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Sharing is caring: The potential of the sharing economy to support aging in place

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ABSTRACT

This article explores innovative applications of sharing economy services that have the potential to support a population aging in place, especially the "oldest old," aged 85 and older, and their caregivers. A mixed-methods study conducted by the MIT AgeLab examined perceptions of and experiences with sharing economy services, ultimately finding opportunities and barriers to use. Thus, although sharing economy services have potential to support aging in place, to do so successfully will require reconstructing how older adults, family caregivers, aging service professionals, gerontology educators, and gerontology students conceptualize and deliver care to an aging population. We suggest examples for gerontology educators to integrate into their classrooms to further cultivate an appreciation among students of multiple approaches to intervention, including those that leverage sharing economy and technology-enabled platforms to support older adults and their caregivers.

KEYWORDS

Aging in place; caregivers; technology; sharing economy; business; gerontology and geriatrics curricula

Introduction

It is no longer news that the population of the United States – and the globe as a whole – is aging. Advances in public health, medicine, and technology have combined to enable people to live longer on average than ever before. Although much of the focus of the aging US population has been on the Baby Boomers, one of the most dramatic changes has taken place among those referred to as the "oldest old" – those aged 85 and older. Although the increase in all people aged 65 and older between 2000 and 2010 was 15.1%, the largest growth has come among those people aged 85 and older. The percentage of people aged 85–94 and those aged 95 and older grew at rates of 29.9% and 25.9%, respectively (Werner, 2011). If this trend continues as the Boomers age, by 2050 those aged 85 and older will constitute about one-fifth of the older adult population (Ortman, Velkoff, & Hogan, 2014; Vincent & Velkoff, 2010).

An aging population presents businesses, government, and society with both challenges and opportunities. With the population growth among the oldest old, many of the challenges will revolve around providing care and support for these individuals as they age (Osterman, 2017). Although traditionally families have cared for their oldest old at home or have placed them in nursing homes, changes in US household composition and the geographic dispersion of families suggest that many more older adults will be living alone as they age, with hopes to remain in their homes as long as possible (AARP, 2012;

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Mather, Jacobsen, & Pollard, 2015). Enabling the aging population, and the oldest old in particular, to age in their own communities will require new supports and services.

To educate future practitioners and policymakers in the field of gerontology who will offer such supports and services, gerontology programs are increasingly integrating technology-enabled interventions into their curricula as an approach to support older adults aging in their own homes (Czaja et al., 2006; Lynch, 2015; Sellers & Markham, 2012). The rise of so-called sharing economy services – peer-to-peer services facilitated by online transactions, often smartphone- and app-based – offers one means to meet the care needs of older adults who wish to age in place (Hamari, Sjöklint, & Ukkonen, 2016; Ward & Coughlin, 2016). Many of these services have been developed and designed primarily for younger populations, so they have received little attention thus far in the gerontological sphere. This study seeks to fill this gap by connecting trends in aging in place with the possibilities sharing economy services for older adults and their caregivers offer, with the further aim of encouraging conversations in gerontology classrooms about such services and their potential to support aging in place.

Background

The draw of aging in place

The notion of aging in place has garnered considerable attention and popularity among older adults and their caregivers, public and private organizations, and gerontology classrooms (Fong & Law, 2018; Kim, Gollamudi, & Steinhubl, 2017; Oakes & Sheehan, 2014; Silverstein, Johns, & Griffin, 2008). Such attention stems from multiple causes. Approximately 90% of adults 65 and older want to stay in their own homes and communities as they age (Farber, Shinkil, Lynott, Fox-Grage, & Harrell, 2011), and 75% of older adults plan on living in their homes for the rest of their lives (Abrams et al., 2017; National Council on Aging, 2013). Given that 60% of adults aged 80 and older have lived in the same home for more than 20 years, it is safe to say that many have strong attachments to their homes, neighborhoods, and communities (Harvard Joint Center for Housing Studies, 2014). Further, studies have found that those living in long-term care facilities report higher rates of loneliness (Jansson et al., 2017) and higher rates of depression compared with older adults aging in place (National Center for Health Statistics, 2014). Aging in place also offers economic and financial benefits (Marek, Stetzer, Adams, Popejoy, & Rantz, 2012: Popejoy et al., 2015). As a result, Medicaid funding for long-term care services is trending away from nursing homes and toward community-based settings (Freedman & Spillman, 2014).

Barriers to aging in place

Medical and functional concerns around aging in place

Despite the allure of aging at home and in one's community, multiple factors can make aging in place challenging. Foremost are medical considerations. Ninety-six percent of adults 85 and older have at least one chronic condition (Centers for Medicare and Medicaid Services, 2013), and 73% have at least one disability (He & Larsen, 2014). Fifteen percent of adults aged 85 and older report difficulty with at least one instrumental activity of daily living (IADL) such as cleaning, preparing meals, grocery shopping, or

transportation, and another 60% also struggle with at least one activity of daily living (ADL) such as bathing, toileting, dressing, or feeding themselves (Centers for Medicare and Medicaid Services, 2013). Projections suggest that 70% of adults over age 65 will require long-term services and supports during their lifetime (Genworth Financial, Inc., 2015). The gradual and/or acute accumulation of illness and disabilities is of particular salience to the oldest older adults who, by nature of their age, are most likely to live alone until they require more intensive medical care (Cutler, Ghosh, & Landrum, 2013; Harvard Joint Center for Housing Studies, 2014; Stallard, 2016).

The declining family caregiver ratio

AARP (2015) estimated in 2015 that 34.2 million people provided unpaid care to an adult aged 50 or older. Caregivers are an average age of 49 and spend an average of 24.4 hours per week providing care. Research has shown that caregiving can have a negative impact on caregivers' wages, savings, and physical and mental health (AARP, 2015; Lee et al., 2017; MetLife Mature Market Institute, 2011; MIT AgeLab, 2017). Often, these family caregivers aid older adults with ADLs and IADLs in and around the home (AARP, 2015; MetLife Mature Market Institute, 2011). Although some older adults enlist paid caregiving services, most prefer unpaid family caregivers, both because of cost savings and issues of trust (Whitlatch & Feinberg, 2007). There is, however, a projected decline in the ratio of family caregivers to older adults in need of care: there simply will not be enough adults – those older adults healthy enough to provide care, as well as younger adults under age 64 – to match the sharp increase in older adults likely to need support (Gonyea, 2013; Roth, Fredman, & Haley, 2015). The projected decline in family caregiver support raises additional questions about who will care for the growing number of older adults hoping to age in their communities rather than in institutions (Osterman, 2017).

The financial strain of longer lives

For many older adults, unprecedented longevity can be more expensive than it is thrilling. With longer lifespans come increases in spending – for individuals, families, and governments – to finance health care, transportation, housing and home modifications, meals, and the well-being of older adults. Yet over 50% of the US population is at risk of not having enough money to maintain their standard of living in retirement (Munnell, Hou, & Webb, 2014). In 2013, for adults approaching retirement, the median retirement account balance was only $12,000 (Rhee, 2013), and 52% of households aged 55 and older had no retirement savings at all (US Government Accountability Office, 2015). The average household income for those 80 and older is $25,000 (Harvard Joint Center for Housing Studies, 2014). Long-term care insurance is not a solution for many. As of 2014, only 11% of adults aged 65 and older had long-term care insurance policies. Having a policy was strongly related to wealth, as about 25% of those with assets over $1 million had a policy, compared with only 4% of people with assets between $50,000 and $100,000 (Gleckman, 2016). Many older adults who wish to age in place may thus lack the financial resources to pay for in-home care and thus must rely on the support of family to age in place.

Moving to a senior residential community can generate its own financial stresses for older adults and their families, however. The national monthly median rate for an assisted living facility in the United States is $3,600, but in many cities the costs can be much higher (Genworth Financial, Inc., 2015). The national median rate for a nursing home is

$250 per day. These costs suggest that relocating to an assisted living or nursing home is simply not an option for many of the oldest old.

These three trends – the growing demands for care, the projected decline in the family caregiver ratio, and lack of individual financial resources to pay for professional care – present challenges as well as opportunities. For gerontology educators, students, and service providers, the rise of new technologies offers new avenues that may help older adults remain at home for longer, while easing the burden on family caregivers and the financial demands on all parties.

The sharing economy and aging

Hamari et al. (2016) define the sharing economy as "the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services" (p. 2047). Some of the most prominent current examples include Airbnb, Uber, Lyft, and TaskRabbit. Many sharing economy businesses reflect traditional services offered through existing organizations. For example, the Administration on Aging currently offers homemaker services, case management, transportation, and home-delivered meals (Altshuler & Schimmel, 2010). For older adults who do not qualify for state or federal services, or for those who prefer more flexible or diverse offerings, sharing economy services may enable them and their caregivers to handle particular tasks they are less capable of doing themselves, including grocery shopping, laundry, housekeeping, and home repairs and maintenance.

Currently, college-educated urban dwellers with disproportionately high incomes are the most active consumers of sharing economy services (Smith, 2016), but they are not the only users. In a study conducted by the National Council on Aging, 47% of older adults reported that they have used or would consider using a ridesharing service such as Uber (National Council on Aging, 2013). The Pew Research Center reported that 44% of adults over 65 have used at least one type of sharing economy or on-demand service (Smith, 2016). Granted, these data overrepresent younger older adults (aged 65–84) compared to the oldest old. Nonetheless, older adults as a whole represent a growing population of mobile device and smartphone users (Anderson & Perrin, 2017), and they are using such technologies to build and maintain social connections, access information, track health, detect and prevent safety hazards, communicate with service providers and shop, among other things (Czaja, Beach, Charness, & Schulz, 2013). As older adults increasingly adopt mobile technologies, they will have greater access to sharing economy services that are often available through apps. Tech-savvy and financially well-resourced older adults' perceptions and usage of sharing economy services can offer insights into ways of expanding these services to broader groups of older adults. Even if the oldest old themselves are not ready to adopt sharing economy apps, they remain a useful tool for caregivers who can remotely organize, schedule, and send services and goods to their care recipients.

Some sharing economy companies are already marketing their services to older adults or building public–private partnerships, often for health care purposes (Powers, Rinefort, & Jain, 2016). For example, the ridesharing services Uber and Lyft have developed programs specifically for older adults and people with disabilities. Lyft Concierge and Uber Circulation partner with senior living communities, health care providers, and

professional caregiving companies to offer door-to-door service for people who use wheelchairs, walkers, and medical equipment. In some states, Lyft serves as a subcontractor for the Centers for Medicare & Medicaid Services and state Medicaid programs as part of free and subsidized nonemergency medical transportation programs (Chaiyachati et al., 2016). Ridesharing services are quick to cite that approximately 3.6 million people (many of whom are older adults) fail to receive nonemergency medical care every year due to transportation barriers, and that their companies can fill that gap (Powers et al., 2016). These companies also pride themselves on their on-demand and call-ahead services, both of which reduce wait times for riders, increasing efficiency while providing easily-trackable rides for safety and accounting convenience (Transit Cooperative Research Program, 2005; US Government Accountability Office, 2016). Despite these offerings, however, there is less than universal adoption of such services among older adults.

Ward and Coughlin (2016) approximated the costs for an 85 year old to age in place using sharing economy services compared with the costs of living in an independent or assisted living facility in metro-Boston, Massachusetts (curated and summarized by Selinger, 2015). Ward and Coughlin (2016) found that, for a single 85-year-old homeowner living without significant physical or financial distress and without a mortgage, the total cost of living at home using sharing economy services for 1 month was $2,967. Compared with a total monthly cost of $6,433 for an assisted living model in the Boston metropolitan area (including meals and housekeeping), the sharing economy model would cost less than half the amount. See Table 1 for definitions of items included in this analysis, Table 2 for costs per month of sharing economy services, and Table 3 for additional costs of homeownership.

Table 1. Categories of services provided by assisted living residences in Massachusetts (created by Ward & Coughlin, 2016, adapted from Commonwealth of Massachusetts Executive Office)).

Category of service	Items included in category
Meals	Includes meal and grocery delivery; together, these account for three meals per day ensuring individuals are food secure. The US Department of Agriculture (USDA) defines food security as having access at all times to enough food for an active, healthy life. The amount each individual spends food is based on the Official USDA Food Plans: Cost of Food at Home at Four Levels, U.S. Average report, stating the average cost of a moderate cost plan for females aged 71 and older to be $301 per month.
Medication management	Includes medication delivery, organization, reminders, and tracking adherence to a medication regimen.
Transportation	Includes available options for travel to medical appointments and social outings. Transportation pricing is based on US Department of Transportation 2009 National Household Travel Survey data reporting that seniors aged 75 and older take on average 2.7 trips per day for a total of 18 miles (United States Department of Transportation, 2009). Because of their declining health and use of delivery services, these numbers have been modified to 1.2 trips per day for 9 miles per day. Includes laundering clothing, linens, and other household items once per week.
Housekeeping	Includes biweekly housecleaning as well as lawn and outdoor space maintenance, including snow removal.
Recreation and wellness activities	Includes opportunities available for individuals to participate in physical fitness and socially and intellectually engaging activities regularly.
Security	Includes home security systems and wearable emergency call systems that are active continuously.
Personal care	Includes aides that provide one hour of assistance per day with ADLs.

Table 2. Costs per month of sharing economy services (created by Ward & Coughlin, 2016).

Type of Service	Vendors	Cost per month ($)
Meals		
	Instacart grocery delivery	242
	Personal Chef to Go Busy Singles Meal Plan	400
	Various local restaurants	80
Medication management		
	PillPack	0
	Medisafe App	0
	CareAngel VIP Care Service	0
Transportation		
	UberASSIST	473
	SCM Community Transportation	0
Laundry		
	Maytag Home Style	80
Housekeeping and outdoor maintenance		
	TaskRabbit housekeeping	140
	TaskRabbit outdoor maintenance	100
Recreation and wellness		
	Senior center classes	12
	Public library	0
Security		
	ADT Basic Plan	37
	Alert1 Fall Detection Medical Alert System	31
Personal care		
	Personal Care Attendant	406
Total		2,001

Note. Calculations for cost per month are explained in Appendix A.

Table 3. Other monthly costs of homeownership (created by Ward & Coughlin, 2016).

Home ownership costs	Cost per month ($)
Homeowners insurance	92[a]
Internet/TV/phone bundle	90[b]
Electricity	75[c]
Gas	99[c]
Fuel oil	221[c]
Water and sewer	87[d]
Trash collection	19[c]
Property taxes	333[c]
Home maintenance	42[e]
Total	1,058

Note. [a]Massachusetts state average from National Association of Insurance Commissioners (2016).
[b]Bundle price from Comcast.
[c]Median monthly price for adults aged 75+ from AHS 2013.
[d]Average monthly spending for a one family customer from Boston water and sewer commission.
[e]Median monthly spending for adults aged 65+ from AHS 2013.

The study

The overall aim of the study was to explore the promise, use, and perceptions of sharing economy services among the oldest old in the United States and to understand the opportunities and challenges that exist in this space for gerontology educators, students, consumers, businesses, and senior care providers. Although older adults are increasingly savvy users of mobile technologies, their perceptions of and experiences with sharing economy services largely remain unexplored (Czaja et al., 2013; Powers et al., 2016; Ward & Coughlin, 2016). Our mixed-methods study

explored the barriers and opportunities to use, as well as attitudes and beliefs about such services.

Methods

In this study, a panel of 21 participants all aged 85 and older was convened in September 2015 at the MIT AgeLab to discuss their attitudes toward, knowledge of, and experiences with sharing economy services. The session was part of an ongoing MIT AgeLab study in which the panel (referred to as the Lifestyle Leaders panel) gathers bimonthly to discuss and deconstruct issues and experiences related to aging. All of the participants were White and lived independently in the metro-Boston area. Most had high levels of education and wealth relative to the US population and to other older adults in the metro-Boston area. Panel characteristics are summarized in Table 4.

During the 2-hour session, participants first completed a questionnaire that included items related to (1) knowledge of and experience with using sharing economy services; (2) difficulties with ADL; (3) use of communication technologies; and (4) overall attitudes toward sharing economy services (see Appendix B for questionnaire). This was followed by a presentation about the sharing economy by researchers, which included brief descriptions of different kinds of services. Finally, participants were divided into smaller groups for in-depth discussions. In these discussions, moderators asked about (1) participants' impressions of, preferences toward, and trust in different sharing economy services; (2) why they would or would not use the services; (3) unmet needs and other services they would find useful; and (4) how they learned about and used sharing economy services on their smartphones. Three discussion groups were held in parallel, each lasting approximately 35 minutes.

Results

See Table 4 for descriptive characteristics of the sample. Although all participants were physically capable of traveling to the meeting location in Cambridge, Massachusetts, many

Table 4. Panel characteristics (N = 21).

Variable	Attribute	Frequency
Age (year of birth)	Born 1919–1925	3
	Born 1926–1928	11
	Born 1929–1930	7
Gender	Male	9
	Female	12
Marital status	Married	5
	Divorced	1
	Widowed	12
	Single, never married	1
	No answer	2
Employment status	Self-employed	3
	Retired and not working	16
	No answer	2
Highest education completed	High school diploma	1
	College	2
	Some graduate education	4
	Postgraduate degree	12
	No answer	2

reported that they experienced difficulties and discomfort completing basic ADL and IADL. Participants reported the highest level of difficulty moving large objects around their homes and keeping their homes clean. Using public transportation and lifting/carrying groceries were regarded as a little difficult by the greatest number of participants.

Findings from the questionnaire and the focus groups revealed a mix of use of sharing economy services and a variety of attitudes toward these services. First, far more participants had heard about various sharing economy services compared with those who had actually used them. For instance, 19 people in the panel had heard of Uber, whereas only 2 had used it. Participants' consumption of such services was found to be constrained by their use of technologies, particularly smartphones and apps. Further, those who did regularly use a smartphone (52.4% of the panel) expressed concerns regarding barriers to using these services such as high cost, difficulty with access, lack of interest, and technology anxiety. For example, one person said, "Using the apps on the iPhone is more and more difficult." Figure 1 displays the discrepancies between people's knowledge and use of sharing economy services.

Although the utilization rate was generally low, the majority of participants reported that they would feel comfortable and safe using sharing economy services. Out of 17 people who answered the question about how comfortable they would feel using sharing economy services, 6 strongly agreed that they would feel comfortable and 6 somewhat agreed that they would feel comfortable. Three people said that they neither agreed nor disagreed and two disagreed somewhat. No participants strongly disagreed that they would feel comfortable using sharing economy services. When asked about their response to the statement "I would not feel safe using these kinds of services," the majority of the panel reported that they would not feel unsafe.

Results from the questionnaires and the discussions suggest four primary considerations related to the participants' current use of sharing economy services. Each of these considerations integrates aspects of the foundational and contextual competencies for undergraduate and graduate education set forth by the Association for Gerontology in Higher Education (2014).

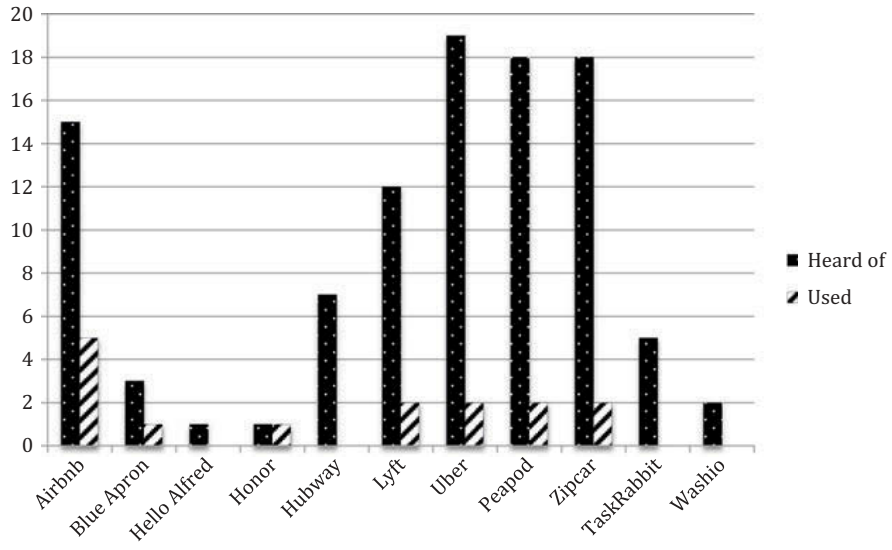

Figure 1. Awareness and usage of sharing economy services.

Managing technology

The use of sharing economy services among those aged 85 and older is constrained by access to, and use of, technologies, particularly smartphones. When asked if they used apps on a mobile phone or tablet, responses were mixed. Of the 21 participants, 14 said they did use apps on their phones or tablets, whereas 4 said they did not, and 1 reported not knowing what apps were. Although this proportion is not representative of all people aged 85 and older, it does highlight an important concept: apps are not just for kids. A variety of reasons were identified among those who were not using apps, including the cost of smartphones, confusion, lack of interest, and fear. For example, one person in the panel expressed anxiety and fear with regard to general use of smartphones, saying, "The letters are too small! If I hit the wrong button, what if the whole thing breaks?"

Minding social ties

Group discussions suggested that among the panelists the sharing economy and the concept of community go hand-in-hand. Many participants noted that the new sharing economy services reminded them of community sharing in the past ("Looks like the old time's come back again, just more convenient to do it," and "People had done similar things, but it just wasn't so easy to do"). The panel also felt, however, that the sharing economy "does not increase the sense of community." For example, one person said, "The lives that we've had before was much more of a – you knew your community, you knew your neighbors, you didn't hesitate to say 'are you driving to the grocery store? I'll go with you' and that's not [how the new sharing economy works]." This attitude might work against businesses with sharing economy models.

Participants also had mixed views about whether and how their use of sharing economy services would affect their social relationships. For example, whereas one person expressed his optimism in the sharing economy's ability to create social connections, another disagreed, saying that to her these services seemed like they might limit her social interactions, which already felt restricted. Another participant recommended a way to meet in the middle by marketing sharing economy services for older adults in pairs or small groups, so that they could access the service while simultaneously engaging in a social activity and guarding their safety.

Maintaining independence and control

Older age can also mean less control to do what we want, when we want, and how we want, and we may often be dependent on the assistance of other people. Although many of the oldest old may be comfortable accepting help in daily tasks and activities, others may struggle because, at its core, such help may undermine independence and autonomy.

Although various sharing economy services may be helpful for older adults who experience difficulties doing tasks as they age in place, some participants viewed it as a threat to independence rather than a tool to maintain independence. One respondent stated that she did not use any of the sharing economy services because she was still shopping, still driving, and still doing odd jobs around the house. Another said that she would only use one of the services if she was really disabled. A third respondent, when asked in a discussion group if she would use these services, said, "If I can do it myself, certainly not." This mentality of "as long as I can do it, I'm going to do it" (or "use it or lose it") may be a tribute to the hard-work generation, the developmental stage of these

older adults, or a perception that the sharing economy model may disempower older adults rather than support them.

Minimizing physical and financial threats

Anyone with media access is privy to news about an unassuming customer being harmed by a business, including those with sharing economy models (Mears, Reisig, Scaggs, & Holtfreter, 2016). As participants recounted hearing negative stories about consumers' interactions with businesses (including but not only related to those within the sharing economy), they seemed to appraise their level of vulnerability in relation to those who have already experienced harm, fraud, or another negative experience. Many participants talked about possible physical and financial threats that could be associated with using sharing economy services. Some indicated they felt that they were at higher risk for physical and/or financial threat by using a sharing economy service. For example, one person said, "Suppose you have a good feeling about the service provider. But you do have to transmit financial information through the Internet, and that sort of thing is vulnerable to hacking." The wariness may stem from a number of factors, including but not limited to a generally heightened fear of personal safety and financial vulnerability as an older person, concern over the security of information transmitted over the Internet, a lack of trust in organizations that conduct business online, and/or a lack of education about sharing economy services (Chakraborty, Lee, Bagchi-Sen, Upadhyaya, & Rao, 2016; DeLiema & Conrad, 2017; Kappes, Greve, & Hellmers, 2013).

Discussion

Expanding on Czaja's (2017) advocacy for technology as an integral component of long-term care service delivery for older adults, we suggest that sharing economy services may have similarly profound implications for older adults and their caregivers and in turn a potential place in the gerontology classroom. Building on early research in this area, results from our studies indicate that sharing economy services may provide some assistance for the oldest old population's efforts to age in place, both directly and through caregivers' use of services (Powers et al., 2016; Ward & Coughlin, 2016). We found that ridesharing services in particular have the potential to keep older adults engaged in activities outside of the home by meeting needs such as transportation to medical appointments and grocery store visits and meeting wants like participation in leisure activities. Such services may not only relieve caregivers of some driving responsibilities, but they may also provide more secure and trackable transportation. As people live longer in their own homes and as caregivers dwindle in numbers and live further away from their loved ones geographically, the potential for on-demand caregiving services through the sharing economy will likely only increase as well. Gerontology educators and students must consider that sharing economy services offer potential solutions to these challenges.

Although the opportunities the sharing economy provides are vast, there are also significant barriers to offering such services to people aged 85 and older. The first is a gap in the ownership and use of technologies to access the services (in this case, mobile devices/smartphones). Growing numbers of people aged 85 and older are smartphone users and these numbers will increase, but in the meantime, technological access and fluency are hurdles (Anderson & Perrin, 2017). Therefore, iterative and ongoing education

and intervention are needed to support older adults as they migrate to digital technologies (Czaja, 2017). Other barriers arise in terms of older adults' perceptions about the safety and physical accessibility of sharing economy services, as well as their overall trust in relatively new businesses and business models. There are also cost barriers, particularly for low-income older adults.

Another impediment to expanding sharing economy services for the oldest old stems from federal and state policies regarding the provision of and/or reimbursement for services. There are unanswered questions about insurance reimbursement for such services and how out-of-pocket expenses for older adults and their caregivers could or would be minimized by billing services to participants' insurance providers, including Medicaid. Finally, geography poses a challenge for consumers and businesses alike. Sharing economy services tend to arise in dense urban areas, but the majority of older adults in the United States live in suburban and rural areas (Harvard Joint Center on Housing Studies, 2014). This population is presently underserved by sharing economy services, creating an additional opportunity for businesses but a further challenge for scope and scaling. Gerontology students have much to learn by engaging with community members and service providers to learn about aging-related needs services, particularly within rural areas (Hash, Jurkowski, & Krout, 2016; O'Connor et al., 2016). By engaging in interview-based research and community needs assessments, students can critically and creatively reflect on ways to build on strengths of communities and fill gaps in service perhaps through the use of sharing economy services.

An additional barrier to the adoption and use of these services among older adults was not raised directly by the discussion groups, but had been mentioned in a previous Lifestyle Leaders session in a discussion housing. The challenge that many older adults encounter when adopting new technologies or services are the complex service agreements that regularly accompany them. People may have accepted that they need to deal with complicated and confusing package options from cable, Internet, and mobile phone providers, but the added need to decipher service agreements from software providers and app makers may be one challenge too many. As adults of all ages continue to migrate to mobile platforms and use apps, streamlining information about contracting, pricing, data use, and data ownership will become increasingly important.

Implications

The aging services and policy landscape is undergoing a quiet but massive overhaul. More stakeholders across public, private, and nonprofit sectors are discovering the rich opportunities afforded by a rapidly aging population. Across disciplines, however, technology is changing the conversation about aging and unprecedented longevity (Czaja, 2017). As sharing economy businesses further exploit technology, we argue that there are significant implications for older adults, their caregivers, and businesses and aging service providers, all of which ultimately can inform gerontology curricula.

Among consumers, we suggest that older adults and their caregivers consider the viability of using sharing economy services. With the oldest old population growing faster than ever before, many people will spend over 20 years in retirement and will hope and plan to age in place with creative and affordable services (Farber et al., 2011). Sharing economy services are uniquely situated to supplement (though not replace) aid from

family caregivers and professional service providers. We suggest that older adults and their caregivers try these services together to test for ease of access, cost, and convenience.

For businesses in the sharing economy, the growing population of older adults represents an emerging and mostly untapped market. Expanding into the 85+ market is an opportunity for businesses to offer innovative services both *for* and *by* older adults. To grow their consumer market of older adults, sharing economy businesses must expand service accessibility and ease access at all points of engagement. Companies might also consider different kinds of models, such as shared service use, to try to address fears or concerns around use in this market.

As technology continues to change the experience of aging, multiple factors that influence acceptance, including human factors design issues, will remain of the utmost importance (Lee, 2014). Based on Czaja's (2017) typology of technologies, we suggest that in order for older adults to receive the benefits of the sharing economy, the services' "technology systems and applications must be available, useful, useable, reliable, and responsive to the needs of diverse groups of users" (p. 46). As demonstrated by a panel participant who was renting out a room in her home through Airbnb, we would also advocate that businesses consider the potential of older adults as service providers. Employing older adults is an important opportunity not only for consumers, but also for businesses in need of labor.

With the Association for Gerontology in Higher Education's ongoing accreditation of gerontological programs of merit, and with the recent formation of the Accreditation for Gerontology Education Council, there are more resources available than ever to evaluate and advance the standing of gerontology programs. Gerontology programs continue to shape the future of aging services despite the fact that attracting undergraduate students to the field of aging remains difficult (Hinrichsen, 2010; Obhi & Woodhead, 2016). To some extent, the continued vitality of these programs will reflect how well they can keep pace with innovation and train practitioners to meet the evolving needs of older adults and their caregivers. As gerontology programs and educators engage in ongoing reflexivity, examining and revisiting syllabi and curricula to reflect rapid changes in the field, integrating concepts from sharing economy services into curricula will be beneficial for multiple reasons.

First, introducing patterns of utilization and adoption of sharing economy services would create an opportunity for students to consider how, why, and why not, older adults and their caregivers might perceive and use technology-driven platforms and the types of disparities that emerge in usage. Professors might consider assigning students to complete an action research project similar to that described by Silverstein and Turk (2016), whereby students learn about, and contribute to, a social issue through active engagement with older adults in the community. One example of this might entail groups of students investigating supports and programs for older adults provided by different sharing economy services. Through one such assignment, students can critically reflect on how companies address, label, and frame their inclusion of older adults as customers and/or providers, as well as who tends to be included and excluded. Students can also interview older adults and their caregivers who have used different companies' services and reflect on the positive and negative aspects they experienced.

Second, in a society now quite dependent on mobile technologies, introducing patterns of utilization and adoption of sharing economy services into gerontology classrooms

would introduce questions and conversations about technology training and support (Czaja et al., 2006). An opening question might include, "The older adults with whom you work may now have access to the technology; now who will teach them to use it and troubleshoot their issues when (not if) they arise?" Building on that question, the next might be, "Is the job of 'technology tutor' limited to family members, activity coordinators at senior living communities, and volunteers at the local senior center? Or should anyone in the field of aging services start to regard themselves as a 'technology tutor' in some way?" From these questions, students can engage in critical reflection (through in-class discussions or online/out-of-class assignments) about the ubiquity of technology, its fundamental impact on how people (including older adults and their caregivers) function, the effects of who has access and who does not, and how aging service providers interact with these issues.

Third, integrating concepts from the sharing economy model would serve as an interesting case study about the increasing relevance of private industry approaches to aging issues. Gerontology curricula have long acknowledged the role of public and nonprofit organizations as preceptors for field placements, service-learning, and other types of learning opportunities, but the introduction of for-profit companies as potential partners and providers of aging services is more recent (Karasik, 2013; Roodin, Brown, & Shedlock, 2013). As private companies carve their niche in the vast network of aging service providers, they are looked to as additional partners (Chaiyachati et al., 2016; National Council on Aging, 2013; Shippee, Schafer, & Pallone, 2008). Olin College of Engineering in Needham, Massachusetts, for example, has forged ongoing partnerships with car companies, professional caregiving companies, and medical alert system companies, many of which host students in engineering-focused action learning projects (Lynch, 2015).

Fourth, the availability of new funding sources (from accelerators, incubators, crowdfunding, micro-venture capital firms, and similar platforms) and rapid cycle user testing has stoked the fire of a vibrant start-up culture. Some of these private companies, such as professional caregiving companies, began as start-ups and have grown. Gerontology programs can weave aspects of start-up culture into their curricula as a way to demonstrate yet another approach to intervention. In doing so, programs can supplement the existing expertise of faculty, bolster the vibrancy of new and ongoing partnerships, and reinforce systems-level thinking, all with the intention to improve education about design, accessibility, service delivery, and beyond. Building on the experiential education opportunities and campus–community partnerships that gerontology courses have long used would be one way to experiment with this new direction.

A fifth and final implication is that more research in the area of sharing economy services for and by older adults is needed.

Our study has several limitations on which future research can build. The panel's generalizability is limited by its small sample size and self-selection of participants. All participants lived in the Boston area, were White, had on average higher levels of education and income, and were more physically and cognitively healthy than the majority of their 85+ counterparts. Our study represents an entry point into what will hopefully be a broader body of research about applications of the sharing economy with the older adult population. For instance, future studies could focus on older adults' experiences working in the sharing economy industry, on caregivers' experiences

entrusting their loved ones with sharing economy services, and on the introduction of sharing economy services to older adults in geographically diverse areas of the United States. Future studies could also position sharing economy services within an intervention research framework.

Conclusion

The study presented in this article sought to explore how sharing economy services might support aging in place, and how such services are perceived and used by adults aged 85 and older. The growth of the sharing economy may enable many more of the oldest old to live in their own homes in more flexible and affordable ways. Our research with the Lifestyle Leaders panel of adults aged 85 and older at the MIT AgeLab identified multiple opportunities for, and barriers to, service usage, including mobile technology adoption rates, concerns about safety, and the desires to maintain social connections and personal independence. The results of this work point to two important possibilities for the future of aging in place and in turn for the future of gerontology curricula. First, sharing economy services may help older adults age in place longer at less cost to them and their families, with a potentially greater quality of life among those who would prefer to age at home. Second, sharing economy services are already enabling some of the "oldest old" to age in place, primarily through ridesharing services and in-home maintenance services, although there exist numerous barriers to the wider adoption of such services. From this research, gerontology educators can consider additional ways to integrate into their classrooms new technology-enabled approaches to support older adults as they age in their homes and communities.

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Appendix A

Table A1 Cost per month calculations (Ward & Coughlin, 2016)

Meals

The amount spent on groceries is based on Official USDA Food Plans: Cost of Food at Home at Four levels U.S. Average December 2015 monthly cost moderate cost plan for females age 71+ . This report states that women aged 71 or older spend an average of $301 on groceries per month. This averages out to $3.58 per meal for 3 meals per day for 4 weeks (84 meals).

- Instacart has a $4 delivery fee for orders over $35.
- The Personal Chef to Go Busy Singles package provides eight precooked meals per week for $99.95.

Transportation

Number of trips and mileage traveled are based off of the National Household Travel Survey 2009 report stating that seniors aged 75+ take 2.7 trips per day for an average of 18 miles. Because of their declining health and use of delivery services, these numbers have been modified.

- UberASSIST charges $0.20/minute + $1.24/mile.
- SCM Community Transportation is a free service that must be booked in advance.

Laundry

- Maytag Home Style charges a minimum of $20 for the first 15 lbs then $1.25 per pound.

Home maintenance and housekeeping

- TaskRabbit workers charge an average of $35/hour for housekeeping services and about $50/hour for yard work or snow removal.

Recreation activities

- Cambridge Senior Center classes are offered for $0–3 per class
- Public library membership is free for city residents

Security
Does not include the cost of installation

- ADT Basic Plan is $37 per month
- Alert1 Fall Detection Plan is $31 per month

Personal care

- Care.com reports the average personal care assistant makes $14.50 per hour.

Table A2 Cost per month calculations

- Electric, gas, fuel oil, trash collection, and property taxes come from the American Housing Survey 2013 median monthly price for people aged 75+ (US Census Bureau, 2013)
- Homeowner's insurance number comes from the NAIC 2013 Homeowners Study. Average in Massachusetts not accounting for age or city.
- Sewer cost comes from rate for average one family customer in 2016 for 1 month from Boston water and sewer commission website (likely too high because priced for a family not an individual)
- Internet/TV/phone comes from Comcast quote on website.
- Home maintenance: American Housing Survey (2013) reports people 65+ spend a median of $42 per month on routine home maintenance (United States Census Bureau, 2013).

Appendix B

FOR RESEARCHER USE ONLY
Participant #: _____
Date: September 16, 2015

Sharing economy questionnaire

For each of the following questions, please write in, circle, or mark the best response. In some cases, you may select more than one answer. You do not need to answer any questions that you do not wish to. These questions will help us to learn more about what you think about the sharing economy.

(1) You read some articles about the new sharing economy (on rides, car rentals, home rentals). Could you see yourself using any of these services? How comfortable do you think you would feel using these services? What do you think about the sharing economy? (Space for open-ended responses provided.)
(2) Please indicate your knowledge of and experience with the following services.

Service	Have you ever heard of this service?		Have you ever used this service?	
Airbnb	Yes	No	Yes	No
Blue Apron	Yes	No	Yes	No
Drizly	Yes	No	Yes	No
Hello Alfred	Yes	No	Yes	No
Honor	Yes	No	Yes	No
Hubway	Yes	No	Yes	No
Lyft	Yes	No	Yes	No
Uber	Yes	No	Yes	No
Peapod	Yes	No	Yes	No
Zagster	Yes	No	Yes	No
Zipcar	Yes	No	Yes	No
TaskRabbit	Yes	No	Yes	No
Washio	Yes	No	Yes	No

(3) If you are already using these service(s), how was your overall experience with them? (Space for open-ended responses provided.)
(4) If you are not already using these service(s), would you consider using any of them? Why or why not? (Space for open-ended responses provided.)
(5) Thinking about different sharing economy services, please indicate how much you agree or disagree with the following statements.

	Agree strongly	Agree somewhat	Neither agree nor disagree	Disagree somewhat	Disagree strongly
I would feel comfortable using these kinds of services	1	2	3	4	5
I think these kinds of services would be too expensive for me to use	1	2	3	4	5
I would not trust the companies or people who provide these services	1	2	3	4	5
Getting in touch with these companies to use their services is easy	1	2	3	4	5
I think these kinds of companies provide a higher level of customer service	1	2	3	4	5
I would not feel safe using these kinds of services	1	2	3	4	5

(6) Do you own or rent your home?
□ Own → How long have you owned your home? _____
□ Rent
□ Neither
(7) Do you own or lease your car?
□ Own → How long have you owned your car? _____
□ Lease
□ Neither

(8) Please indicate how difficult you find the following tasks:

	Very difficult	A little difficult	Not difficult at all
Lifting or carrying groceries	Very	A little	Not at all
Preparing meals	Very	A little	Not at all
Keeping your home clean	Very	A little	Not at all
Moving large things around the home (e.g., chairs, furniture)	Very	A little	Not at all
Moving small things around the home	Very	A little	Not at all
Managing your finances	Very	A little	Not at all
Walking without assistance	Very	A little	Not at all
Driving	Very	A little	Not at all
Using other modes of transportation (e.g., bus, subway, etc.) outside of the home	Very	A little	Not at all

(9) Please indicate how prepared you feel to continue doing the following tasks *in the future*:

	Very well prepared	Somewhat prepared	Not prepared at all
Lifting or carrying groceries	Very well	Somewhat	Not at all
Preparing meals	Very well	Somewhat	Not at all
Keeping your home clean	Very well	Somewhat	Not at all
Moving large things around the home	Very well	Somewhat	Not at all
Moving small things around the home	Very well	Somewhat	Not at all
Managing your finances	Very well	Somewhat	Not at all
Walking without assistance	Very well	Somewhat	Not at all
Driving	Very well	Somewhat	Not at all
Using other modes of transportation (e.g., bus, subway, etc.) outside of the home	Very well	Somewhat	Not at all

(10) If any of the tasks listed above became difficult to do on your own, do you have someone whom you would trust to do these tasks for you? Please select all that apply.
- □ No, I can't think of anyone whom I would trust to do these for me
- □ Yes, a family member
- □ Yes, a close friend or neighbor
- □ Yes, a paid caregiver
- □ Yes, a public service
- □ Yes, a commercial service
- □ Yes, other (please specify): _____

Transportation

(11) What is your primary mode of transportation?
- □ I drive myself
- □ A friend, loved one, or caregiver drives me
- □ Taxi, Uber, Lyft, or other shared service
- □ The Ride or other group van service
- □ Walk, scooter, or bike
- □ Public transportation
- □ Other (please specify): _____

(12) If you drive, which of the following types of vehicles do you use?
- □ I no longer drive
- □ My own car/vehicle or a loved one's car/vehicle
- □ Zipcar or other car-sharing services
- □ Rental car
- □ Other (please specify): _____

(13) If you drive, when is the last time you drove?
- □ I no longer drive
- □ Today or yesterday
- □ Within the past week
- □ Within the past month but not the past week
- □ Within the past six months but not the past month
- □ Longer than six months ago

Around the home

(14) Do you regularly use any paid services that locally pick up/deliver products to your home?
- □ Yes
- □ No
- □ Don't know

(15) If you answered yes to the question above, what kinds of services do you use?
- □ I do not use any of these services
- □ Laundry
- □ Grocery shopping
- □ Prepared foods
- □ Prescription medications from a local pharmacy
- □ Other (please specify): _____

Communication technologies

(16) Do you regularly use the Internet?
- □ Yes
- □ No
- □ Don't know

(17) Do you regularly use a smartphone?
- □ Yes
- □ No
- □ Don't know
- □ Have a smartphone but don't use it

(18) Do you use a tablet (e.g., an iPad, Kindle Fire, etc.)?
- □ Yes
- □ No
- □ Don't know
- □ Have a tablet but don't use it

(19) Do you use a smartphone or tablet to do any of the following? (Select all that apply.)
- □ Make a telephone call
- □ Make a video call
- □ Send and receive texts
- □ E-mail
- □ Search the web
- □ Social media
- □ Get directions/navigate
- □ Take pictures
- □ Manage schedule
- □ Play videos or music
- □ Play games
- □ Read books, magazines, or newspapers
- □ Other (please specify): _____
- □ None of the above

(20) How do you input information into your smartphone or tablet?
□ I don't input or enter any information into my smartphone or tablet
□ Type and touch only
□ Voice recognition system only
□ Both type and touch and voice recognition
□ Don't know
□ None of the above

(21) Do you use apps (applications) on your phone or tablet?
□ Yes
□ No
□ Not sure
□ Don't know what apps are

(22) Please list the five apps that you use the most often, or mark "none":
□ None
(1) _____
(2) _____
(3) _____
(4) _____
(5) _____

A few last questions about you

(23) What is your gender?
□ Male
□ Female
□ Prefer not to answer

(24) In what year were you born? _____

THANK YOU!