results reveal a significant divide in respondents' willingness to recommend voice assistants to their peers for improving digital literacy. A substantial majority, 60.9% of participants, expressed reluctance to endorse these technologies to their family and friends, suggesting that a considerable portion of the surveyed population may have reservations about the effectiveness, usability, or overall value of voice assistants in enhancing digital skills among their age group. Conversely, 39.1% of respondents demonstrated a positive attitude towards voice assistants, indicating their willingness to recommend these tools to others in their age cohort. This group likely perceives voice assistants as beneficial in bridging the digital divide and improving technological proficiency among their peers. The stark contrast between these two groups highlights a notable disparity in perceptions regarding the utility of voice assistants for digital literacy enhancement. Several factors could contribute to this divide, including personal experiences with voice assistants, perceived ease of use and accessibility, concerns about privacy and data security, awareness of the potential benefits for digital skill development, and general attitudes towards technology adoption. This split opinion underscores the need for further investigation into the reasons behind the majority's reluctance to recommend voice assistants. Understanding these concerns could help in addressing potential barriers to adoption and improving the design and implementation of voice assistant technologies to better serve the needs of diverse user groups.

Conclusion

This study provides valuable insights into the current landscape of voice assistant adoption. The findings reveal a significant disparity in usage patterns, with Amazon's Alexa leading in user adoption, followed by Google Assistant and Apple's Siri. However, the most striking revelation is the substantial proportion of participants—nearly two-thirds—who do not use any voice assistant devices. This high non-adoption rate suggests that despite technological advancements and marketing efforts, voice assistants have yet to achieve widespread acceptance.

This study provides valuable insights into the adoption and perception of voice assistants among Gen X and Baby

Boomer populations aged 44-85 years. The findings reveal a mixed landscape of technology adoption and digital literacy among these generations. While smartphone ownership and daily internet usage are high, awareness and usage of voice assistants remain limited. Among users, information search and making phone calls are the most common applications, with ease of use reported by less than half of the users. Challenges include difficulty understanding local accents and comprehending responses. Desired improvements include better understanding of local languages and enhanced accuracy. The impact on digital literacy is mixed, with only a small percentage experiencing high improvement. These findings suggest that while voice assistants have potential in bridging the digital literacy gap, significant barriers remain, including lack of awareness, language limitations, and usability issues. To effectively leverage voice assistants for digital inclusion, efforts should focus on increasing awareness, improving language support, enhancing user interface design, addressing privacy concerns, and developing targeted features for older adults. In conclusion, while voice assistants show promise in enhancing digital literacy among Gen X and Baby Boomers, their current impact is limited.

In conclusion, while voice assistants have made significant inroads in the consumer technology market, there remains substantial room for growth and improvement. As the technology continues to evolve, it will be crucial to address user concerns and demonstrate clear value propositions to increase adoption rates and fully realize the potential of voice assistant technology in enhancing daily life.

Acknowledgements: The authors thank the anonymous reviewers for their comments and suggestions.

Author Contributions: All the authors participated in the conception and design of the study.

Funding: The authors received no financial support for this study.

Ethical Compliance: All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest Declaration: The authors declare that they have no affiliations with or involvement in any organization or entity with any financial interests in the subject matter or materials discussed in this manuscript.

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