Perception of Emerging Technology for Emergency Preparedness: A Cross-Sectional Study

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Abstract

This study gauges the preparedness levels of individuals (younger and older) across hazards and investigates their willingness to use emerging technology for disaster preparedness. Older adults are among the most vulnerable during disasters and more likely to be displaced. As climate change contributes to the increased frequency, intensity, and scale of disasters, the number of areas impacted by multiple hazards has also increased. In December 2023, a nationwide survey with over 1,000 respondents was launched. The results indicate a variation in the perception of preparedness across hazards, at the individual level. Additionally, most respondents would use emerging technology to help them improve their disaster preparedness, including smart speakers, phones, mobile appliances, cars, wearable devices, robots, and virtual reality devices. Findings indicate that older adults may be willing to use emerging technology that they are uncomfortable with for disaster preparedness, necessitating training, exercises, and qualitative research to understand how and why.

Keywords: emerging technology, disaster preparedness, survey, older adults

1. Introduction

Climate change has contributed to the increased frequency, intensity, and scale of disasters, as well as the number of areas impacted by multiple hazards. The time between each disaster has simultaneously decreased. For example, in 2023, Oklahoma received federal declarations for fire, straight-line winds, tornadoes, and severe storms; Georgia endured severe storms, tropical cyclones, heatwaves, flooding, power outages, and hail; and New York endured flooding, power outages, and winter weather (Federal Emergency Management Agency [FEMA], 2024). Studies on individual decision-making during crises and emergencies have become critical. However, most theories and models regarding decision-making during disasters focus on the protective active measures undertaken during one incident. Very few, if any, have considered that as hazards frequently impact a location in a short timeframe, many people will be forced to make crisis decisions for multiple cascading events. A Federal Emergency Management Agency (FEMA) report acknowledges “that many people and groups in the United States do not currently share a sense of urgency about preparedness (FEMA, 2019, p. 10).”

To assist in disaster preparedness, several broadband wireless devices for personal use have been developed to disseminate warnings or to conduct preparedness training among the broader populations. For example, in Japan, virtual reality is being used for disaster exercises among children and in certain communities (Hsu et al., 2013; Ooi et al., 2019, 2021). While the number of older adults is projected to rapidly increase over the next few years, so is the frequency and intensity of natural hazards due to climate change (Census Bureau, 2018; Intergovernmental Panel On Climate Change, 2015; Kendra & Wachtendorf, 2024). Currently, the research regarding how older adults make decisions during disasters is thin. Furthermore, the research that has been conducted has conflicting results as some assert that older adults are far more prepared than other demographics, while other research finds evidence that older adults are more vulnerable due to cognitive decline and the need for social support (Adams et al., 2021; Annear et al., 2014; Howard et al., 2017; Kim &

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Zakour, 2017; Mayhorn, 2005). Given the trends in population growth and the frequency of hazards, it is imperative to investigate and identify the individual decision-making factors which lead to appropriate hazard adjustments for older adult populations.

This study surveyed US adults to assess their disaster preparedness levels, disaster experience, and willingness to use broadband wireless devices for disaster preparedness. The results provide comparisons of self-identified use of technology for disaster preparedness among older adults (aged 65 and older) and younger adults (aged 18 – 64).

2. Related Work

Communications during all-hazards require real-time information to inform individuals of threats to life, health, home, economic, and social well-being. Furthermore, one's perception of risk may impact one's willingness to take protective action following credible messages from qualified sources (Lindell, 2012; Sutton et al., 2021). Likewise, the degree to which individuals trust so-called "credible" sources (e.g. stakeholder perceptions) has an influence on the delay or immediacy of protective actions. Previous studies have also been clear and extensive on the importance of crafting clear, concise, and understandable messages. However, while this may be true for older adults regarding a particular hazard (such as a hurricane), it may not be true for another (such as a pandemic) in the same area among the same populous.

2.1 Emergency Preparedness

Individual and household preparedness encompasses a wide range of activities. Previous research on preparedness focused on the presence of supplies, perception of the ability to comply, perception of the threat, emergency plans, and adherence to emergency response instructions (Levac et al., 2012; Murphy et al., 2009; Tanner & Doberstein, 2015). Kirschenbaum (2002) proposed a model for measuring preparedness, which included four key factors: disaster kits, life-saving skills, planning, and protection (Kirschenbaum, 2002). Many metrics for disaster preparedness also include knowledge about the hazard (Sutton & Tierney, 2006). Furthermore, socio-demographics and past disaster experiences significantly relate to the preparedness factors. In particular, age was significantly related to the presence of supplies (Kirschenbaum, 2002). This study uses the Kirschenbaum model to measure preparedness.

While the number of older adults (> 65 yrs.) is projected to increase over the next few years, so too is the frequency and intensity of hazards attributed to climate change (AghaKouchak et al., 2020; Coronese et al., 2019). From 2006 to 2016, there was a 33% increase in the U.S. population of individuals aged 65 years and older (Census Bureau, 2018). By 2040, the number of older adults is expected to increase to 22% of the overall population (Census Bureau, 2018). Older adults living alone or with low income often need more assistance during evacuation, though awareness and preparedness can reduce vulnerability (Arimura et al., 2020; Koloushani et al., 2022). Therefore, considerations for older adults must be included at every disaster planning stage to mitigate the likelihood of disparate outcomes.

Studies of older adults are critical, as they are among the most vulnerable to and more likely to be displaced by disasters (Kendra & Wachtendorf, 2024). Older Americans are expected to reside in places that may be more affected by climate change, including coastal zones and large metropolitan areas (Gamble et al., 2013). Older adults are often more vulnerable during heatwaves and winter weather events (Gascoigne et al., 2010; Loughnan et al., 2015; Rudge & Gilchrist, 2005). Shelter-in-place (SIP) orders contributed to an increase in elder abuse and victimization in congregate facilities (Elman et al., 2020). During evacuation orders such as flooding scenarios, older adults may be reluctant to leave due to social connections in the area (Brockie & Miller, 2017). Few older adults develop plans for evacuation from a hurricane because of their social connections (Coronese et al., 2019).

2.2. Emerging Technologies and Preparedness

Emerging technologies are technologies that are still in the early stages of development or practical application, with their full potential not yet realized (Davis, 1989). This study focuses on information and communication technologies, which have been used for disaster preparedness among NGOs, practitioners, and the public (Cope et al., 2018; Troy et al., 2008) (BennettGayle & Yuan, 2023; Khan et al., 2022) Akinbi et al., 2021; Canning et al., 2022; Samaddar et al., 2014). For example, wireless mobile devices have been leveraged to quickly disseminate public alerts and warnings with targeted accuracy using cell broadcast technology (Bean & Grevstad, 2022). Previous research regarding the use of emerging technologies by the public has focused on disinformation, misinformation, lack of trust, privacy/security issues, as well as the use by different demographics (Chan et al., 2004; Ghosh et al., 2022; Gulatee et al., 2020; Palen & Hughes, 2018; Samaddar et al., 2012; Sutton, 2010).

2.2.2. Older Adults use of technology. There is evidence to suggest that older adults are interested in using emerging technology. An AARP survey in 2023 indicates that older adults are actually embracing technology, but they need to know more about the technologies and learn about their usefulness before they are willing to purchase (Kakulla, 2023). A direct quote from the AARP survey report highlights this point: "Consumers 50-plus own devices at about the same rate as those 18–49, but they can be motivated to further engage with new tech devices such as wearables and home assistants that will help them live a more robust and safer life" (Kakulla, 2023). In fact, their nationwide survey showed an increase in the use of technology during the COVID-19 pandemic (Kakulla, 2023). Previous studies using emerging technology such as virtual reality with older adults indicate that their perspectives change from neutral to positive after having exposure to the device (Huygelier et al., 2019; Molina et al., 2014).

As such, this study hypothesized that older adults are not averse to using or adopting new technology but have to see the benefit of the device and receive training on how to use the device to increase their comfort and acceptability. In this paper, the following research questions are explored: RQ1: What is the perception of personal disaster preparedness among respondents? RQ2: Does willingness to use personal broadband wireless devices for disaster preparedness differ among older adults (>65) and younger adults (18-64)? If so, what types of technologies differ? RQ3: Is there a significant difference among respondents between their willingness to use and their comfort with these technologies?

3. Methodology

This study collected data through a nationwide survey administered online using Qualtrics in December 2023. Respondents were recruited using a convenience approach through university-related listservs in New York and Georgia to intentionally capture older adults and people with disabilities. These listservs include over 8,000 people nationwide who were interested in learning more about preparedness information for older adults and people with disabilities. A total of 1042 people completed the survey, where response to each question was voluntary. Given the population with access, our confidence level is 99%, ±4%. The full survey instrument and responses are publicly available (Bennett Gayle et al., 2024).[1] The survey took each respondent ~12 minutes to complete. The survey was approved by the University at Albany, SUNY, Institute Review Board, Study Number 23X081.

The TAM model, Figure 1, was loosely considered to identify behavioral intent to use different technologies to increase disaster preparedness. We evaluated the respondents' willingness, perceived ease of use (comfort), and their attitude toward using the emerging technology.

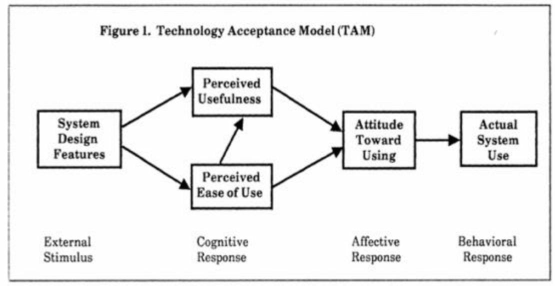

Figure 1: TAM model (Davis, 1989)

There are several theoretical models related to the acceptance and adoption of technology under general conditions, such as the Technology Acceptance Model (TAM), the Unified Theory of User Acceptance of Technology (UTAUT), and the Antecedents Privacy-Concerns Outcomes (APCO) model. However, a model related to the differences in use of technology based on the disaster preparedness level does not exist.

3.1. Respondent Demographics

There was a near-equal distribution of respondents identifying as male (48%) and female (45%), and the remaining 7% identified as another gender.

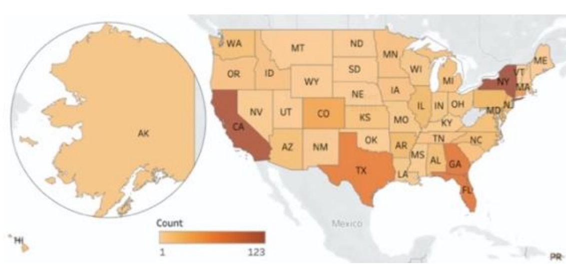

Figure 2: Location of survey respondents

Nearly 15% of the respondents were over 65 years old. Approximately 66% of the respondents identified as white. Over 70% of the respondents had some level of education beyond a high school diploma.

[1] https://doi.org/10.17603/ds2-pzdq-h545

Most of the respondents had an annual income between $15K and $74K. Approximately 77% of respondents have previously experienced a disaster. The location of the respondents is shown in Figure 2.

4. Results

The results are shown in the following sections to identify the findings related to emergency preparedness, the use of emerging technology, and the comparison between older and younger survey respondents and people with and without disabilities.

4.1. Emergency preparedness

Perception of preparedness, varied across hazards for all respondents, Figure 3. As shown, even for the most common disaster, flooding, only half of the respondents felt prepared. This finding was consistent among all respondents, older adults, and people with disabilities.

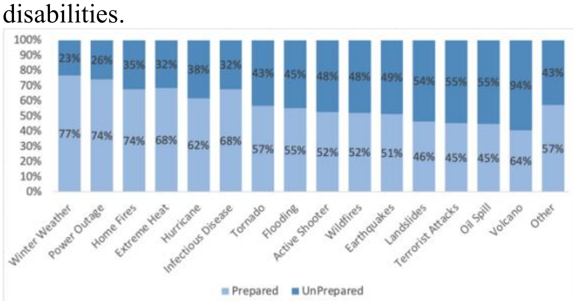

Figure 3: Respondent preparedness perception across different hazards.

After verifying the reliability of preparedness level variables (α = .93), the average preparedness level for 1038 respondents based on 15 categories, excluding other disasters not included in response options was computed. An independent sample t-test reveals a significant difference between the perception of preparedness by older and younger adults (t=2.813, p=.005), with younger adults being more prepared. Similar results apply to people with and without disabilities (t=3.346, p<.001), with those not identifying with a disability being more prepared.

In addition, an independent sample t-test (see Table 1) exhibits a significant difference in average preparedness between participants who have children (slightly more prepared) in their household and those who do not. The same case applies to the older adult population and people with disabilities. Although there is a significant difference between those who live alone and those who live with other adults (slightly more prepared) for the overall population, this difference is not statistically significant among older adults and people with disabilities.

Table 1: T-test for Average Preparedness Level

Variable	*All Respondents t (p)*	*Older Adults t (p)*	*People with Disabilities t (p)*
Household Children	-2.614* (.005)	-3.097* (.003)	-2.780* (.006)
Household Adults	-3.136* (.002)	-1.428 (.157)	-1.556 (.125)

While all respondents identified activities they have undertaken to prepare for disasters, the top five activities varied by age and ability, Table 2.

Table 2: Top five preparedness activities by types of respondents.

	Top activities (All respondents)	*Top activities (Older adults)*	*Top activities (People with disabilities)*
1	Prepared an emergency kit	Property/renters insurance	Property/renters insurance
2	Learned to shut off utilities	Learned fire extinguisher	Learned to shut off utilities
3	Learned fire extinguisher	Learned to shut off utilities	Participated/ attended a drill
4	Property/renters insurance	Learned first aid/CPR	Prepared an emergency kit
5	Fire escape plan	Prepared an emergency kit	Learned fire extinguisher

As shown, older adults did not always prioritize having a preparedness kit over other types of preparedness activities. Additionally, among the top five activities only people with disabilities prioritized participating in or attending a drill or exercise.

4.2. Emerging technology for emergency preparedness

Using TAM (Figure 1) as a guide, we asked certain survey questions. For example, survey respondents were asked how much they agreed with the following statement: 'I am willing to use [technology] to improve my disaster preparedness' and to identify their comfort level with [technology]. Where the term technology (in brackets) was specified for each type including smartphones, robots, smart cars, virtual reality, etc.

As shown in Figure 4, most respondents perceived themselves to be tech-savvy (78%) and felt that using technology made life more convenient (89%). The same was true for older adults. Majority of them also felt that they would use technology to gain knowledge (81%), and technology works the way the mind works

(77%). This was even though many had a bad tech experience (43%). Respondents overwhelmingly felt that learning a new technology was not a burden on themselves (60%), their family (64%), or not necessary (62%).

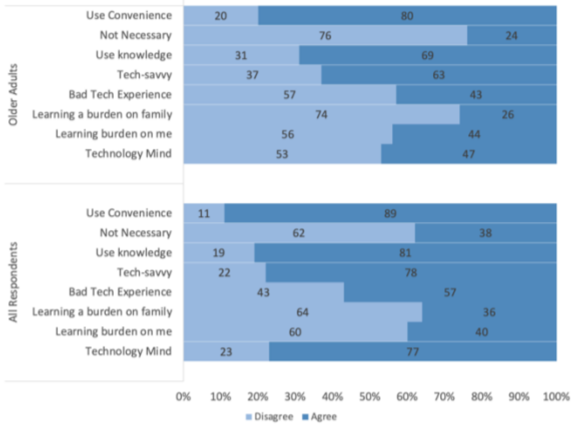

Figure 4: Tech-savviness of all respondents and older adults

These technology-savviness findings hold true for the older adult respondents as well, Figure 4. Older adult respondents felt that using technology was a convenience (80%), they could use technology to gain knowledge (69%), and considered themselves tech-savvy (63%). Most of the older adults also believed that learning a new technology was not a burden on themselves (56%), their family (74%), or unnecessary (76%). Most older adults have had a bad tech experience (57%) and a good portion think technology works the way the mind works (47%).

The most often used technology for receiving emergency information was the cellphone (62%). The second and third most used technologies were social media/Internet and television, 52% and 49% respectively. The least used methods for receiving emergency information were landline telephones, newspapers, and satellite radios, 69%, 66%, and 66%, respectively.

Across all emerging technologies shown (see Figure 5) to the respondents in both picture and text form, most of the respondents (nearly 3 in 4) indicated they were willing to use each for disaster preparedness. This included 87% for smart security systems and 86% for smart home appliances.

Among older adults, the willingness to use emerging technology differed, Figure 6. However, nearly 50% of the participants were willing to use most. The most popular emerging technologies older adults were willing to use for disaster preparedness include smart security (78%), interactive chat (73%), wearables (72%), and Smart appliances (72%).

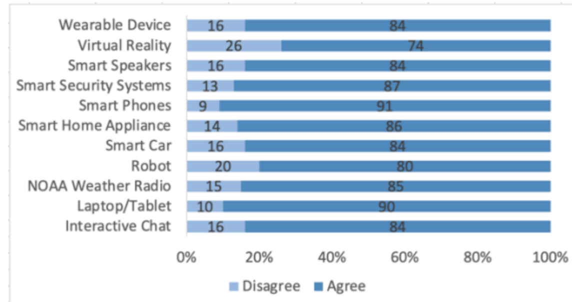

Figure 5: Willingness to use emerging technology for disaster preparedness among all respondents.

4.3. Older and Younger Adult Comparison.

Using a bipolar scale for data analysis (-3 as extremely uncomfortable to 3 as extremely comfortable), the overall responses reveal an average positive comfortability and willingness to use emerging technologies. While there were differences in comfort and willingness for each of the emerging technologies, individuals were generally comfortable with the devices and overwhelmingly willing to them for disaster preparedness, which fits the descriptive data shown in Figures 5 & 6.

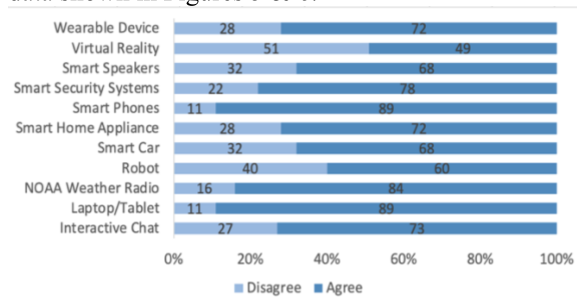

Figure 6: Willingness to use emerging technology for disaster preparedness among older adults.

4.3.1. Comfortability. The independent sample t-test represented in Table 3 indicates a statistically significant difference between younger and older adults in comfortability with a group of smart technological devices and applications. Older adults are more comfortable with more established technologies such as feature phones (e.g. flip phones), desktop computers, and e-book readers. While younger adults are more comfortable with smart headphones, smartphones, tablets, laptops, smart wearables, smart health monitoring devices, smart home fitness equipment, smart home appliances, smart cleaning devices, smart security systems, smart kitchen appliances, virtual reality (VR) headsets, augmented reality (AR) glasses, robots, smart cars, and generative AI. However, the devices where a statistically significant difference in comfort was found were feature phones, health monitoring devices, home fitness equipment, home appliances, home cleaning devices, kitchen appliances, VR headsets, AR glasses, robots, smart cars, and generative AI.

Table 3: T-test for Comfort Level

Variable	*t*	*df*	*p*
Feature Phones	-4.326	550	<.001
Smart Headphones	0.442	78.384	0.660
Smartphone	1.768	171.300	0.079
Tablet	1.536	125.736	0.127
Laptop	1.487	128.642	0.140
Desktop Computer	-0.058	880	0.954
E-book Reader	-0.424	99.904	0.672
Smart Wearable	0.977	79.661	0.331
Smart Health Monitoring Devices	3.323	738	0.001
Smart Home Fitness Equipment	2.621	41.291	0.012
Smart Home Appliances	3.665	924	<.001
Smart Home Cleaning Devices	3.195	77.732	0.002
Smart Home Security Systems	0.480	95.276	0.632
Smart Kitchen Appliances	4.279	824	<.001
VR Headset	5.550	722	<.001
AR Glasses	4.611	35.520	<.001
Robots	2.866	26.883	0.008
Smart Cars	3.082	61.178	0.003
Generative AI	3.292	814	0.001

4.3.2. Willingness to Use. The independent sample t-test represented in Table 4 indicated a significant difference between younger and older adults in willingness to use most of the technologies for disaster preparedness. The mean values show that older adults are more willing to use NOAA (National Oceanic and Atmospheric Administration) weather radio, smartphones, and computers (desktop or laptop) compared to younger adults while younger adults are more willing to use the rest. Significance was found in the willingness to use all except smartphones and tablets/laptops.

Table 4: T-Test for Willingness to Use

Variable	*t*	*df*	*p*
NOAA Weather Radio	-2.544	1011	0.011*
Smartphone	-1.568	1011	0.117
Tablet or Laptop	-1.948	186.594	0.053
Virtual Reality	7.523	1003	<.001*
Robot	6.995	1007	<.001*
Interactive Chat	4.134	1005	<.001*
Smart Home Appliances	4.948	1007	<.001*
Wearable Device	3.881	1002	<.001*
Smart Speakers	4.921	1009	<.001*
Smart Security Systems	3.292	1002	0.001*
Smart Cars	6.048	1007	<.001*

4.4. Comfort with and willingness to use tech for disaster preparedness, comparison

4.4.1. Older Adults. There was a statistically significant difference between the comfort level and willingness to use emerging technologies for older adults. The mean values reveal the average higher willingness to use these technologies compared to the comfort level. In addition, the effect size of the differences for smartphones, portable computers, VR headsets, robots, and smart cars was comparatively large (d>.5). There were differences among older adults with comfortable and willing to use emerging technologies. More specifically, the patterns were different for virtual reality, robots, smart wearables, and smart home appliances. Despite their comfort with using smartphones, portable computers, and interactive chats, their willingness to use these technologies was overwhelmingly higher.

4.4.2. Older Adults with Disabilities. To explore intersectionality, an independent sample t-test for older adults with disabilities was performed (Table 5). However, the comparison between these measures demonstrates slightly different patterns. While the mean of this population's comfort level with the significantly different technologies is the same or lower, their willingness to use them is higher. Yet, this premise does not apply to the technologies that showed no significant differences in the paired t-test. For example, there was higher comfortability and lower willingness with robots, higher comfortability with smart home appliances, and lower willingness with interactive chats. It was noted that based on the mean (among the significant differences) older adults with disabilities were less comfortable and more willing to use VR headsets than younger adults.

Table 5: T-Test Comparison - Comfort and Willingness to Use

	Older Adults	*Older Adults W/Dis*	*Young Adults*	*Younger Adults W/Dis*
Variable	*t* (*p*)			
Smartphone	-6.592* (<.001)	-4.991* (<.001)	-10.370* (<.001)	-5.362* (<.001)
Portable Computer	-8.210* (<.001)	-6.403* (<.001)	-10.370* (<.001)	-3.391* (<.001)
Smart Wearable	-3.935* (<.001)	-3.239* (.003)	-10.127* (<.001)	-3.310* (.001)
Smart Home Appliance	-2.469* (.015)	-0.913 (.366)	-8.706* (<.001)	-8.706* (<.001)
Smart Home Security	-3.962* (<.001)	-2.292* (.029)	-12.252* (<.001)	-12.252* (.001)
VR Headset	-3.967* (<.001)	-3.029* (.013)	-6.022* (<.001)	-6.022 (.369)
Robots	-2.628* (.014)	-0.373 (.719)	-9.567* (<.001)	-9.567* (<.001)
Smart Cars	-4.384* (<.001)	-2.351* (.029)	-8.018* (<.001)	-8.018 (.354)
Interactive Chat	-3.428* (.001)	-1.357 (.195)	-9.826* (<.001)	-9.826* (.005)

4.4.3. Younger Adults. Like older adults, there was a statistically significant difference between the comfort level and willingness to use emerging technologies for younger adults. The mean values reveal the average higher willingness to use these technologies compared to the comfort level. However, the low effect size (d<.5) reveals the weakness of these differences. In addition, younger adults' responses to comfort level and willingness to use technologies followed similar patterns.

4.4.4. Younger Adults with Disabilities. A similar pattern applied to younger adults with disabilities, as evident in Table 5. The only difference in behavior was the lack of significant difference between comfort and willingness for smart cars and VR headsets. Although there was no significant difference in comfort level and willingness to use VR for younger adults with disabilities, the mean of both variables was much higher compared to younger adults. For other technologies, the mean of responses was lower than younger adults for both comfortability and willingness to use them.

4.5. Predicting Willingness

Using a linear regression to predict willingness, table 6 shows the results for four emerging technologies, VR, smart cars, robots, and interactive chat. The predictors include frequency of use (actual use), comfort (perceived ease of use), and attitudes toward technology aligned with the TAM framework. The attitude variables, incorporated self-identified measures from respondents as tech-savvy, using technology more in their daily life if knowing how, technology making their daily life more convenient, considering learning about technology as a burden on themselves or their family, considering using a new technology unnecessary, and considering technology working the same way as the mind. The variables were normally distributed, with heavy tails in some cases.

Table 6: Linear Regression Predicting Willingness

Variable	*VR B/(p)*	*Smart Cars B/(p)*	*Robots B/(p)*	*Interactive Chat B/(p)*
Constant	-.141 (.526)	-.058 (.755)	.175 (<.353)	.208 (<.235)
Comfort	.184* (<.001)	.163* (<.001)	.068* (.039)	.108* (.001)
Use Frequency	.168* (.002)	.279* (<.001)	.177 (<.001)	.158* (<.001)
Tech Savviness	.086* (.030)	.081* (.008)	.114* (.001)	--
Use Knowledge	.137* (.001)	--	.190* (<.001)	.103* (.003)
Use Convenience	.217* (<.001)	.177* (<.001)	--	.175* (<.001)
Burden on Myself	--	-.079* (.027)	--	--
Burden on My Family	--	.085* (.020)	--	--
Tech Not Necessary	--	-.065* (.034)	--	--
Tech Works Like the Mind	--	--	.149* (<.001)	.097* (.007)
Adjusted R^2	.201	.247	.187	. 153

Convenience of use had the highest magnitude of impact on willingness to use VR, controlling for other VR predictors. One interesting observation related to smart cars was the negative coefficient for participants who considered technologies as a personal burden and the positive coefficient for technologies being a burden on their families. This result suggests that first-hand burden will decrease willingness to use while burdening others might lead to an increase. The goodness of fit for each of the models was different ranging from .15 to .25.

5. Discussion

This study highlights that even though similar types of activities are undertaken, the prioritization of the preparedness activities differs across age and ability. This could be a start to prioritizing different types of preparedness activities, thus extending the Kirschenbaum (2002) model. In this study, the findings indicate that the perception of preparedness at the micro level is hazard specific. The variation in survey responses indicates that there is still a lot of work to do to advance the culture of preparedness in society.

Since research indicates that emerging technology may help people in their awareness of hazards and preparedness activities, this study sought to explore the willingness of younger and older adults to use such technology. The findings indicate that people are willing to use novel technology for the purposes of disaster preparation with at least 70% of respondents agreeing to the use of smart speakers, phones, appliances, cars, wearable devices, robots, and virtual reality. Among older adults, nearly 50% of the respondents were willing to use all the emerging technology, which tracks with the findings from the nationwide AARP study (Kakulla, 2023). Not surprisingly, there was a significant difference in how willing older and younger adults are to use these technologies and their comfort level. Older adults are more comfortable with more established technologies such as feature phones, desktop computers, and e-book readers. Younger adults are more comfortable with the emerging technologies. The findings for willingness to use the technologies for disaster preparedness were similar, where older adults were more willing to use established devices such as NOAA weather radios, smartphones, and computers. Their willingness to use smartphones is encouraging, as technologies such as

AR/VR can be integrated as a feature or app on smartphone platforms.

However, the difference between comfort level and willingness to use the technologies among older adults was statistically significant, where their willingness to use was much higher than their comfort level. These findings indicate that training and other means to increase comfort, such as embedding emerging tech features into existing and trusted platforms, may lead to even higher rates of willingness to use these newer technologies (Huygelier et al., 2019; Molina et al., 2014). Although this study exposed a similar difference among younger adults, the effect size was much smaller. Among the significant differences, older adults with disabilities were less comfortable and more willing to use VR headsets compared to younger adults, which indicates that willingness to use and comfort to use are not always positively correlated.

5.1. Implications

Within research, investigators should carefully consider the different perceptions of disaster preparedness based on the hazard. Studies or policies that focus only on one hazard may not truly depict an individual's preparedness across all hazards. Given that there is an increased risk for multiple, concurrent, and/or cascading hazards in one location, more studies are needed that consider multiple hazards.

Differences between older and younger adults clarify that while younger adults may be more willing to use technologies for disaster preparedness, it may be due to their increased comfort (but not always). Findings indicated that older adults and people with disabilities were willing to use emerging technology that they might not yet be comfortable with. Furthermore, in this study, most older adults were willing to use most of the technologies presented. This encourages more qualitative and experimental research to understand why this difference exists and how to increase comfort with these technologies for disaster preparedness.

Researchers cannot assume that technological savviness decreases due to age or ability, nor can technology developers. Also, one cannot assume that comfort with or willingness to use are the same, or both positively related to intention to use, which can challenge the TAM framework. Though many of the respondents were uncomfortable with certain new technologies, they were still interested in learning how they might help for disaster preparedness.

Disaster management (and other related) officials should be aware of the potential variations in preparedness based on hazards. They should also consider ways to incorporate a wider variety of emerging technologies to improve personal disaster preparedness. Training sessions and disaster exercises that utilize emerging tech may be the key to increasing use among more vulnerable populations and improving overall disaster preparedness.

5.2 Limitations

While the nationwide survey included individuals from 49 states and two territories, it did not meet the requirements to be representative of the US population, using the census data. The survey is generalizable for the larger US population, but not as granular for all subpopulations within the US, though the confidence level is at 99%. Although the use of convenience sampling may raise bias and generalizability concerns, it allows us to satisfy the objective of studying older adults and people with disabilities.

6. Conclusions

This paper examined individual and household perceptions of disaster preparedness and gauged willingness to use technology for disaster preparedness. Results uncovered differences in the perception of disaster preparedness at the individual/household level. The findings indicate that although many people are uncomfortable with emerging technology, they are willing to use newer devices to improve their disaster preparedness. Future studies are needed to examine comfort and willingness of technologies among these populations for disaster preparedness through qualitative and longitudinal lens to capture the experiences and draw on causal inferences. More qualitative research is required to better theorize the differences between comfort and willingness to use certain technologies. The authors are using this survey data to inform a larger experimental study testing the use of VR as a methodological tool to study the improvement of disaster preparedness among older adults.

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