Older Adults and Technology Adoption
Sara J Czaja PhD
Department of Geriatrics and Palliative Medicine
Center on Aging and Behavioral Research
Weill Cornell Medicine

Research presented is supported by the National Institute on Aging
Why a focus on Technology Adoption and Aging?

• Technology applications hold promise for enhancing the quality of life and independence of older people.

• Technology is increasingly being viewed as a solution to healthcare challenges of older adults especially since the COVID-pandemic.

• Developments in technology will continue to evolve and people will continue to age.
How can Digital Tools Help Meet the Healthcare Challenges of Population Aging

• Enhance:
  • Early diagnosis/prevention
  • Access to healthcare
  • Ability to perform healthcare management tasks
  • Cognitive and physical support
  • Safety and Security
  • Access to information and resources
  • Ability to perform everyday activities
Older Adults and Technology Adoption

- Perceive IT as valuable and are willing to use it *(e.g., Czaja et al., 2008, 2014, 2018)*.

- Are more likely to adopt technology if it is perceived as valuable and contributing to quality of life *(e.g., Sharit et. al., 2018, Moxley et al., in press)*.

- Can learn to use new technologies *(Kelley et Charness, 2007; Czaja et Sharit., 2012, Czaja et al., 2018)*.

- Are less comfortable and have less IT self-efficacy than younger adults *(e.g., Czaja et al., 2006; 2008, Lee et al., 2019)*.

- There still remains an age-related digit divide *(Pew Research, 2022)*.
Digital Divide

Smartphone ownership and social media use among older adults continue to grow

% of U.S. adults who say they ...

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Own a smartphone</th>
<th>Use social media</th>
<th>Own a tablet computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-29</td>
<td>66</td>
<td>82</td>
<td>63</td>
</tr>
<tr>
<td>30-49</td>
<td>59</td>
<td>81</td>
<td>56</td>
</tr>
<tr>
<td>50-64</td>
<td>50</td>
<td>53</td>
<td>50</td>
</tr>
<tr>
<td>65+</td>
<td>13</td>
<td>11</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: Respondents who did not give an answer are not shown.

PEW RESEARCH CENTER
Older Adult Willingness to Adopt Technology-Based Applications (Moxley, Sharit & Czaja, in Press, JIMR)

Five Technologies were Examined:

- **Lyft** a ride sharing app used on smartphones
- **eCareCompanion** an app for sharing health information with your care team
- **Curious.com** a website for lifelong learners on a variety of topics
- **InteliChart** a patient portal
- **Fittle 2** a health and wellness app
Technology Ratings

You are now going to be asked to rate the technology that was just described to you on a variety of different criteria, such as how willing you are to adopt the technology and how you would rate the importance of the technology. For each question, please place a check mark in the box for your answer.

Willingness to Adopt

On a scale from 1 to 9, with 1 being completely unwilling and 9 being completely willing, how willing are you to adopt the technology that was just presented to you? In other words, how willing are you to “take it up” and start using it?

Perceived Value

On a scale from 1 to 9, with 1 being not at all important and 9 being extremely important, how would you rate the importance or value of the technology that was just presented to you?
<table>
<thead>
<tr>
<th>Total Sample (Age &amp; Gender) (N = 187)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(M = 74.11, SD = 6.33)</strong></td>
</tr>
<tr>
<td>Females</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>&lt; High school</td>
</tr>
<tr>
<td>HS/GED</td>
</tr>
<tr>
<td>Vocational training</td>
</tr>
<tr>
<td>Some College/Associate’s degree</td>
</tr>
<tr>
<td>BA/BS</td>
</tr>
<tr>
<td>MS/other PG training</td>
</tr>
<tr>
<td><strong>Occupational Status</strong></td>
</tr>
<tr>
<td>Retired</td>
</tr>
<tr>
<td>Works part time or full time</td>
</tr>
<tr>
<td><strong>Perceived Health</strong></td>
</tr>
<tr>
<td>Poor- Fair</td>
</tr>
<tr>
<td>Good</td>
</tr>
<tr>
<td>Very Good - Excellent</td>
</tr>
</tbody>
</table>
## Predictors of Willingness to Adopt

<table>
<thead>
<tr>
<th></th>
<th>B (regression)</th>
<th>r (zero-order)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Value of Technology</td>
<td>.60</td>
<td>.77</td>
</tr>
<tr>
<td>Quality of Life from Technology</td>
<td>.32</td>
<td>.71</td>
</tr>
<tr>
<td>Confidence using Technology</td>
<td>.15</td>
<td>.45</td>
</tr>
<tr>
<td>General Technology Experience</td>
<td>.12</td>
<td>.30</td>
</tr>
<tr>
<td>Help with Technology</td>
<td>−.10</td>
<td>.17</td>
</tr>
</tbody>
</table>

$F_{8,178} = 59.7, \ P < .001, R^2 = 0.73,$
Technology Readiness Insecurity, Technology Readiness Innovative, Positive Tech Readiness were not significantly predictive in regression. Variables selected by Cross-Validation
Attitudes Towards Technology
• Older adults, in general, have less experience with and adoption of technology, but not all older adults are the same

• “Oldest old” different from “youngest old” and tend to adopt technology less.

• Individuals with disability are less likely to own and use technologies.

• Less technology use and ownership associated with lower income, education, geographic location.
Use of Telehealth Services by Older Adults and Rural Adults

Telehealth as a % of each sub-group’s total commercial claims, January 2020

- Nationwide: 0.22%
- NYS: 0.13%
- Urban: 0.14%
- Rural: 0.06%
- Female: 0.15%
- Male: 0.10%
- 19-30 years: 0.34%
- 31-40: 0.24%
- 41-50: 0.13%
- 51-60: 0.08%
- 60+: 0.04%

Overall NYS average:
### Challenges with Telehealth Visits (N = 42 providers)

<table>
<thead>
<tr>
<th></th>
<th>Total % (N)</th>
<th>GI %</th>
<th>Endo %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack Technology Skills or Lack Access to Needed Technology</td>
<td>33% (14)</td>
<td>35% (7)</td>
<td>33% (6)</td>
</tr>
<tr>
<td>Older Adults</td>
<td>86% (37)</td>
<td>80% (16)</td>
<td>94% (17)</td>
</tr>
<tr>
<td>Have a language barrier (non-English Speaking)</td>
<td>28% (12)</td>
<td>45% (9)</td>
<td>11% (2)</td>
</tr>
<tr>
<td>Patients with sensory challenges</td>
<td>5% (2)</td>
<td>0% (0)</td>
<td>10% (2)</td>
</tr>
</tbody>
</table>

% mentioned by those who responded to the question overall and then within subspeciality

Note: Could mention more than one category
The older group had significantly less computer experience (F(2.226) = 6.5, P < .002; mobile device experience (F(2,226) = 7.2 , P<.001. The younger group had significantly more Internet experience (F2.226) = 3.9, p <.02 than the other age groups.
Barriers to Adoption

- Lack of Knowledge & Awareness
- Lack of Training & Technical Support
- Cost
- Continual Changes in Technology
- Usability
- System Complexity/Feature Creep
Barriers to Tech Adoption

• Older adults are often ignored as a user group in the design space.
Secondary Analysis of a Rapid Review: 34 studies met the inclusion criteria:

- Empirically tested a digital health intervention
- Supported a hospital-to-home transition
- Tested with adults ≥65 years recruited before discharge,
- Conducted in high-income countries
- Published in English in or after the year 2010

Main Findings:
- Many groups of older adults were excluded in the studies:
  - the oldest old
  - those with a cognitive impairment
  - many studies excluded those with a sensory impairment
  - very few studies described the characteristics related to gender, education, race, ethnicity, and culture.
Adoption extends beyond simple hardware access!!!

Requires:

- Understanding the functionality of the technology
- Understanding the limitations and maintenance requirements of the technology
- Having the requisite technology skills
- Having digital health literacy
- Having the requisite support – technical and instructional support
### Conclusions and Important Issues

#### Policy Implications:
- Ensuring **meaningful access**
- Cost and reimbursement issues
- Cyber Security & Information sharing
- Ensure equitable access to technology, training and technical support programs

#### Research:
- Robust studies of effectiveness with diverse populations
- Identification of strategies for matching technology apps with needs of older adults and families
- Measurement and big data issues
- Strategies for implementation and sustainability
- Interface design Issues

#### System Designers
- Design Process
- Usability issues
- Integration across technology platforms
- Scalability
- Pushing the technology platform – e.g., engagement, sustainability
Thank You!