Technology to Enable Working Longer

Sara J. Czaja

Division of Geriatrics and Palliative Medicine

Center on Aging and Behavioral Research

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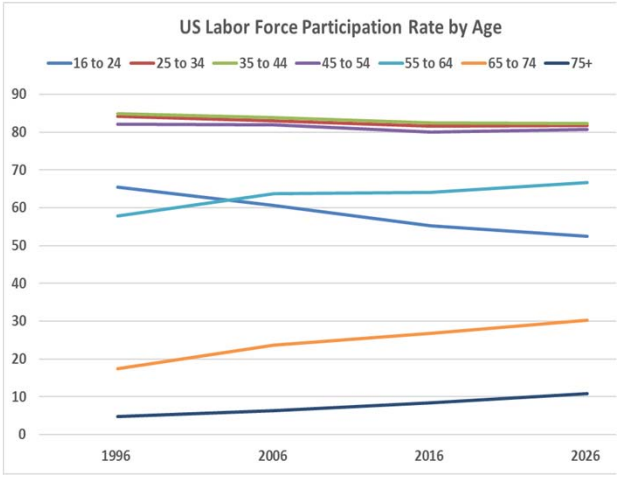
Overview

- Discuss:
  - the changing demographics of workers.
  - the changing workplace landscape.
  - the potential implications of these two trends.
  - highlight some pressing issues.

Employment Landscape: Demographics

- Increase in the number of older adults who qualify for publicly financed retirement and health benefits.
- Decrease in the number of younger adults who work.
- Current changes in government and organizational pension policies favor extending working life.
- Many older adults choosing to work longer or return to work.



Workplace Trends

- An increased emphasis on knowledge and skilled work.
- An increased emphasis on teamwork and team performance.
- Increased number of workers in "nonstandard" work arrangements.
- Responsibility for training is shifting to workers.
- Rapid and continual diffusion of technology into work environments:
  - Technology are reshaping work processes, and where and how work is conducted.
  - Machines or other forms of automation now do the work of humans.
  - Increased reliance on technology for communication activities.
  - Increased reliance on technology-based worker training (e-learning).

Positive Implications of Technology for an Aging Work Force

- Technology reduces the physical demands of jobs.
- Technology makes work at home and flexible work arrangements more likely options.
- Adaptive technologies may make work more viable for older people.
- Technology such as online multi-media systems may be effective learning tools for older adults.


8
5
2

Assembly Operations:

Adapting "Aging in Place" ideas to the workplace

Robotic (adjustable) exoskeletons

Exoskeleton means "outer skeleton" – robotic exoskeletons are designed to offer people additional protection, support, and strength.

Lightweight exoskeletons allow operators of heavy tools to handle them as if they were weightless.

Some exoskeletons can minimize pressure on the wearer's lower back, hips, knees and ankles while improving posture and reducing the risk of injury.

A Ford assembly line worker. “My job entails working over my head, so when I get home my back, neck and shoulders usually hurt. Since I started using the vest, I’m not as sore, and I have more energy to play with my grandsons when I get home.”

Ford is investing in the **EksoVest.**

This type of exoskeleton supports factory employees' upper bodies to ease strain when lifting and performing overhead tasks.

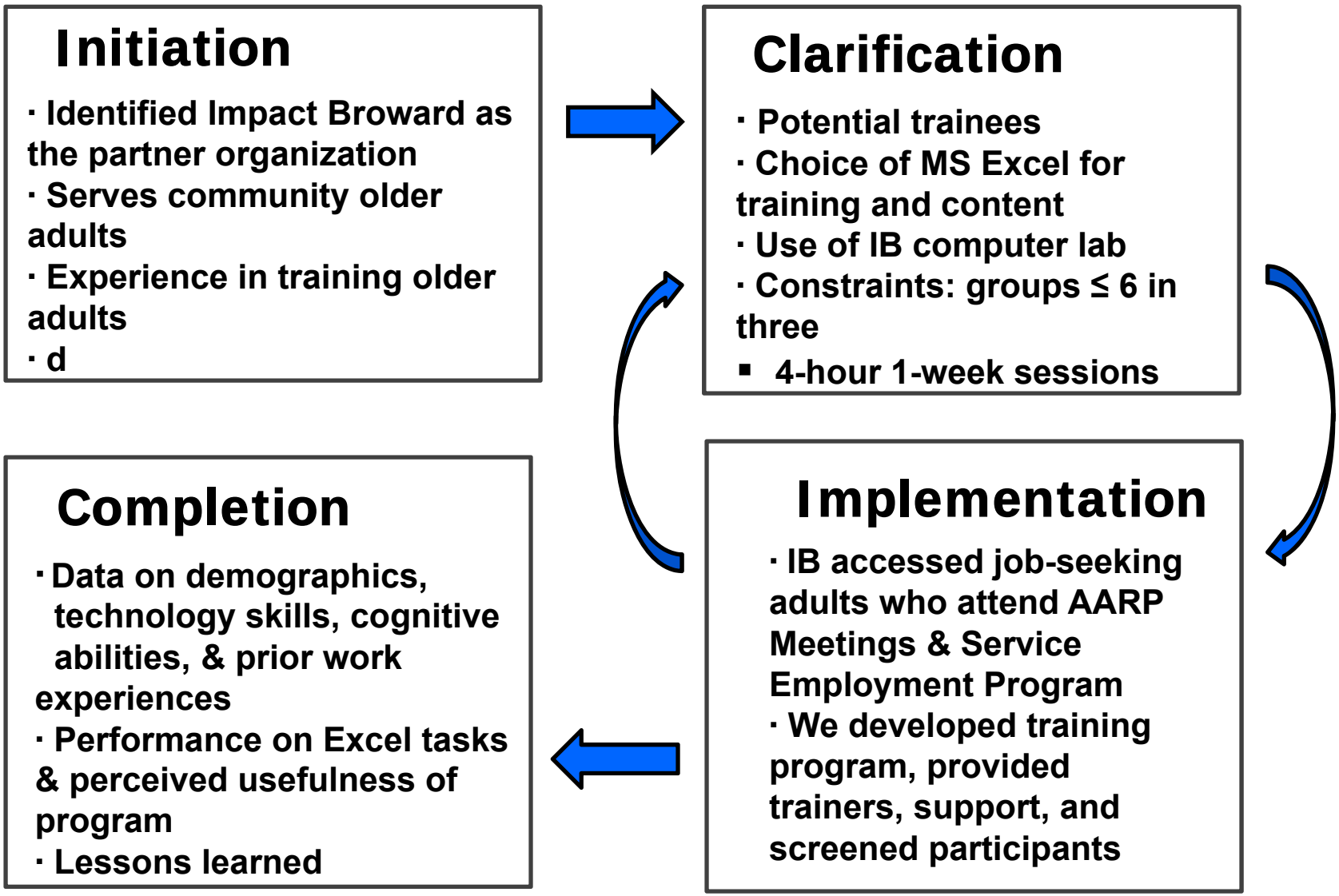
Certain employees do these tasks up to 4,600 times per day.

Knowledge Work

CREATE Study: An e-learning training program for teaching MS Excel to older adults

- E-learning for gaining technology skills can be beneficial for older adults seeking employment.
- Study Participants:
  - Adults seeking employment with no skills in software program applications.
  - *N* = 35; 25 females and 10 males; 50-71 years (*M* = 60.3; *SD* = 5.6).
  - 51% African American/Black, 40% were White/Caucasian, and 9% were multi-racial.
  - Only 20% had at least a Bachelor's degree.
  - 54% < $15,000; 26% $15,000 – $40,000; 9% > $40,000.

A 4-phase iterative academic-community



Performance data

- **Maximum scores possible on two problems:**
  - Problem 1: 34; Problem 2: 30; overall maximum: 64
- **Four participants had perfect scores (64).**
  - 8 participants performed well (*M* = 56.1, *SD* = 3.6),
  - 11 participants performed poorly (*M* = 15.1, *SD* = 5.6).
  - 12 participants fell in between these two groups (*M* = 32.7, *SD* = 8.2).
- **Cognitive test scores:**
  - Reasoning and processing speed correlated significantly with overall task performance.
- **Training data (video) logs:**
  - The best performers went through the video lessons in order, practiced the concepts along with the narrator, and paused throughout the lessons.
  - The worst performers tended to watch the videos straight through with few or no pauses and often jumped around between lessons, even missing some of the lessons in the training.

Participants' evaluation of the training program

- ***83% indicated that the training was very beneficial.***
  - 69% felt that they had a basic understanding of Excel.
  - 86% thought that the training would help them learn other Microsoft applications.
- ***83% found the training to be well organized.***
  - 71% indicated that the training software was easy to use.
  - Only 6% found the language used in the training to be too technical.
- ***Criticisms***
  - 86% felt they needed more time to review/practice the Excel concepts and operations.
  - 34% felt that too much material was covered in the time allotted.

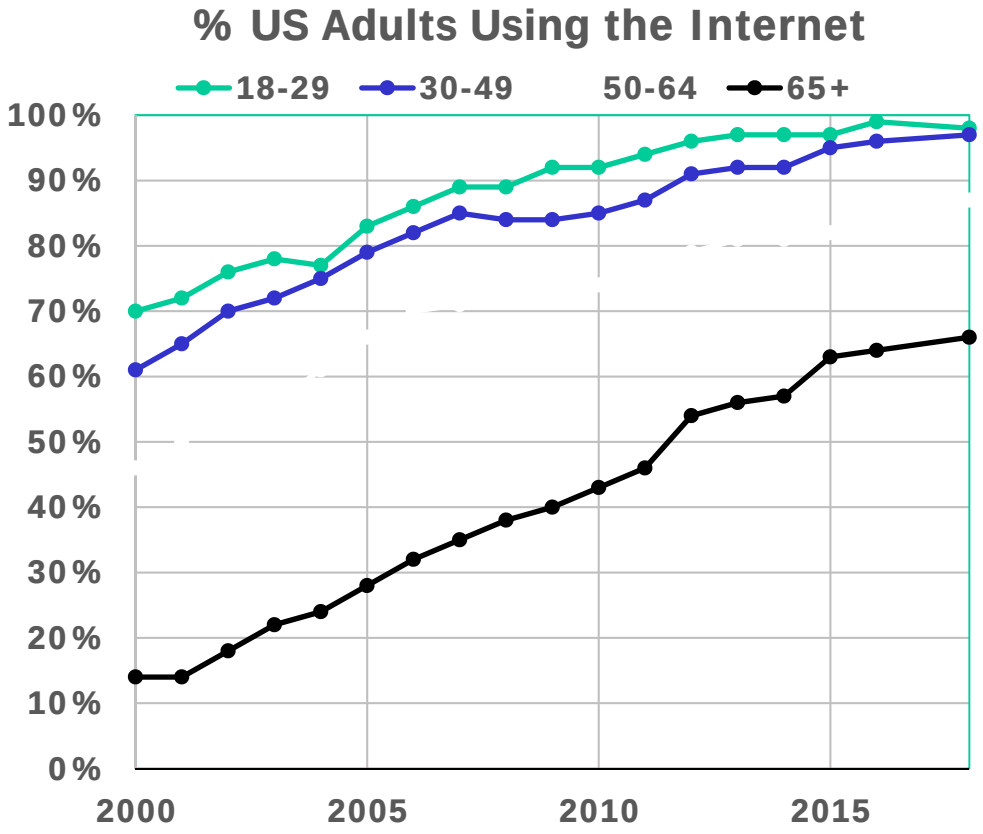
Negative Implications of Workplace Technology

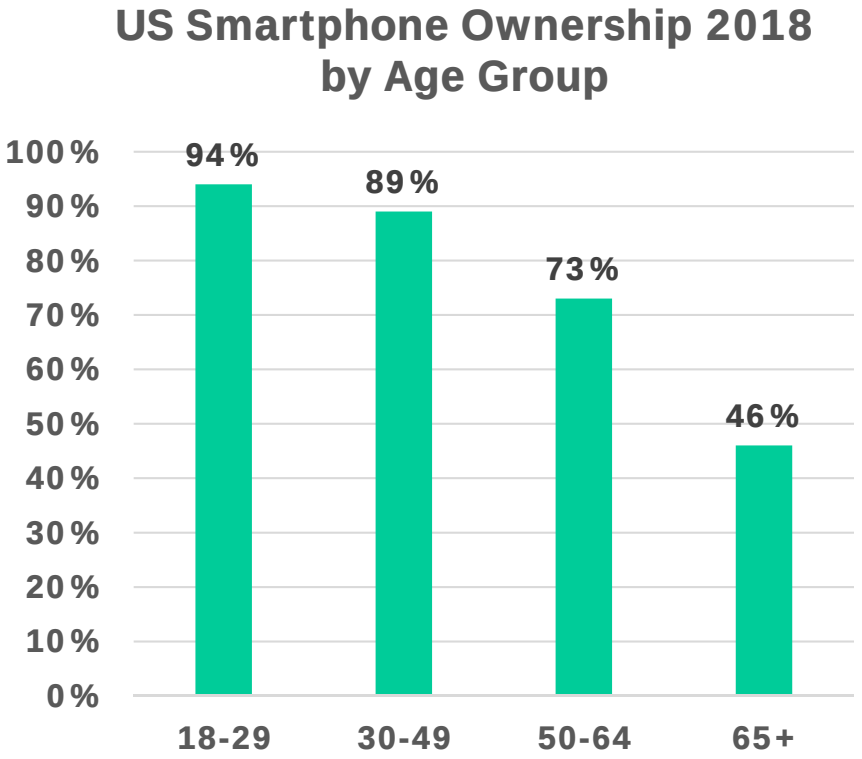
- Advances in technology imply that workers need to learn new skills and to interact with new systems.
- Current job skills and knowledge become obsolete.
- Usability problems create barriers to access.
- Technology-based tasks place a greater emphasis on cognitive abilities that decline with age.

Critical Questions

- Given age-related changes in functional abilities, will older people be able to access and successfully adapt to new information technologies and job requirements?
  - Have the requisite skills?
  - Have the training/retraining opportunities?
  - Have the job opportunities?
  - Be able to adapt to the characteristics of the job and work environments?

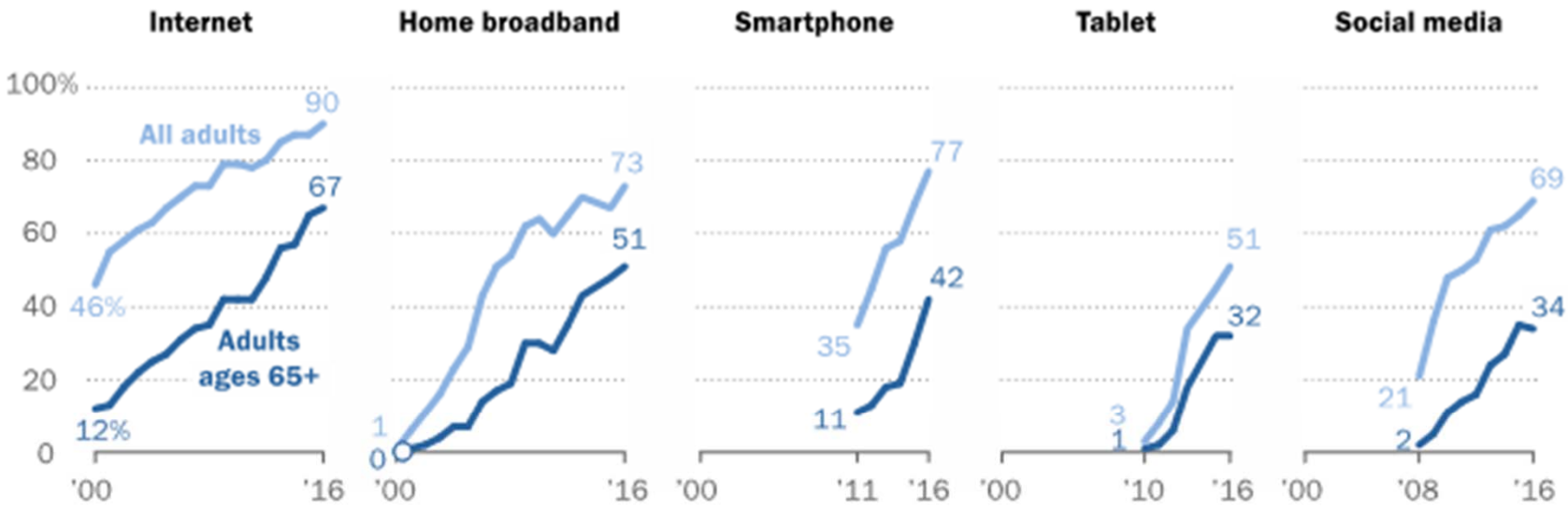
US Internet & Smartphone Use





Smartphone adoption among seniors has nearly quadrupled in the last five years

% of U.S. adults who say they have or use the following



Source: Survey conducted Sept. 29-Nov. 6, 2016. Trend data are from previous Pew Research Center surveys.
"Tech Adoption Climbs Among Older Adults"

PEW RESEARCH CENTER

Focus Group Study: Lower SES Older Workers, Training and Continued Employment *(Lee, Czaja & Sharit, 2009)*

- Study Goals:
  - Gather insight into barriers confronting lower SES older adults seeking employment
  - Gather information on training needs and preferences
- Study Methodology: Questionnaires, Focus Groups
- Sample:
  - N= 37 (Male 9, Female 28)
  - Age
    - Mean, SD: 65 years, 7
    - Range: 55 – 75 years old
  - Ethnicity
    - Hispanic: 16
    - Non Hispanic White Caucasian: 2
    - Non Hispanic Black/ African American: 17

Reasons for wanting to return to work

	Major factor (%)	Minor factor (%)	No factor at all (%)	Don't know / NA (%)
Need the money	94.6	2.7	2.7	0
To fulfill pension requirements	27.0	21.6	48.6	2.7
To qualify for Social Security	24.3	13.5	54.1	8.1
Need to support other family members	24.3	16.2	59.5	0
Need to pay for health costs for self and / or family	43.2	16.2	37.8	2.7
Being productive is a way I can help others	56.8	24.3	18.9	0
People have an obligation to work if they can	62.2	21.6	13.5	2.7
It makes me feel useful	75.7	16.2	5.4	2.7
Need to maintain health insurance coverage	45.9	16.2	32.4	5.4
To save money for retirement	54.1	18.9	24.3	2.7

Reasons not confident to find a job

	N (n=37)	Percentage
Age	35	94.6%
Lack of computer skills	27	73.0%
Limited opportunities	19	51.4%
Tight labor market/economy	18	48.6%
Limited in the skills that I have	18	48.6%
Level of education	14	37.8%
Have been looking for a while	14	37.8%
Language/Communication skills	12	32.4%
Race or ethnicity	8	21.6%
Health or disability	7	18.9%
Have highly specialized skills	4	10.8%

Telework

An online questionnaire was developed and directed at managers (*N* = 314)

13 worker attributes considered important for telework from the home were evaluated.

Company size

- *n* = 133 (42.4%) < 500 employees employees (small company)
- *n* = 62 (19.7%) > 500, ≤ 5000 (medium size company)
- *n* = 118 (37.6%) > 5000 employees (large company)

Managerial experience (4 groups)

- 72 (22.9%) had ≤ 5 years of experience.
- 80 (25.5%) had [> 5, ≤ 10] years of experience.
- 83 (26.4%) had [> 10, ≤ 20] years of experience.
- 78 (24.8%) had > 20 years of experience.

Representative Industries

- Computer technologies 59 (18.8%)
- Computer services 52 (16.6%)
- Educational services 37 (11.8%)
- Telecommunication technologies 26 (8.3%)
- Brokerages/Financial services 21 (6.7%)
- Hospitals 20 (6.4%)
- Publishing 20 (6.4%)
- Hospitality 17 (5.4%)
- Insurance 17 (5.4%)
- Medical products 17 (5.4%)
- Banking 15 (4.8%)
- Educational products 15 (4.8%)
- Logistical services 14 (4.5%)
- Transportation services 14 (4.5%)
- Retail stores 14 (4.5%)
- Inventory/auditing 13 (4.1%)
- Construction 12 (3.8%)
- Military services 12 (3.8%)
- Entertainment 10 (3.2%)
- Law firm/legal services 10 (3.2%)
- Electronics manufacturing 8 (2.5%)
- Aviation manufacturing 7 (2.2%)
- Pharmaceutical production 7 (2.2%)
- News/Broadcast media 6 (1.9%)
- Food products 5 (1.6%)

Ratings of importance of 13 attributes considered important for telework

Worker-Related Attributes	*M*	(*SD*)
Trustworthiness	9.31	(1.11)
Reliability	9.31	(1.06)
Ability to work independently	9.31	(1.08)
Time-management ability	9.04	(1.36)
Maturity	8.67	(1.62)
Experience in the work activity	8.29	(1.71)
Technology skills	8.25	(1.70)
Ability to make adjustments to work activities	8.11	(1.62)
Verbal communication ability	7.25	(2.26)
Writing ability	6.67	(2.40)
Ability to work on teams	6.62	(2.57)
Tenure (time on the job)	5.66	(2.86)
Health status	4.66	(2.99)

Scale: 1, not important; 10, very important

Based on your experiences with workers of all ages, compare older workers (55+) to younger workers on the following work-related factors:	Compared to younger workers, older workers are generally:			
	N	Less / Worse	About the Same	More / Better
Worker-Related Factor		*n* (%)	*n* (%)	*n* (%)
Trustworthiness	305	1 (0.3)	199 (65.2)	105 (34.4)*
Reliability	303	11 (3.6)	155 (51.2)	137 (45.2)*
Ability to work independently	306	22 (7.2)	171 (55.9)	113 (36.9)*
Time-management ability	305	25 (8.2)	172 (56.4)	108 (35.4)*
Maturity	306	4 (1.3)	60 (19.6)	242 (79.1)*
Experience in the work activity	305	2 (0.7)	65 (21.3)	238 (78.0)*
Technology skills	306	218 (71.2)*	79 (25.8)	9 (2.9)
Ability to make adjustments in work	305	141 (46.2)*	130 (42.6)	34 (11.1)
Verbal communication ability	305	24 (7.9)	193 (63.3)	88 (28.9)*
Writing ability	305	22 (7.2)	168 (55.1)	115 (37.7)*
Ability to work in teams	305	64 (21.0)*	206 (67.5)	35 (11.5)
Tenure (time on job)	305	1 (0.3)	43 (14.1)	261 (85.6)*
Health status	304	187 (61.5)*	112 (36.8)	5 (1.6)

* Significant differences based on 95% confidence intervals on proportions

Study implications

- Instructional programs that embody principles for training older adults on software applications and information & communication technologies can potentially positively impact the employability of older workers.
- How can we reconcile (perceived) positive attributes—*reliability, trustworthiness, time-management ability, and verbal/written communication skills*—with (perceived) negative attributes—*technology skills, ability to make adjustments and work on teams, and health*?

Myths about Aging Workers

- Older workers are:
  - technophobic
  - uninterested in learning
  - unable to learn new skills
  - unreliable
  - higher rates of absenteeism
  - perform at lower levels than younger workers
  - have higher rates of turnover

Attitudes Towards Technology

- However, in our experience, older adults in general are not "technophobic"
  - Report more positive than negative attitudes toward technology
  - Believe technology can help them perform activities they care about
  - Are open to learning and using a wide range of technology if training and support are available
  - Are often less confident and have less efficacy in the ability to learn to use technology

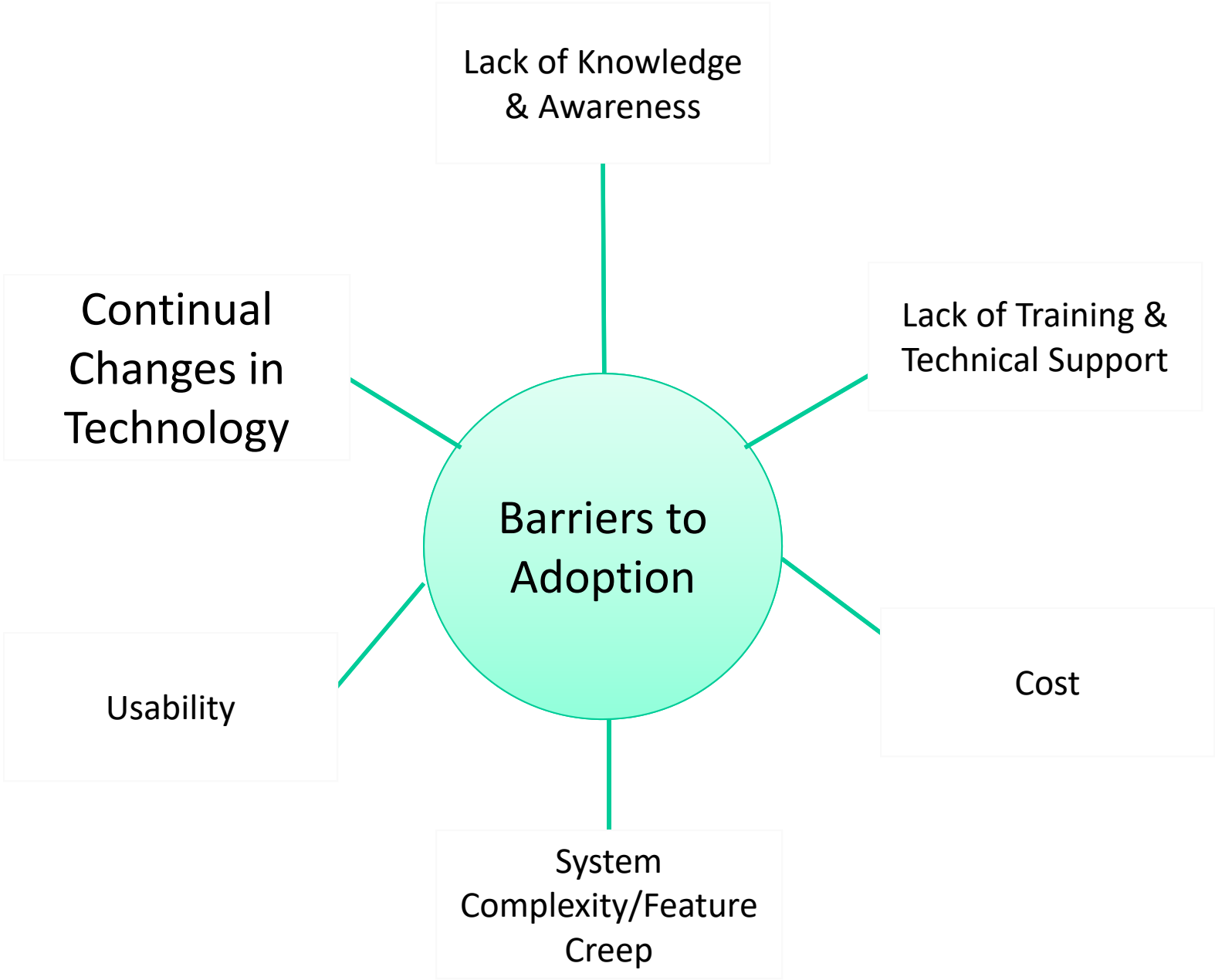
Technology-Based Work Performance (S. Czaja, J. Sharit, and Colleagues *1998, 1999, 2001, 2002, 2003,2005, 2007)*

Examined age performance (20-75 yrs) differences on a variety of technology-based tasks including:

- Data entry (transportation industry)
- Customer service representative (health insurance industry)
- Accounts balancing (banking industry)
- Tele-Commuting (customer service rep.)
- Internet Search
- Interactive-Telephone Menu Systems

Summary of Findings

- The older adults were willing and able to perform the tasks
- The older adults generally achieved lower levels of performance than younger adults
- Performance typically improves with experience for all age groups
- There was substantial variability in performance among the older adults
- Prior computer experience and component cognitive abilities were important predictors of performance
- Design aids are beneficial to older people


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

Conclusions

- **Older adults:**
  - Will continue to be a presence in the workforce.
  - Want to remain productively engaged.
  - Are productive and can make strong contributions in terms of wisdom and experience
  - Are reliable
  - Are able to learn new skills
  - Should be included in worker training programs
- **We Need:**
  - Programs to support older workers
  - Information on optimal training programs for older learners
  - Strategies to minimize "ageism"
  - Information on how to optimize the fit between older workers and current job demands