Exploring how Internet services can enhance elderly well-being

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Abstract

Purpose – This study investigates how Internet services can improve the well-being of elderly consumers. Drawing on transformative service research (TSR) and technology adoption literature, it examines the main challenges for the elderly when adopting Internet services and how they and their family members can co-create value to improve the elderly service inclusion and well-being.

Design/methodology/approach – A qualitative methodology is used to identify challenges, value co-creation behaviors, and well-being outcomes of elderly individuals and their younger family members when using Internet services. The data collection method involved 24 in-depth interviews with consumers aged over 75 years and their family members.

Findings – This research first recognizes specific challenges for the elderly in adopting Internet services related to resistance to using Internet services and health impairments. Second, the findings identify value co-creation behaviors held by elderly consumers of Internet services: learning and formal training, complying with indications, and seeking help when they encounter problems with technology. Younger family members also contribute to elderly well-being through two value co-creation behaviors: helping and supporting elderly relatives with technology, and being patient and tolerant when they need support. Finally, these behaviors are found to influence five dimensions of elderly consumers’ well-being: enjoyment, personal growth, mastery, autonomy, and social connectedness.
Research limitations/implications – Limitations in this research derive from its qualitative nature.

Practical implications – The findings contribute to the TSR and service inclusion literature, helping to understand how the elderly obtain value and well-being from Internet services, and providing practical suggestions for Internet services, marketers and policymakers.

Originality/value – This study addresses a gap in the literature by exploring the value co-creation behaviors of elderly consumers of Internet services and their younger family members for improving well-being outcomes. Understanding value co-creation and well-being for elderly consumers of Internet services is an emerging and under-researched area in TSR and service inclusion literature.

Keywords: elderly, Internet services, value co-creation, well-being, TSR, service inclusion

Paper type: Research paper
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Introduction

The world’s population is aging, and every country is experiencing growth in the number of elderly individuals, mostly due to a longer life expectancy (United Nations, 2020). According to a recent report, one in six people in the world will be over the age of 65 in 2050, and the number of individuals aged 80 or over is projected to triple in 2050 (United Nations, 2019). The aging population is poised to become one of the most significant social transformations of this century, with implications for all service sectors (Wan He, Goodkind, & Kowal, 2016). However, the elderly and are considered vulnerable consumers (Moschis, Mosteller, & Fatt, 2011), who are more likely to be socially excluded (Walsh, Scharf, & Keating, 2017), and have lower well-being indexes than younger adults (Bowling, 2011). Thus, there is an increasing concern on how to improve elderly inclusion and well-being in the services discipline (Feng, Altinay, & Olya, 2019; Plaud & Guillemot, 2015), particularly through the adoption of technology and Internet services (Charmarkeh & Lagacé, 2017).

Transformative service research (TSR) focuses on “improving consumer and societal welfare through service” (Rosenbaum et al., 2011, p.3), and the main goal is to enhance well-being for people via service design and delivery (L. Anderson et al., 2013). TSR suggests that value co-creation behaviors can have a positive effect on the well-being of vulnerable consumers such as the elderly (Ostrom, Parasuraman, & Bowen, 2015; Parkinson, Schuster, Mulcahy, & Taaminen, 2017; Rosenbaum, Seger-Guttmann, & Giraldo, 2017). Value co-creation refers to the integration of resources between consumers, employees, and other actors of a service ecosystem (Vargo & Lusch, 2016). Value co-creation behaviors may help the elderly to cope better with the vicissitudes of aging, improve service inclusion and
increase their well-being (Davenport, Mann, & Lutz, 2012; Pera, Quinton, & Baima, 2020; Ramón-Jerónimo, Peral-Peral, & Arenas-Gaitán, 2013).

Several studies have found that Internet services can improve the well-being for elderly consumers (Cotten, Ford, Ford, & Hale, 2012; Kavetsos & Koutroumpis, 2011). These services refer to services that use Internet access via mobile phones, handheld tablet devices, and personal computers to enable ubiquitous communication, messaging, and e-commerce activities. Particularly during the pandemic COVID-19, Internet services have increasingly become an integral part of the lives of the elderly, including email and messaging, along with music downloads, shopping, banking, and bill payments (Wallcook, Nygård, Kottorp, & Malinowsky, 2019; Yang & Lin, 2019). Internet services can also help the elderly maintain their independence, reduce depression, and increase well-being (Cotten et al., 2012; Heinz et al., 2013; Kavetsos & Koutroumpis, 2011; Reneland-Forsman, 2018).

In spite of their well-being potential, elderly consumers use Internet services less often than younger individuals (Anderson & Perrin, 2017; Jefferson, 2018). In fact, there is evidence of an age-related digital divide (Friemel, 2016; Niehaves & Plattfaut, 2014), which refers to a gap between individuals who have the ability to use technology, usually younger individuals, and those who do not (Krueger, Stone, & Lukaszewski, 2018). One reason is the age-related impairments that hinder the visual, auditory, motor, and cognitive capacities of elderly individuals, that can affect how they comprehend instructions and remember processes (Deary et al., 2009; Lee, Chen, & Hewitt, 2011). Other reasons include a lack of formal training in technology, difficulty in using and learning how to use the Internet, lower self-efficacy, frustration with technology and the lack of benefits perceived (Blaschke, Freddolino, & Mullen, 2009; Li & Luximon, 2018; Zhou, Rau, & Salvendy, 2012), which
negatively affect the elderly functioning with Internet services (Barnard, Bradley, Hodgson, & Lloyd, 2013; Klimova, Simonova, Poulova, Truhlarova, & Kuca, 2016).

Despite increasing concerns on how to improve elderly well-being within TSR (Feng et al., 2019; Plaud & Guillemot, 2015), and acknowledging the vulnerability of elderly consumers for service inclusion (Moschis et al., 2011), scant research has examined how the elderly can improve their well-being by co-creating value when consuming Internet services to bridge the age-related digital divide (Krueger et al., 2018). This is important because a digital divide can have a negative impact on well-being outcomes (Boz & Karatas, 2015), and on service inclusion (Fisk et al., 2018), particularly for the elderly over 75 years. Service inclusion refers “to nurture an enduring state in which all people can realize fair value from service” (Fisk et al., 2018, p.837).

Moreover, as people age, they require more support from others in basic activities of daily living, such as bathing, walking, paying bills or attending doctor appointments (Rantakokko, Mänty, & Rantanen, 2012; Suarez-Álvarez, Suarez-Vazquez, & del Río-Lanza, 2020). It may be difficult for elderly people with decreased cognitive or mobility capacity to participate in value co-creation behaviors by themselves, since they may be less able to do so (Plaud & Guillemot, 2015). Thus, elderly consumers may need help from other actors of the service ecosystem that act as second customers or mediators (Johns & Davey, 2019; Leino, 2017). Specifically, the literature on aging, upward transmission and reverse socialization suggests that younger family members may play an important role in value co-creation and the well-being of elderly consumers because, as people age, they tend to interact more with close family relatives, such as spouses, children, and grandchildren, in comparison to friends or peers (Barrantes-Cáceres & Cozzubo-Chaparro, 2019; Charles, 2010; Lobet & Cavalcante, 2014; Luijkx, Peek, & Wouters, 2015; Peek et al., 2016; Rittirong, Prasartkul, & Rindfuss,
Particularly in collectivistic countries, or less developed contexts where public social services are weak, family support can be important in the service ecosystems for elderly well-being (LaFave, 2017; Luijkx et al., 2015; Suarez-Álvarez et al., 2020; Xiong & Zuo, 2019).

Overall, this study draws on the TSR paradigm and aims to address the potentially transformative role of Internet services through value co-creation for elderly well-being. First, it draws on the literature on elderly technology adoption (e.g., Alvarez-Dardet, Lara, & Perez-Padilla, 2020) and detects the main challenges for the elderly in adopting Internet services. Second, the findings identify value co-creation behaviors and well-being outcomes for elderly consumers of Internet services by drawing on frameworks of value co-creation (Yi & Gong, 2013) and hedonic and eudaimonic well-being (Diener, 2000; Ryff, 1989).

Third, consistent with Anderson and Ostrom (2015), who argue that “services are always embedded within socio-cultural ecosystems” (p. 244), this study extends value co-creation and well-being from a dyadic perspective to an ecosystem level by considering the role of family members as relevant actors in value co-creation and well-being within the elderly Internet service ecosystem.

This paper is organized as follows: in the next section the literature on elderly technology adoption, TSR, and service inclusion is reviewed. This is followed by a theoretical framework regarding value co-creation behaviors and well-being dimensions. The methodology is then explained, along with the data analysis, results and implications.

**Literature review**

*Elderly consumers and Internet services*

Internet use is becoming imperative for elderly individuals to remain independent for longer (Alvarez-Dardet *et al.*, 2020); they are encouraged by their families and friends to use
Internet services in their daily life to reduce loneliness and enhance their well-being (Khalaila & Vitman-Schorr, 2018; Luijkx et al., 2015). Internet services can become an important tool for enabling the elderly to grasp opportunities to stay active and independent and be able to participate in society (Boz & Karatas, 2015).

Most studies examining Internet use and well-being among the elderly find that it is positively associated with developing new friendships and higher-quality relationships with family and friends, and maintaining social involvement (Chen & Schulz, 2016; Veena, Kwon, & Juan, 2012). Internet use can also provide elderly individuals with various forms of entertainment (Veena et al., 2012), which helps to reduce feelings of loneliness due to aging (Damant, Knapp, Freddolino, & Lombard, 2017; Heo, Chun, Lee, Lee, & Kim, 2015; Khalaila & Vitman-Schorr, 2018; Yu, Mccammon, Ellison, & Langa, 2016). Further, elderly consumers perceive various health benefits from using Internet services, such as obtaining health information, monitoring and managing their health status, and purchasing healthcare goods and services (Jacobson, Lin, & McEwen, 2017; Li & Luximon, 2018).

In spite of these benefits, elderly adults worldwide use fewer technologies than younger adults (Jefferson, 2018). According to the literature, the main barriers for technology adoption among the elderly are personal variables, such as age, difficulty in following instructions, lack of knowledge and confidence, fear or skepticism about using technology, previous negative experiences, and health-related problems (Tan & Chan, 2018; Vaportzis, Clausen, & Gow, 2017; Vroman, Arthanat, & Lysack, 2015). These barriers are largely due to the fact that people’s cognitive and physical abilities diminish with age (Kourkouta, Iliadis, & Monios, 2015), which affects their confidence and attitude toward technology usage in their daily lives (Pan & Jordan-Marsh, 2010; Wagner, Hassanein, & Head, 2010). For example, text comprehension and working memory capacity decline with age, and this might
be problematic when task complexity is increased because it can cause people to feel lost or confused when using the Internet (Morrison & Newell, 2017).

Due to the abovementioned limitations, many elderly have been left behind due to an age-related digital divide (Choudrie, Pheeraphuttranghkoon, & Davari, 2020; Dutot, 2014; Niehaves & Plattfaut, 2014), or excluded from fully participating in society through Internet services (Hargittai & Dobransky, 2017). The digital divide refers to a form of inequality and vulnerability affecting elderly people who face obstacles to access and use technology (Krueger et al., 2018). There is greater fear, anxiety, and resistance associated with using Internet technology among the elderly (Chouk & Mani, 2019; Mani & Chouk, 2018), and their assessment of their skills and abilities for learning and using technology is much lower than for younger age groups due to a less experience, lack of confidence, or feeling too old or left behind (Barnard et al., 2013; Mitzner et al., 2010; van Deursen & Helsper, 2015). For example, younger people usually learn how to use a computer at school or work; and this is often not the case for the elderly, especially among those over 75 whose occupation probably did not involve computer use (van Deursen & Helsper, 2015).

Due to the above, several scholars consider that the elderly are vulnerable consumers (Moschis, 2012), that may be excluded from Internet services because they have less ability or knowledge to use the Internet (Garrett & Toumanoff, 2010; Griffiths & Harmon, 2011; Perry & Wolburg, 2011; Shultz & Holbrook, 2009). Service exclusion occurs when services deliberately or unintentionally fail to include or serve customers in a fair manner. Particularly the COVID-19 pandemic has highlighted the challenges for vulnerable elderly individuals who may lack access or skills to use Internet services (Seifert, Cotten, & Xie, 2020).

To offset the problems of exclusion, Fisk et al. (2018) propose the concept of service inclusion for well-being, which “calls for attention to an egalitarian system that provides
customers with fair access to a service, fair treatment during service and fair opportunity to exit a service” (p. 835). Service inclusion draws on the TSR paradigm and proposes four pillars of systematic efforts to ensure that all people are accepted and included in society by enabling opportunity, offering choice, relieving suffering and fostering happiness. Service inclusion is particularly relevant for elderly vulnerable consumers that might lack the ability to use Internet services and obtain fair value from them (Rosenbaum et al., 2017).

**Elderly value co-creation and the role of family**

Previous TSR research shows that value co-creation confers well-being outcomes for vulnerable consumers such as healthcare patients (McColl-Kennedy, Vargo, Dagger, Sweeney, & van Kasteren, 2012; Sharma, Conduit, & Rao Hill, 2017), people with disabilities and developmental conditions (Beatson, Riedel, Chamorro-Koc, Marston, & Stafford, 2020; Dickson, Darcy, Johns, & Pentifallo, 2016; Lam & Bianchi, 2019), care services (Johns & Davey, 2019; Leino, 2017), and refugees (Nasr & Fisk, 2019). In general, this research suggests that the elderly should actively take part in value co-creation behaviors to obtain well-being from service offerings. Value co-creation results from the integration of resources between different actors of the service ecosystem to improve well-being outcomes (Edvardsson, Tronvoll, & Gruber, 2011). Thus, value co-creation for the elderly can involve several service ecosystem actors, such as service providers, family members, caregivers, or other consumers (Pinho, Beirão, Patrício, & Fisk, 2014).

Moreover, for value co-creation behaviors to occur, consumers need to be capable, effortful, and willing to engage resources to create value (Lusch & Vargo, 2014). However, some consumers may have diminished resources and skills to apply to their value-generating processes (Dickson et al., 2016). For instance, due to the cognitive and physical deterioration
of aging, elderly consumers may experience a degree of powerlessness and dependency on others and may need to find resources in other actors of the service ecosystem that enable them to co-create value (Payne, Storbacka, & Frow, 2008). However, cognitive impairments and less confidence may affect the understanding of the instructions offered by service providers (Suarez-Álvarez et al., 2020). Thus, interactions with family members, rather than service providers, are likely to have a greater impact on elderly well-being because people strongly rely on their families for joint decision-making in consumption (Black & Gallan, 2015; Charles, 2010; Rittirong et al., 2014), and support (Świderska, 2014), particularly regarding technology adoption (Barrantes-Cáceres & Cozzubo-Chaparro, 2019; Luijkx et al., 2015; Schreurs, Quan-Haase, & Martin, 2017).

The role of family support in service consumption has been recognized in previous research (e.g., Lam & Bianchi, 2019; Tan & Chan, 2018), and family members can act as second customers (Leino, 2017) or mediators (Johns & Davey, 2019) for vulnerable consumers. For example, elderly with health limitations may not be able to engage in value co-creation behaviors by themselves, and younger family members can take a pivotal role in the value-creation process with Internet services (Luijkx et al., 2015; Schreurs et al., 2017; Xiong & Zuo, 2019). It is shown that there is an inter-generational transfer of knowledge for technology use, which means that younger family members become knowledgeable experts and the elderly learn from how younger people use Internet services (Barrantes-Cáceres & Cozzubo-Chaparro, 2019). Predominantly in countries that have a collectivistic culture or where there is less access to public social services, family support can be essential for elderly value co-creation and well-being (LaFave, 2017; Suarez-Álvarez et al., 2020).

Theoretical framework: value co-creation behaviors and well-being dimensions
The concept of elderly well-being has been investigated from two disparate conceptualizations (Araújo, Ribeiro, & Paúl, 2017): hedonism, which reflects the view that well-being comprises pleasure or enjoyment (Diener, 2000); and eudaimonism, which conceptualizes that well-being consists of fulfilling people’s personal potential (Ryff, 1989). The hedonic view proposes that well-being consists of subjective happiness and places more emphasis on permanent life challenges, such as the sense of purpose, achievement of satisfying relationships, and self-realization (Ryan & Deci, 2001). To assess hedonic well-being, researchers have used the subjective well-being construct, which refers to how elderly people feel about their lives at a cognitive and an affective level (e.g., pleasure, contentment, enjoyment, as well as the absence of negative emotions and moods) (Diener, 2000).

The eudaimonic perspective instead has to do with elderly peoples’ life activities aimed at self-realizing aspects of being a person (Ryan & Deci, 2001; Ryff, 1989; Waterman, 1993). For example, Ryff (1989) established a multidimensional model of well-being that considers six key dimensions: 1) autonomy (independence, self-determination), 2) environmental mastery (ability to create environments suitable to one’s psychic needs), 3) positive relations with others (capacity for love, friendship, and close identification with others), 4) self-acceptance (having positive self-regard), 5) purpose in life (having a sense of meaning in life), and 6) personal growth (self-realization and achieving personal potential).

Several studies have found a positive link between elderly Internet use and hedonic and eudaimonic well-being (Cotten et al., 2012; Forsman & Nordmyr, 2017; Lelkes, 2013; Quintana, Cervantes, Sáez, & Isasi, 2018; Zhang & Umemuro, 2012). These studies show that Internet use among the elderly improves interpersonal interactions, social inclusion, decreased social isolation and loneliness among elderly adults (Beneito-Montagut, Cassián-
Yde, & Begueria, 2018). The recreational use of Internet services has also been identified as a relevant aspect of hedonic well-being among elderly (Lifshitz, Nimrod, & Bachner, 2018).

Moreover, research has attempted to identify consumer value co-creation behaviors in service consumption that might affect *hedonic* and *eudaimonic* well-being dimensions (McColl-Kennedy et al., 2012; Neghina, Caniels, Bloemer, & van Birgelen, 2015; Yi & Gong, 2013). Among these studies, Yi and Gong (2013) proposed a parsimonious model which contemplates two types of value co-creation behaviors in services: 1) participation behavior, which comprises information seeking, information sharing, responsible behavior, and personal interactions; and 2) citizenship behavior, which comprises giving feedback, advocacy, helping, and tolerance. This value co-creation framework has been previously applied to digital-related contexts (Akman, Plewa, & Conduit, 2019; Frasquet-Deltoro, Alarcón-del-Amo, & Lorenzo-Romero, 2019). For instance, learning how to use Internet services and following instructions are essential co-creation behaviors for elderly consumers of Internet services to achieve value (Hunsaker & Hargittai, 2018).

In sum, although previous studies have investigated the role of Internet adoption on elderly well-being (e.g., Boz & Karatas, 2015), scant research has considered how the elderly, which are seen as vulnerable consumers, co-create value and achieve well-being with Internet services, and what is the role of family members in this process. Drawing on Yi and Gong’s (2013), Ryff’s (1989), and Diener’s (2000) theoretical frameworks, this study aims to address this existing gap in TSR. Three research questions emerge for this study: *What are the main challenges for elderly consumers in adopting Internet services? How do elderly consumers of Internet services co-create value to improve their well-being? What is the role of family members in this process?*
Methodology

Research design

A qualitative approach was used to examine the research questions (Corbin & Strauss, 2015). In-depth interviews were chosen as the research methodology because they provide an effective means of obtaining rich insights into the phenomenon of interest (Bolderston, 2012). Data were collected through 24 in-depth, face-to-face, semi-structured interviews with a sample of 12 elderly adults and 12 family members of the elderly who live in Chile. The sample size is consistent with previous TSR studies which consider vulnerable consumers (e.g., Abney, White, Shanahan, & Locander, 2017; Lam & Bianchi, 2019). Elderly participants were retired men and women (75% women) aged between 75 and 92 years, with an average age of 78.8 years. All elderly participants were currently retired but had previously held different occupations, such as engineers, architects, accountants, nurses, and educators. Most participants belonged to the middle–upper socio-economic level and were living in the Metropolitan Region (Santiago and its surroundings) in their own homes. Family participants were daughters (33%), sons (33%), and grandchildren (33%) of the elderly participants, with ages that ranged between 27 and 63 years.

Potential participants were invited by phone to participate in this study. Once interviewees had agreed to participate, interviews were held in the elderly person’s home. Potential participants were purposefully selected using a snowball sampling technique and chosen to represent the older spectrum of elderly adults (+75). This decision was made because people over 75 are, in general, more vulnerable due to aging impairments, have less experience with technology, and Internet use is particularly limited in this age group (Lee et al., 2011; van Boekel, Peek, & Luijkh, 2017), as opposed to younger elderly (55–75 years old), who are found to be more knowledgeable of Internet services (Schehl, Leukela, & Sugumaran, 2019).
Interviews were also held with a younger family member—a child or grandchild who had a close relationship with the elderly participant—who was contacted by phone by the researchers and invited to participate in this study. Although interviews were held only with one family member of each elderly participant, the questions asked also considered the roles of the different family members in interacting and supporting their elderly relatives. These interviews were conducted in convenient locations for family members, such as their homes, offices, or by phone. After interview 24 did not elicit any new information, the data collection process was terminated and this sample was deemed sufficient due to theoretical saturation, which refers to the extent to which predetermined themes are adequately represented in the data (Saunders et al., 2018). Participant characteristics are shown in Table 1.

[Insert Table 1 here]

Both samples of elderly participants and their family members were willing to participate and had the capacity to contribute appropriately to this study in terms of both relevance and depth. For example, all elderly participants reported that they had access to the Internet at home, had some experience using Internet services, possessed and used at least a smartphone, and were cognitively able to express their opinions regarding their experience with Internet services. Furthermore, the family members interviewed were actively involved in the lives of their elderly relatives and supported them frequently with Internet usage. Thus, these samples were perceived as appropriate for the nature of this study.

An interview protocol was developed for elderly participants and their family members considering previous literature on value co-creation and elderly well-being (e.g., Boz & Karatas, 2015; Frasquet-Deltoro et al., 2019), as well as the theoretical frameworks on value co-creation behavior and well-being (Diener, 2000; Ryff, 1989; Yi & Gong, 2013). The main objective of the interview questions was to gain insights into the consumer perspectives
regarding what are the main challenges of elderly consumers of Internet services, how they co-create value to improve their well-being and what is the role of family members in this process. The interview protocol was pre-tested with two elderly participants and their family members to identifying possible problems of word ambiguity and comprehension and changes were made accordingly to the interview questions.

Initial warm-up questions with elderly participants asked them to talk about their health situation, mention what technology they possessed, indicate what Internet services they were using, and for what purpose. Deeper questions followed, asking about the main benefits they gained from using Internet services in their daily life and what the main challenges or problems were with this technology. Specific questions were asked on their perceived contributions to obtaining value from using Internet services in their daily lives (value co-creation behaviors). Examples were: “What benefit do you obtain from using Internet services in your daily life?” “How do you contribute in any way to the realization of this value?” Finally, participants were also asked how Internet services may have improved their life and well-being. During the interviews, the researcher encouraged participants to share examples to obtain richer insights into their experiences.

Similar questions were asked to family participants, but they focused on the use of Internet services by their elderly relatives. For example, family participants were asked to give their opinion regarding their elderly relative regarding their general health situation, what technology the elderly possessed, and which Internet services their elderly relative was using and why. Deeper questions asked for their opinion on the main benefits their elderly relatives received from using Internet services in their daily lives and the main challenges or problems they encountered with technology in general. Specific questions were asked to family members on how they perceived that their elderly relatives contributed to obtaining value
from using Internet services in their daily lives (value co-creation behaviors), and how they contributed to help their elderly relatives co-create value with Internet services. Finally, family participants were asked their opinion on how Internet services may have improved their elderly relatives’ well-being. Participants were encouraged to share examples to obtain rich insights from the interviews. This protocol was tested on three elderly individuals over 75 years old and three family participants to ensure the questions were worded in a non-directive manner (Bolderston, 2012).

Overall, this methodology considered the recommendations by Azzari and Baker (2020) for conducting qualitative transformative service research. First, interviewing followed an ethical protocol where participants were required to give their consent by signing a form before the interview. Furthermore, although the researcher was familiarized with the research context, the data collection process was participant centric in nature, which allowed for co-creation of meaning with participants. Finally, the authors analyzed the data following an iterative process, moving from the data to the theoretical frameworks for themes to emerge.

Analysis and interpretation

Data analysis was conducted following an iterative process of data coding, categorization, and abstraction (McCracken, 1988). Interview transcripts were analyzed and interpreted through a systematic classification process of coding and identifying themes or patterns (Spiggle, 1994). The main researcher and a research assistant coded the interview transcripts into preliminary categories of co-creation behaviors using a process of abstracting and generalizing from specific observations by means of constant comparison, coding, and memo procedures (Spiggle, 1994; Strauss & Corbin, 1998). Coding was conducted on a line-by-line
basis to disaggregate the text into meaningful insights, which formed categories with more abstract explanatory power (Strauss & Corbin, 1998). Axial coding was then performed to link coding categories to subcategories to provide a more precise understanding. To avoid relying on the initial interpretations, the researchers constantly took into account alternative explanations endorsed by both elderly and family participants to polish the categories, subcategories, and their interconnections (Strauss & Corbin, 1998). Lastly, responses were collapsed into categories through inductive categorization (Spiggle, 1994) by drawing on the initial value co-creation framework (Yi & Gong, 2013) and well-being (Diener, 2000; Ryff, 1989) dimensions. The 97% agreement rate met the criteria of over 80% for inter-judge reliability for content analysis (Kassarjian, 1977). Disagreements between the researchers were resolved through conversation.

**Results**

The data confirm that the sample of elderly participants use Internet services predominantly through mobile phones and tablets rather than laptops. Ten out of twelve elderly participants mentioned that they use Internet services on a regular basis, sometimes several times a day and for several hours, mostly to communicate with friends and family, pay bills, and purchase products and services online. The most common social media platforms used by these elderly participants are WhatsApp (used mostly to communicate and share photos with family, friends, and interest groups) and Facebook (used to communicate collectively and publicly on the platform and to see what other people are doing).

*Main challenges for elderly consumer adoption of Internet services*
For the first research question, the data identified that the main challenges encountered by elderly consumers for using Internet services were resistance and health limitations.

_Elderly resistance toward adopting Internet services_

Consistent with previous research, the data show that the elderly encounter great anxiety when using technology (Barnard _et al._, 2013). According to ten elderly participants, the initial adoption of Internet services was accepted with a sense of unease and resistance due to the perception that the Internet was not relevant or could bring about significant change to their lives, as stated by P2:

_ I learned all this very late! I have a phone but don’t like to use it because I find it very complicated. My sister has tried to teach me how to pay bills through the Internet but I prefer to delegate this to her, and also my banking. I don’t really want to put so much effort in learning, what for?_ (P2, elderly female, 80)

Of the total sample of elderly, two participants were much less involved with technology, and they were part of the older segment (over 80+). These participants expressed little interest in using Internet services and felt no need to keep up with evolving technologies. For P10, there was no point in learning it since they didn’t see much value in using Internet services and preferred to have a simple life:

_ I don’t like to use a cell phone; I don’t want one. I hate it. I don’t know if I’m stupid or what, but it doesn’t work for me. My son insisted and said to me, “mom, give it a try!” So I have one now, but I don’t use WhatsApp or Facebook._ (P10, elderly female, 89)

The data identifies the presence of a generational or age-related digital divide (Krueger _et al._, 2018), as these elderly participants recognized that they take longer to adopt new technology compared to younger generations and feel left behind, either because they lack knowledge on using technology (which leads to less confidence to use new technologies) or because of health limitations as mentioned by P12:
Sometimes my iPad is not working, and I don’t know how to fix it. When my children explain things to me, I only understand half of it, and it is not because I don’t have the ability, but when I try to do it myself, it just doesn’t work. (P12, elderly female, 79)

I sometimes feel that I am just not part of this world anymore because I do not use the Internet very often due to my eyesight problems. There are many things that are not possible nowadays if you don’t use the internet and you feel left out of society (P9, male, 82).

The data also suggest the presence of a digital divide among the elderly, (Kania-Lundholm & Torres, 2015), where the ones who are more involved with Internet services are younger and perceive themselves as more digitally savvy compared to their non-user counterparts, as shown by P4:

My brother-in-law is not that much older than me, but he is terrible with technology! He only uses a mobile phone to communicate. He doesn’t know how to use WhatsApp, Facebook, or any app. He said that we message him too much and too quickly, and he is slow. I think he is scared. (P4, elderly male, 75)

One family participants mentioned that another reason for some elderly to avoid using Internet services is that they rely on spouses or relatives who have more experience in using technology and therefore do not make an effort to learn. This is consistent with studies that show that the elderly rely on their partners because they had not previously been exposed to technology (Reneland-Forsman, 2018).

My father does not use Internet services because he has my mom, who does it for him. In fact, he loves to say that he does not understand anything and that he only has a mobile phone because my mother forces him. (P19, daughter, 52)

However, six family participants believed that the real reason for elderly not adopting Internet services was because they felt frustrated for not knowing how to use basic Internet technology, so they do not want to make an effort to learn, as mentioned by P20:

I think that my grandmother does not want to use a smartphone or any technology to communicate because she has never done this in her whole life. She might be a bit anxious for not knowing how to do things or frustrated when we teach her, and she doesn’t understand. So, she prefers to stay away from technology. (P20, grandson, 30)
Additionally, P14 and P16 mentioned that their elderly relatives resisted to using Internet services all the time because they enjoyed visiting retail stores and financial institutions in person, and they preferred to see the products they were buying and meet with real people:

*My mother likes to [go to] the bank to pay her bills because she finds it entertaining. She prefers to go to the bank in person because she enjoys the walk, and she doesn’t have many other things to do. She also enjoys meeting with her bank agent because this is fun for her, and she is more trusting that her savings are safe. (P14, son, 62)*

*My grandmother does not purchase groceries online because she finds it enjoyable to go shopping in person to the supermarket. She says that she likes to choose avocados and fresh produce or choose a specific brand, and she has the time to do it. (P16, granddaughter, 28)*

**Physical and cognitive impairments**

Of the total sample of elderly, seven participants admitted to having problems when using Internet services due to physical or cognitive impairments as stated by P10 and P12:

*And I am deaf now, so I bought earplugs recently, but I can hardly hear the TV now, so that is enough technology for me. (P10, elderly female, 89)*

*I am frequently sick, and I take many medications, so I don’t have the energy or capacity to use Internet services because although my children teach me, it is hard for me to learn. I usually ask my daughter to help me shop for groceries online because I don’t remember how to do it. (P12, elderly female, 79)*

Although these elderly participants acknowledged health limitations and admitted to having trouble dealing with new technology, they insisted on trying to use Internet services because it was important for them to stay independent and autonomous, as shown below:

*I have sight problems. It is a huge problem not to be able to see the screen completely, but over time I have gotten used to it. I have no other choice because my eyes won’t get better, and I need to use the Internet to stay independent and autonomous. (P9, male, 82)*

All family members recognized that a decline in memory or inability to follow instructions affected the ability of their elderly relatives to follow basic instructions for using Internet
services, particularly because Internet technologies were perceived by four participants, as not being user-friendly for the elderly:

*Internet services are generally not friendly for older people! Mobile phones have small keyboards and my parents always complain about pop-ups, and they don’t know what to do. Even for using Uber, you have to confirm several times for the service; otherwise, it doesn’t work.* (P21, daughter, 52)

**Value co-creation behaviors**

Drawing on Yi and Gong’s (2013) framework, the findings identify several co-creation behaviors held by the elderly and their family members to obtain value when using Internet services (see Figure 1). The data identified three general value co-creation participation behaviors held by the elderly that contribute to well-being: *learning and formal training,* *complying with directions,* and *seeking help and support.* Additionally, the data identified two value co-creation citizenship behaviors displayed by younger family members that contribute to well-being for the elderly and themselves: *helping and supporting elderly relatives* and *being patient and tolerant with elderly relatives.* Table 2 identifies and describes the specific value co-creation behaviors.

[Insert Figure 1 and Table 2 about here]

*Elderly learning and formal training*

Learning about technology and taking formal training courses is a value co-creation behavior that can assist people in better using of Internet services (Shapira, Barak, & Gal, 2007). This behavior provides individuals general information pertaining to basic routines on how to use Internet services, and enables them to master their role during the consumption of Internet services (Barnard et al., 2013). All the elderly participants under 80 years agreed that it was essential for them to learn how to use technology and overcome any resistance because they
acknowledged the benefits resulting from using Internet services. They also recognized the importance of formal training for learning how to use Internet services. In fact, all the seven elderly participants who had been employed in the past had obtained formal training on Internet use from their employers and they experienced fewer problems with Internet services and were able to solve many problems on their own as mentioned by P5.

*When we started using [the] Internet here in the office, I had to learn. My employer hired a company to provide training to all of us. They taught me how to use the Internet, and then I had to repeat it several times, so I was able to remember. I find that I know more than other people my age because of this. I generally manage the Internet well, but [if] I have any problems I usually call my children. (P5, elderly female, 75)*

However, the data show that for P2 and P8, Internet adoption was also encouraged from family members, rather than being a personal decision:

*I had to learn how to use the Internet and email because my daughter forced me to do this in order to help her with her business, and it has been wonderful! (P2, elderly female, 80)*

*Several years ago, while I was still working, my husband told me that I had to learn computing because this was the future, and I had to do it. He enrolled me in a training course so that I would learn how to use the Internet, and then I learned. So I was diagramming on the computer long before all the people! (P8, elderly female, 75)*

Five elderly participants didn’t have previous formal training on technology but learned how to use Internet services by directly asking close family members for verbal or written help. In these cases, family members were the main source of training as stated by P6:

*I had to learn, so I asked all of my children how to do things because they would ask me to transfer money, but then I thought, "now, how do I do it" so I asked them and they taught me, and this is how I learned. (P6, elderly female, 76)*

In fact, when undertaking formal training with younger students, P1 recognized an age-related digital divide during the training sessions, as she couldn’t always understand verbal instructions and was slower to learn, so she felt left behind. This also reflects a form of service exclusion for elderly consumers who enroll in Internet training courses (Fisk *et al.*, 2018):
I enrolled once in a class on how to use the Internet, but it was exhausting, and I only went to one class. I was surrounded by younger people that were much brighter than me, and I was left behind. They understood everything that was going on, and the course was too quick for people my age. (P1, female elderly, 83)

Elderly complying with directions

Compliance with directions refers to customers accepting and following directions provided by other actors of the service experience (McColl-Kennedy et al., 2012). To obtain value, elderly consumers need to follow the instructions or directions provided by others (family members or service providers) on how to use Internet services. Compliance behavior assumes responsible conduct and presumes that participants require training for proper use of technology and performance (Ennew, 1999). Almost all elderly participants (eleven) recognized the importance of complying with directions for learning properly, even though P8 recognized that it could take longer for them to understand instructions:

I am much slower than my children, so I learn little by little. For example, I asked them, "how do I use Uber?" So they downloaded the app for me and told me you have to do this and that, and I followed their instructions, and, finally, I understood. But they must be patient and explain everything slowly to me. (P8, elderly female, 75)

It became clear that the five elderly participants that didn’t have previous formal training needed more support from family members to use Internet services. According to their family relatives, these elderly encountered frequent problems and required permanent assistance from family members when trying to use Internet services because of this lack of formal training, as mentioned by P14:

I installed the Uber app on my mother’s mobile phone, but she has never been able to use it, although I have taught her many times. I think that she doesn’t understand what’s behind technology, so it is very difficult for her to use this app. The solution for me is to do it myself and ask for an Uber when she needs to go out. But this is also a problem for me because when the Uber arrives, the driver calls me to say that he has been waiting for my mom for 10 minutes! (P14, son, 62)
Elderly seeking help and support when problems arise

Seeking support from others is a value co-creation activity that provides value to the elderly because it enables them to clarify doubts or solve problems, use the technology appropriately, and obtain value from the service (Barnard et al., 2013). Seeking help when problems arise or clarifying doubts regarding Internet use enables value co-creation because this information helps to improve performance with Internet services.

The data show that cognitive or physical limitations affect the capacity of some elderly participants to use Internet services properly, and they reached out to their children, grandchildren, or spouses. Particularly those suffering arthritis, visual degeneration, or mild cognitive problems, admitted that it was difficult for them to use any technology, and the main source of support for these elderly participants was the family, as mentioned by P2:

*I have several health problems, and it has been hard for me to learn how to use the Internet to purchase groceries. I can’t remember things! My grandson, Diego, is the one who has helped me the most. He teaches me how to purchase online. I call him, and I ask him to help me when I forget. Also, my granddaughter, Magdalena, helps me, and my son Cristian said to me, "mom, take it easy, step by step."* (P2, elderly female, 80)

All elderly participants mentioned that they usually do not contact service providers for support when they have problems with Internet services, and prefer to obtain help from family members. In fact, only four elderly participants had ever called a service provider in cases when their family relatives were too busy or not available, as explained by P10:

*I had a big problem one day with my Internet connection on my phone, and the kids were busy and could not solve it. So, I called the Internet provider, and a nice young man came to visit me and he solved the connection problem. He was very patient and spent time with me and explained in simple words what had happened.* (P10, elderly female, 89)

According to family participants, the main reasons for elderly relying on family members is that they find most Internet service providers difficult to reach or understand their
instructions to fix a problem. Service providers were also perceived as being less friendly or patient with elderly consumers, as seen in the following quotes by P14 and P24.

*My mom can’t call a service provider by phone because she doesn’t hear very well. She also does not understand what they tell her. They say to her “but ma’am, try such a thing” ... But she doesn’t understand it. (P14, son, 62)*

*If something is not working, my mother tries to solve it on her own, or she calls us. She doesn’t like to call Internet service providers because they take forever to answer the phone, and then she can spend an hour on the phone until they give her a solution that she understands. So she prefers to call me, and I try to help her when I can. (P24, son, 63)*

The data suggests that although some Internet service providers may be patient with elderly, there is a hesitation among elderly consumers to ask service providers for help or recommendations because of the perception that these providers might not be patient or assume that all consumers are able to understand instructions and solve problems with Internet technology. This implies the presence of service exclusion for some elderly consumers of Internet services (Fisk et al., 2018).

*Younger family members providing help and support to their elderly relatives*

The data indicate that younger family members also co-create value for their elderly relatives by assisting them with using Internet services. Obtaining family member support is very important for the elderly because it helps them overcome unease with technology, especially during the early stages of Internet adoption (Barrantes-Cáceres & Cozzubo-Chaparro, 2019). All elderly participants recognized that largely their children and grandchildren provide help and assistance to them by contributing resources such as knowledge and time for teaching them how to use Internet services, and solving any problems arising from Internet use, as mentioned by P8 and P12:
In general, my children and my seven-year-old grandson are willing to help me with Internet services. My youngest daughter also helps me when I need to transfer money online because I haven't learned how to do it. (P8, elderly female, 75)

I usually ask my eldest daughter and my son for help. My daughter teaches me because I am trying more and more to learn and do things with technology so that I can purchase things online by myself. (P12, elderly female, 79)

Family being tolerant and patient with elderly relatives

Family members also co-create value for elderly relatives by being tolerant and patient when being asked for help and displaying a sense of support to them when they experience difficulties (Rosenbaum & Massiah, 2007). Tolerance behavior refers to an inclination to be patient and kind during a service experience due to delays or mistakes made by the consumer (Lengnick-Hall, Claycomb, & Inks, 2000). Tolerance leads to positive value co-creation outcomes because failure and human mistakes in services lead to customer frustration and withdrawal (Yi & Gong, 2013). Thus, value is co-created for the elderly when family members are tolerant and patient with elderly consumers who have less experience or encounter problems with internet services, as stated by P22.

Initially, my mother took a course on the Internet, but she did not understand much and so we had to help her a lot and she always made the same mistake. But with patience, she learned, although sometimes I am exhausted. (P22, son, 58)

Although this value co-creation activity is particularly important for elderly consumers because of their vulnerability due to health limitations or lack of technology experience, several elderly participants mentioned that usually they were left out of conversations regarding new technology and felt intimidated by their children or grandchildren if they did not understand something. In fact, two elderly participants admitted that their relatives were incredibly intolerant with them when they asked for help, as mentioned by P2:
My children don't have the patience to teach me. They tell me, "this is how it is, press here, press there" and then you ask them, what do I do now, and they get upset. It took me several years to be able to pay the bills and send WhatsApp with photos. (P2, elderly female, 80)

Family participants also agreed to feeling frustrated when their elderly relatives did not use Internet services properly, or did not follow the instructions or forgot passwords, as exemplified by P13:

My mother forgets all the passwords, so she calls me and tells me that the bank webpage is not working. So I say to her, "did you use the password," and she says: “no, I don't remember." She never remembers the passwords!! It is so frustrating! Also, I have tried to teach her how to shop online many times! I downloaded the supermarket app and I taught her, but she forgets all the instructions! (P13, daughter, 56)

In spite of this, all family participants recognized the importance of being patient and tolerant with their elderly relatives to avoid hurting their feelings or diminishing their confidence with using Internet services, as stated by P15:

I think that all in the family have tried to be respectful of my mother's limitations, and we make sure not to make fun of her or make her feel bad, like saying, "how can you not understand this?" We try to say things without making her feel uncomfortable. I think that it is normal for a person of her age not to understand everything. (P15, son, 60)

Well-being outcomes from using Internet services

Data were analyzed based on dimensions of hedonic (Diener, 2000) and eudaimonic (Ryff, 1989) well-being. The findings identified five well-being outcomes that emerge from elderly and family value co-creation behaviors when using Internet services: enjoyment, personal growth, environmental mastery, autonomy, and social connectedness. The data also identify two well-being outcomes for family members: enjoyment and autonomy (see Table 3).

[Insert Table 3 here]
Enjoyment

Through Internet services, the elderly can carry out various social activities at any time and place, such as sharing information and exchanging text and video/audio messages with others in real time and even making new friends (Yang & Lin, 2019). Elderly participants enjoyed using Internet services for communication purposes and sharing photos and jokes with family and friends, which made them feel connected as mentioned by P1:

*I enjoy using the Internet services to communicate with my friends and family. I love chatting to people and sending text messages. I also like watching videos, playing games, looking at cooking videos, and I can even check my bank account.* (P1, elderly female, 83)

Consistently, family participants also recognized that Internet services provided their elderly relatives much enjoyment, especially for those who had physical impairments and couldn’t visit relatives on their own, as seen in the comments by P17:

*Sending messages is something that my grandmother loves. She views the photos that we upload in Facebook, and she comments on them and shares them. This makes her very happy and she enjoys it a lot.* (P17, granddaughter, 27)

The ubiquitous nature of Internet services can enable the elderly to acquire interesting, funny, or useful information and news from others in order to pass the time and relax the mind (Yang and Lin, 2019).

Four elderly participants also admitted that learning how to access the Internet had helped them to identify with modern society. The data suggest that the use of Internet services not only enables the elderly to socialize with family members and friends at any time, but also helps them communicate and receive information from others quickly, making them feel that they are keeping up with the times—especially with younger generations such as their grandchildren as show by P3 and P18.

*I am happy to use the Internet because I do not feel old! I spend a lot of time sending WhatsApp messages and memes to my grandchildren. I enjoy myself and it also keeps me company.* (P3, elderly female, 75)
With the Internet she is happier, she talks to the grandchildren all day, so she feels closer. I think she feels good, she entertains herself and forgets about bad things, so it is super important. With the mobile phone, she sends WhatsApp, photos; we talk on Facetime about everything. Technology has a super, super important role in her life! (P18, daughter, 55)

The data show that family participants are happy to provide support to their elderly relatives, which is consistent with previous research on upward transmission and inverted filiation (Luijkx et al., 2015; Schreurs et al., 2017; Xiong & Zuo, 2019). Family participants recognize that by providing support, they improve their elderly relatives’ well-being as well as their own well-being, because they feel happiness and personal satisfaction for allowing their relatives to become feel more autonomous and achieve personal growth with technology (Luijkx et al., 2015), as mentioned by P13:

To be honest, it is a lot of work, but I feel happy for being able to help them become more independent with technology. (P13, daughter, 56)

Personal growth

Personal growth has to do with people’s drive to develop their own potential, openness to new experiences, and growing and expanding as a person (Ryff, 1989; 1995). Results suggest that value co-creation behaviors held by the elderly when using Internet services, play an important role in elderly participants’ personal growth. Elderly participants recognize that they gained skills and knowledge about using Internet services through value co-creation behaviors, such as engaging in formal training, and seeking help when they have problems. For example, for P10, this value co-creation behavior helped improve her well-being through personal growth:

I have been learning slowly, but I am getting there. I learn with my children and grandchildren. When they come on Saturdays, they always give me some instructions and teach me new things. Before they leave, they say, "let's see? Ah, you're fine!" They are always teaching me something new. (P10, elderly female, 89)
Additionally, P16 also raised a similar point regarding the role of family members who teach and support their elderly relatives patiently to improve their technology skills and advance their ability to solve problems that arise from using Internet services:

I think technology helps my grandmother to keep busy, because she sends messages, watches videos on YouTube and photos, and she also feels young when doing this. She feels like she has our same age, and is at our level [of the grandchildren], so that’s how it helps her because she has a big problem with being old. Old age bothers her very much, so by using the iPad or the phone, she feels more like us. (P16, granddaughter, 28)

Environmental mastery

Environmental mastery refers to a sense of mastery and competence in managing the environment and controlling a complex array of external activities (Ryff, 1989). According to the data, most elderly participants realize that it is beneficial to use Internet services for their lives, and they engage in value co-creation behaviors, such as learning and receiving help and support from family members, to be able to better master the technology:

Using technology makes her feel younger; it rejuvenates her because she is at the same level as younger people. In other words, when she uses WhatsApp with her granddaughter, they are both at the same technological level. When you make a payment or transaction online, you are keeping up with times, so I think that for your self-esteem, it is super important to use technology. (P15, son, 60)

The data also show that value co-creation behaviors can affect elderly consumers’ sense of mastery when they are able to control and solve complex situations by effectively dealing with them. Mostly family members provide the necessary information so that the elderly can perform their role appropriately with Internet services. Furthermore, the elderly co-create value by following their family’s instructions and advice for managing technology, which leads to feelings of mastery when using Internet services:

Obviously, there are things that I don’t know how to handle, but I see myself as a person that manages technology well. Sometimes I have to ask some things, but I ask directly to
the company or to my grandson, who is always helping me. For example, if the computer is slow, then I know now that it is because it is updating a software. (P7, elderly male, 78)

**Autonomy**

Autonomy refers to independence and self-determination of personal behavior and resisting social pressures (Ryff, 1989). Most participants mentioned that Internet services such as online messaging, shopping, and banking services are very important for them because they allow them to live more independently and for longer, which results in a better quality of life and well-being for them and the rest of the family:

*I don’t have to move from my home, and I can pay all my electricity, gas and water bills. This is very practical because I do not have to go personally to the bank or to the store to pay the bills. It feels good because I have no need to run around in public transportation since I don’t have a car. I consider this very useful.* (P7, elderly male, 78)

In particular, participants who have mobility or vision problems admitted that Internet services, such as online shopping and banking services, are very important for them because they can manage their lives independently and don’t need to ask others for help, as mentioned by P9 and P12:

*Internet services help me since I don’t have to move from my home. I buy online and the package arrives at my house. This is wonderful because I have poor vision and mobility, so, for obvious reasons, I cannot drive.* (P9, elderly male 82)

*I can’t do many things because I can’t see very well, so being able to purchase groceries online is fantastic for me! I can manage my own life without the help of others, and this is very important because I feel that I am no longer a burden for my children. All my children are very busy, so if I can do something by myself it is wonderful!* (P12, elderly female, 79)

There is evidence in previous research which shows that providing social support to elderly parents is related to lower well-being for adult children, suggesting that supporting elderly relatives generates challenges for adult children with busy jobs and young families to care for (Merz, Consedine, Schulze, & Schuengel, 2009). However, in this study, all younger
family participants admitted that the fact that elderly relatives used Internet services resulted not only in well-being for the elderly but also for themselves:

*Internet services have helped improve the quality of life for my parents and also mine because I can shop for their groceries online, and I don’t have time to run to the supermarket. I can also shop anywhere and at any time, and I can also travel and be anywhere in the world and I can still shop for them and solve their problems. So the Internet is beneficial for me too! (P22, son, 58)*

**Social connectedness**

This dimension refers to value co-creation behaviors that result from close relationships where there is a demonstration of strong empathy, affection, and intimacy (Ryff, 1989; Ryff, 1995). Relationships with family members or close friends are very meaningful for the elderly because they fulfill companionship and emotional support needs (Feng *et al.*, 2016). All elderly participants acknowledged that Internet services are very important for maintaining relationships and permanently connecting with family and friends:

*She uses WhatsApp to send messages to each one of us every day. She keeps in touch with her friends and interest groups. She receives many messages from different people, so I think it helps her a lot to stay active and communicate. (P23, grandson, 28)*

Internet services also help the elderly communicate and keep in regular contact with family and friends who live abroad. Participants commented on the wonderful opportunity they had of keeping in touch with their loved ones who live far away, through email, Facebook, or WhatsApp:

*I can communicate with all my family that live abroad. One lives in Central America, and the other one in Buenos Aires, and the three of us were talking and seeing each other through the iPad. So I can maintain contact with my grandchildren who are away. They call me before going to school, and I see them when they are having breakfast and what they are eating, so for me this has been wonderful! (P6, elderly female, 76)*
In general, participants felt that the use of Internet services had a positive impact on their level of social connectedness. Most elderly participants spoke about how the use of email, WhatsApp, and Facebook allowed them to feel more connected with family and friends:

_The other day I taught my two granddaughters how to sew through the video cameras. This for me is wonderful! It makes you closer to your family._ (P3, elderly female, 75)

**Discussion and implications**

Although a few studies have considered elderly well-being in the services literature (e.g., Feng et al., 2019), minimal research has investigated the use of Internet services by the elderly consumers and the potential outcomes for inclusion and well-being. This study expands previous research on TSR by focusing on the more vulnerable older group of elderly consumers (over 75 years) to understand how they co-create value to when using Internet services and the resulting well-being outcomes. The findings support previous research which shows that age, difficulty in following instructions, lack of knowledge and confidence, and health-related problems can be important challenges for elderly consumers of Internet services (Tan & Chan, 2018; Vaportzis et al., 2017; Vroman et al., 2015).

Drawing on Yi and Gong (2013), the findings of this study confirm that in spite of their physical or cognitive limitations due to aging, elderly consumers can perform specific value co-creation behaviors such as partaking in formal training and learning about Internet usage, complying with instructions to adopt technology, and seeking help and support when problems arise. These value co-creation behaviors result in the five positive hedonic (Diener, 2000) and eudaimonic (Ryff, 1989) well-being outcomes for elderly consumers of Internet services: enjoyment, personal growth, environmental mastery, autonomy, and social connectedness. The data also show that family members can co-create value for their elderly
relatives and achieve well-being by being helpful and supportive with them when they use Internet services, and by being patient and tolerant with them when they encounter problems or forget instructions. Thus, the elderly consumers of Internet services require support from other ecosystem actors, particularly family members, to achieve service inclusion (Fisk et al., 2018) and well-being outcomes (Johns & Davey, 2019). This is important because the service community should not ignore the fact that the elderly are vulnerable consumers, who are less likely to have the ability to co-create value and use Internet services by themselves due to an age-related digital divide and health limitations.

**Theoretical implications**

Several theoretical contributions emerge from the study’s findings. First, the results of this study address a gap in the TSR literature by examining how elderly vulnerable consumers co-create value when using Internet services, and how these value co-creation behaviors may impact service inclusion and well-being outcomes. This study specifically applies and extends the value co-creation framework of Yi and Gong (2013) to a specific TSR context of elderly vulnerable consumers of Internet services, emphasizing the need of these consumers to overcome their health limitations and resistance to using Internet services through formal training, complying with instructions, and asking for support from their families to cope with the difficulties of aging and the challenges of evolving technology for them (Charles, 2010; Rittirong et al., 2014).

The findings also contribute to TSR (Ostrom et al., 2015), and literature on Internet adoption by elderly (Cotten et al., 2012; Kavetsos & Koutroumpis, 2011) by revealing that elderly participants’ value co-creation behaviors with Internet services may result in the
improvement of five dimensions of hedonic and eudaimonic well-being for the elderly (Diener, 2000; Ryff, 1989): enjoyment, personal growth, environmental mastery, autonomy, and social connectedness. This is relevant given that elderly adults are found to have lower well-being indexes than younger individuals (Bowling, 2011), and are more excluded from Internet services due to an age-related digital divide (Niehaves & Plattfaut, 2014). Furthermore, the findings also show that value co-creation by elderly consumers with Internet services can also improve the well-being of family members, because they feel happy when they realize that their elderly relatives become more autonomous and enjoy using Internet services (Luijkx et al., 2015).

A third contribution is provided for the emerging literature on vulnerable consumers and service inclusion (Fisk et al., 2018). This topic is particularly relevant to the elderly because the COVID-19 pandemic has excluded them from physical and social contact and many of them struggle with social and digital exclusion (Seifert et al., 2020). The findings suggest that although Internet services can improve the inclusion and well-being of elderly consumers, they require participating in value co-creation behaviors during the service delivery, such as training and asking for help and support. These results highlight the relevant role of service mediators (Johns & Davey, 2019), such as close family relatives, to bridge the age-related digital divide and achieve service inclusion.

A fourth theoretical contribution of this study refers to examining the role of family as a relevant actor (mediator or second customer) in the ecosystem of Internet services (Luijkx et al., 2015; Schreurs et al., 2017). The data show that the role of family is fundamental for value co-creation of elderly consumers that are vulnerable due to physical or cognitive impairment, which hinders their ability to co-create value and improve their well-being (Rosenbaum et al., 2017). This contributes to the value co-creation literature by reinforcing
the importance for vulnerable consumers of considering the support of other service ecosystem actors in value co-creation beyond the dyadic relationship between providers and customers (Beatson et al., 2020; Johns & Davey, 2019). This also contributes to TSR because it acknowledges that elderly consumers cannot always engage optimally in value co-creation behaviors, and therefore require other actors of the ecosystem, such as family members, to obtain positive well-being outcomes (Leino, 2017; Payne et al., 2008). The findings also reveal that the value co-creation behaviors carried out by other actors (family members) can also improve their own well-being. This finding suggests that value co-creation is not only beneficial for vulnerable consumers but also for other actors in the service ecosystem.

Finally, the findings of this study extend the literature on technology adoption and the age-related digital divide (Krueger et al., 2018; Niehaves & Plattfaut, 2014), to consider how elderly individuals can obtain well-being outcomes from Internet adoption. Although several studies on technology adoption by the elderly have previously been conducted (Boz & Karatas, 2015; Cotten et al., 2012), scant research has used a value co-creation approach to address Internet adoption and well-being outcomes for elderly consumers over 75 years, who are more vulnerable due to an age-related digital divide and health problems. The findings suggest that technology adoption models for the elderly should consider the fact that these vulnerable consumers require support from service meditators such as family members to adopt technology and co-create value for well-being outcomes.

**Managerial implications**

Several managerial suggestions are offered for Internet service organizations and providers, government assistance programs for the elderly and public policymakers, with a deeper understanding of how Internet services can improve service inclusion and well-being for
elderly consumers, and the role value co-creation and family member support in this process. First, the results suggest that Internet services do not only provide communication benefits to the elderly but can improve different dimensions of their well-being. Thus, Internet service organizations should identify elderly consumers in their database through CRM systems and acknowledge the vulnerability of these consumers in their service design and processes to improve the overall service experience for the elderly. For example, these organizations could offer tailored training on Internet usage to leverage their services among the elderly segment of the population. Frontline service providers can also be trained to behave more emphatic and patient with elderly vulnerable consumers and offer personalized assistance and support to them, as well as post-service support when they purchase Internet services (Rosenbaum et al., 2017).

Second, it is essential for service providers to give precise information to the elderly consumers, using terms that are easy to follow according to their level of understanding. In addition, practicing active listening, showing empathy toward the elderly consumer and using non-verbal language (gestures, tone, facial expressions and movements) that inspires confidence would be aspects that would aid communication between the parties. Service providers of Internet services should also involve members of the family, while maintaining the elderly as the focal customer. These skills include creating a good relationship with all the participants through the identification of their individual problems and perspectives, as well as fomenting participation by means of listening to and addressing the worries of all concerned. In addition, considering that people are becoming more and more informed and aware, which in itself demands active participation in the management health and a greater joint responsibility in decision-making, and that health professionals have a less paternalistic
role, a model of health communication is required that responds to the current needs of all the parties who make up the system.

Third, the findings provide a new viewpoint on the role of family members as secondary customers or mediators for Internet services; therefore, service providers should involve families to facilitate better communication and service delivery. These organizations should redesign their service offerings and consider the relevant role of family in the service delivery and consumption process. For instance, families should receive support from these organizations to help assist their elderly relatives with Internet services. In the same vein, family members can support the value co-creation behaviors identified in this study to obtain positive outcomes for themselves as well, by helping their elderly relatives live independently and happier for a longer period. This would increase the opportunities for Internet service providers to develop and strengthen their relationships with elderly consumers and their families. Further, as the elderly take pleasure in using Internet services, marketers could design and tailor specific communication campaigns for this segment and their families to actively engage them.

Fourth, the results of this study also show that elderly individuals are more willing to use Internet technology when they receive support from their children and grandchildren. Thus, family relatives of elderly consumers could be provided with information about the value obtained by their elderly relatives when using Internet services. Most children worry about their ageing parents, so they will probably encourage their elderly relatives to use Internet services when they realize that it can help to improve their quality of life. Additionally, grandchildren might be relevant for supporting elderly with technology use, and probably have a facilitating role when it comes to applications running on tablets and smart phones, which might diminish the burden for children.
Finally, this study also has implications for government entities to help increase the motivation of the elderly to use and co-create value with Internet services. Governments and other bodies engaged in achieving digital inclusion for all individuals of society should launch initiatives aimed at increasing a general understanding among the elderly of the potential benefits it offers for their well-being. The demographic trend toward an increase in the elderly population suggests that public policies should be strengthened to try to reduce the number of elderly that are excluded from Internet services. In addition, the aging of the population frequently results in a dependency on others, resulting in a strong impact on the family relatives. Initiatives aiming at building Internet skills and confidence can also exert impact by educating elderly technically about the Internet and informing them about Internet benefits by involving friends and other peers. This can help design educational public policies for the elderly that allow greater access to formal technology training and support to actively participate in society. Furthermore, community initiatives may target children at schools to help and motivate them to teach grandparents how to use the Internet.

**Limitations and Future Research**

This study acknowledges some limitations which can be addressed in future research. First, participants in this study were educated elderly consumers living independently in their own homes, and therefore perhaps not fully representative of the wider elderly population over 75. Future research could include samples of elderly consumers who are residents of retirement homes or aged-care facilities to understand their use of Internet services for well-being. Second, value co-creation behaviors and well-being dimensions were observed independently; however, there is no clarity as to which specific behaviors are related to each dimension of well-being; thus, this is an interesting topic for future research. Third, this study
emphasizes the role of elderly family members. However, some elderly may rely on other service ecosystem actors as mediators for this service. Finally, future research could explore the role of value co-creation and well-being considering other types of service contexts such as health monitoring.
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Figure 1: Value Co-Creation Behaviors and Well-being Outcomes for Elderly Consumers of Internet Services and their Family Members

**Value Co-Creation Behaviors**
Framework of value co-creation Yi & Gong (2013)

**ELDERLY**
1. Learning and training
2. Complying with instructions
3. Seeking help and support

**FAMILY**
1. Providing help and support to their elderly relatives
2. Being tolerant and patient when helping their elderly relatives

**Well-being Outcomes**
Hedonic and eudaimonic well-being (Diener, 2000; Ryff, 1989)

**ELDERLY**
1. Enjoyment
2. Autonomy
3. Personal growth
4. Environmental mastery
5. Social connectedness

**FAMILY**
1. Personal satisfaction
2. Autonomy

Literature on upward transmission (Barrantes-Cáceres & Cozzubo-Chaparro, 2019; Lobet & Cavalcante, 2014; Luijkx, et al. 2015; Peek et al., 2016; Rittirong et al. 2014)
Table 1: Participant characteristics (elderly and family)

Sample of Elderly Participants

| Code | Gender | Age | Activity | Status   | Living Status       |
|------|--------|-----|----------|----------|---------------------|
| P1   | Female | 83  | Retired  | Widow    | Lives alone         |
| P2   | Female | 80  | Retired  | Widow    | Lives with sister, 82|
| P3   | Female | 75  | Retired  | Married  | Lives with husband, 75|
| P4   | Male   | 75  | Retired  | Married  | Lives with wife, 75  |
| P5   | Female | 75  | Retired  | Married  | Lives with husband, 82|
| P6   | Female | 76  | Retired  | Divorced | Lives with brother, 79|
| P7   | Male   | 78  | Retired  | Married  | Lives with wife, 75  |
| P8   | Female | 75  | Retired  | Divorced | Lives alone         |
| P9   | Male   | 82  | Retired  | Married  | Lives with wife, 80  |
| P10  | Female | 89  | Retired  | Widow    | Lives with a nanny   |
| P11  | Female | 78  | Retired  | Married  | Lives with husband, 81|
| P12  | Female | 79  | Retired  | Married  | Lives with husband, 84|

Sample of Family Participants

| Code | Gender | Age | Activity    | Elderly Relative | Relationship |
|------|--------|-----|-------------|------------------|--------------|
| P13  | Female | 56  | Academic    | Mother, 79       | Daughter     |
| P14  | Male   | 62  | Academic    | Mother, 89       | Son          |
| P15  | Male   | 60  | Administrative | Mother, 80     | Son          |
| P16  | Female | 28  | Nurse       | Grandmother, 75  | Granddaughter|
| P17  | Female | 27  | Psychologist | Grandmother, 76  | Granddaughter|
| P18  | Female | 55  | School teacher | Mother, 75     | Daughter     |
| P19  | Female | 52  | Housewife   | Father, 75       | Daughter     |
| P20  | Male   | 32  | Engineer    | Grandmother, 75  | Grandson     |
| P21  | Female | 52  | Housewife   | Father, 82       | Daughter     |
| P22  | Male   | 58  | Export Agent | Mother, 78       | Son          |
| P23  | Male   | 28  | Physician   | Grandfather, 78  | Grandson     |
| P24  | Male   | 63  | Architect   | Mother, 83       | Son          |
Table 2: Value co-creation behaviors for elderly and family members

| Value co-creation behavior | Description of behavior | Value co-created |
|----------------------------|--------------------------|------------------|
| 1) Elderly learning and training | Elderly consumers co-create value from learning and training on how to use Internet services from formal courses, family members, and much less from service providers. | Elderly consumers obtain value from learning from family members and formal training because they acquire knowledge to use Internet services properly, which allows them to achieve well-being outcomes. |
| 2) Elderly complying with instructions | Elderly consumers co-create value by complying with the instructions of family members or service providers for the correct use of Internet services. | Elderly consumers obtain value because by complying with instructions, they avoid problems or mistakes, and this improves their performance with Internet services and allows them to achieve well-being outcomes. |
| 3) Elderly seeking help and support | Elderly consumers co-create value by seeking help and support from family members or providers when they encounter a problem from using Internet services. | Elderly consumers obtain value because they receive help and support when they have problems, which improves their performance when using Internet services and allows them to achieve well-being outcomes. |
| 4) Family providing help and support to elderly relatives | Family members co-create value for elderly relatives by assisting or supporting them when they need help with Internet services, during service consumption. | Elderly consumers obtain value because by receiving help and support from family, they can address their problems when using Internet services, which leads to elderly well-being outcomes. |
| 5) Family tolerance and patience when helping elderly relatives | Family members co-create value for elderly relatives by being patient and tolerant with them when they help them to use Internet services. | Elderly consumers obtain value because it makes them feel more relaxed and confident when trying to learn or solve a problem when using Internet services, which leads to elderly well-being outcomes. |
Table 3. Well-being outcomes for elderly consumers from using Internet services

| Well-being dimensions | General description of well-being dimensions | Quotes |
|-----------------------|-----------------------------------------------|--------|
| Enjoyment             | Value co-creation of overcoming resistance to using Internet services, being able to connect with family and friends, and finding interesting information online can improve several aspects of enjoyment in life for elderly consumers and their family members. | “I can spend all day in the iPad, investigating things, seeing new things from other countries, I love it. I think that at my age I will not be able to travel to all these places but can enjoy all this online and I love it!” (P8, elderly female, 75) |
| Autonomy              | Value co-creation behaviors of learning and training can positively improve elderly autonomy, which refers to how consumers are able to make their own decisions regarding Internet services and their lives without relying on the approval or beliefs of others. | “Using Internet services helps her self-confidence too because she feels useful, capable, and she loves feeling that way! I think that it makes her want to do more things online.” (P16, granddaughter, 28) |
| Personal growth       | Value co-creation behaviors of learning, formal training, and complying with indications play an important role in elderly consumers’ personal growth. They learn skills and knowledge that can optimize their full potential when consuming Internet services. | “I think that the most important thing for me about using Internet services is that it makes me feel vital, useful, and young.” (P6, female, 76) |
| Environmental mastery | Value co-creation behaviors of learning, formal training, and complying with indications facilitate the consumption of Internet services and improve elderly consumers’ sense of mastery. | “She feels young when using Internet services; it helps her a lot to feel super modern and keep up to date with everything. I find her very advanced compared to her friends.” (P18, daughter, 55) |
| Social connectedness  | Value co-creation behaviors of family helping elderly relatives with problems and being tolerant and patient with them can improve relationship development and connectedness of the elderly. | “The internet helps my mother to be in contact with people around the world. For example, she has a friend in Barcelona, and she contacts her by WhatsApp and they write in Catalan. So she enjoys herself by communicating with family and friends.” (P14, son, 62) |
