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Digital participation in service environments among senior electricity consumers in Finland

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Digital participation in service environments among senior electricity consumers in Finland

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Conflicts of interest

Author certifies that she has no affiliations with or involvement in any organisation with any financial interests.

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Digital participation in service environments among senior electricity consumers in Finland

Abstract

Research to date suggests that older adults engage with digital technologies less frequently than young adults. Studies typically focus on chronological age, ignoring the effects of life course factors on the adoption and use of digital technologies. By utilising multiple triangulation, the article investigates the role of age and life course stage in the usage of an electricity company's online services among senior consumers. The data are derived from an internet-based survey study (N=1,366) and six focus group discussions involving Finnish electricity consumers (N=29). The results suggest that online consumers aged 50 and over utilise electricity company online services more frequently than younger consumers. Seniors report lack of knowledge regarding online environments less frequently than young adults. On the bodily level, senior consumers mention physical discomfort as a challenge and maintaining a physically active lifestyle as a driving force for digital participation. On the mental level, seniors report environmentally conscious attitudes and altruistic values as a challenge and social connectedness as a motivation to digital participation. On the biographical level, a decline in social networks challenges digital participation but simultaneously provides new opportunities for strengthening existing networks. In conclusion, the article suggests that life course factors (e.g. multidimensionality of age and other socio-demographic variables, such as occupation and income level) may better explain use of electricity company online services among seniors than chronological age.

Keywords

Digital participation, electricity consumption, online environments, older adults, ageing, life course

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1. Introduction

In a digital society, companies and other service providers now offer various digital platforms in order to engage their customers in active use of online environments. Digital platforms are constituted around producing and consuming personal data to manage various aspects of everyday life [40]. Among consumers, the internet is now used for various purposes ranging from bank services, reading the online newspapers, producing and consuming blogs and other social media, and searching for information on health, nutrition, travel, and leisure activities. In Finland, almost all online activities are performed less frequently by older adults than by middle-aged and young people [46]. For instance, use of the internet for online bank services is most active among adults aged 35 to 44 (98%). The majority (83%) of late middle-agers (aged 55 to 64) have used the internet for bank services in the past 12 months, but among adults aged 75 to 89, the amount is only 27%. In certain online activities, late middle-agers have become active users; still, online activities that involve social participation are more typical for young people [46].

Research on older adults' engagement with digital technologies has proposed various reasons for the use and non-use of online environments among senior consumers. Although adults aged 65 and over have become more active online, they use the internet and personal smartphones, desktops, laptops, e-readers and tablets less frequently in comparison to younger age groups [19, 33, 38, 41, 48] and thus lag behind in digital engagement [14, 32, 34, 44, 49]. Along with age, other socio-demographic factors such as income, socio-economic position and education level are associated with technology use such that disadvantaged social groups more likely lack access to technology such as the internet [14, 41, 50]. Furthermore, behavioural indicators such as attitudes towards the internet and other individual judgements and considerations shape experience with technologies. Among older adults, a lack of internet attitude, feeling too old, a lack of internet experience or skills,

insufficient time, and high connection costs have been recognised as barriers causing limited or non-use of the internet [19, 24, 29, 31, 34].

This article explores the role of age and life course stage in digital participation among senior electricity consumers in Finland. The study examines seniors, or adults aged 50 and over who are experiencing late midlife (approximately years 46 to 60) and approaching old adulthood (approximately ages 61 and over) [21]. Representing a specific yet heterogeneous group of consumers, adults aged 50 and over are encountering life transitions related to work and family life [6, 21], which may influence the usage of digital technologies.

Previous research on older adults and digital technologies addresses the usage of certain devices, thus paying less attention to the usage of online services. The article focuses first on the usage of an electricity company's online services, and second on the role of age and life course stage in digital participation among electricity consumers. The article begins with an overview of theoretical concepts regarding digital participation across the life course. This is followed by an empirical investigation of digital participation among senior consumers, analysing both quantitative and qualitative data. At the end, the results are discussed with respect to challenges and opportunities in senior consumers' digital participation at the bodily, mental, and biographical levels.

2. Digital participation across the life course

2.1. Participation in digital environments

Participation in digital environments refers to various forms of online engagement which revolve around online-based interaction between consumers and service providers [26, 27]. Many companies and service providers, electricity companies among others, now offer digital platforms that enable their customers to manage personal data related to electricity

consumption. Through mobile applications and other digital services, consumers are able to track their energy consumption in order to save energy or minimise the costs related to it. In internet environments, consumers are actively recruited into production by offering management tools to quantify and calculate personal data. Participating in an electricity company's online services resembles social media, where digital tools are applied to connect and share information between individuals, social groups, and a customer and a company. These kinds of participatory media [7, 43] are associated with questions of social stratification [27], and active online participation is typically considered beneficial for both individuals and companies [26].

In the usage of an electricity company's online services, various participatory forms of interaction and production are involved. These include online communication with customer service, connecting with the company's social media networks, receiving advertising information and status updates, and sharing personal data with a social network. Among consumers, participation in digital platforms may result in user empowerment, such as greater self-acceptance, more self-confidence, and a reduction in perceived isolation [1]. New media can thus strengthen the exchange relationships between companies and consumers [9, 42]. Consumers' engagement can be viewed as prosumption, which combines consumption with productive input [5]. The interaction between producers and consumers contributes to collaborative value creation, where consumers of new media actively create their input into the design and production of services [26]. This is expected to improve the customer experience by increasing interactivity as well as lead to an increase in satisfaction and trust [9, 42].

In digital servicescapes, consumers apply digital technologies that exist to enhance the customer experience, but quite often, digital technologies make the interaction between consumers and suppliers more complex [3]. Due to the lack of physical attributes, in online

servicescapes, maintaining interaction and dialogue, which typically contributes to the customers' sense of wellbeing, encounters challenges, and factors such as aesthetic appeal, layout, functionality, and financial security become key components of virtual space [16]. Social interaction is central to customer experience on the internet [51], and through signs and symbols, consumers' expectations are managed. In digital environments, individuals interpret each other's actions symbolically [4]. In consequence, service providers, consumers, and participants co-create the virtual servicescape reality they are experiencing [3].

2.2. Digital participation in the lives of seniors

Consumer participation in digital environments is expected to increase quality of life by strengthening social networks, providing tools for active ageing, and enhancing active participation in consumer culture [28]. Research on older adults' internet and computer use has typically concentrated on cognitive and motor skills, indicating that older adults possess diminished skills in computer use [8]. The lack of skills has been associated with generational experiences, indicating that older adults, born as 'digital immigrants' [36], lack certain knowledge in relation to digital environments due to delayed exposure to digital technologies in young adulthood. Participating, sharing and connecting in digital environments nevertheless changes across the life course, as people in various stages of life possess different needs, routines, and desires that influence digital activity [47]. The dynamics and processes of digital participation are thus significantly influenced by life stage, which transforms the co-creation of digital services into a more fragmented and individualised process in different groups of people.

The effect of life course stage on digital skills, access and attitudes towards technology can be understood on three levels. On a bodily level, changes in physical condition and perceptual and motor abilities may affect interest and disinterest in technologies [8, 30]. On a mental

level, older adults may report a lack of internet attitude, feeling too old, and frustration with learning experiences [13, 17, 19]. Lack of internet attitude indicates motivational problems that are associated with internet anxiety and may result in attempts to minimise the time spent at the computer [10]. On a biographical level, changes in social and personal relationships may influence access to technology. For instance, the presence of children in the household may increase adults' internet use [22], as children may provide a reason to acquire internet access and enhance adults' interest and skills in using the internet [12, 47]. Stronger social ties might predict better access to the internet, as those who are lonely mention lack of access as a reason for non-use of the internet more often [19].

Among senior consumers, social support that is exchanged through digital media can therefore enable digital participation. For older adults, social connections and intimate relationships maintained by digital media are sources of emotional strength [28, 37]. With ageing, senior consumers encounter changes in social and personal relationships: social networks narrow, yet they become more meaningful [6], and older people have a stronger need for maintaining meaningful ties with established social partners [2. 11]. When people become older, these social ties become threatened due to poor health, death of relatives and family members, and residential relocation of friends and family [28]. In later life opportunities for socialising may become more restricted due to decreasing health and mobility [25] and reduced motivation and energy [18]. The weakening of social networks may thus reduce digital activity, as social support that is typically needed for active online engagement becomes less available [20, 37]. To advance the understanding of the life stage factors behind digital participation, these biographical factors need to be taken into consideration.

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3. Research questions

Previous research on older adults' use of digital technologies has mostly focused on chronological age, putting less emphasis on the life course factors in digital engagement [19, 33, 38, 41, 48]. In order to better characterise the dynamics between digital servicescapes and consumption in relation to age, the article takes into consideration the multidimensional role of age in digital participation. The article explores digital participation among senior electricity consumers in Finland by focusing first, on the use of an electricity company's online services and second, on the role of age and life course stage in digital participation among senior electricity consumers. Through this analysis, the article contributes to bridging the knowledge gap regarding age and digital prosumption and highlights the role of life stage factors in digital consumption. The article asks:

1) To what extent do senior consumers take part in an electricity company's online services and report challenges in digital participation?
2) How are age and life course stage associated with digital participation among senior electricity consumers?

4. Research material and methods

4.1. Quantitative data

The study utilises data from an online survey conducted among Finnish-speaking electricity consumers (N=1,366) and five focus group discussions conducted among electricity consumers of Jyväskylä Energy Group (N=29). The online survey was administrated between November 2015 and January 2016 to Finnish-speaking internet users from various electricity companies. The online survey was distributed through several online forums in order to reach

a heterogeneous group of respondents[1]. In addition, the online survey was delivered via electricity companies. The target group of the survey consisted of participants aged 50 and over (N=743) with a control group of participants aged 18 to 49 (N=623). The age categorisation was based on developmental studies that consider late midlife to start at approximately age 46 [21].

Despite the relatively high number of respondents, the survey sample covered participants who most likely had more frequent access to internet and online services in comparison to the Finnish population on average [46]. When distributing an online survey through online forums it is not possible to gather a population-based sample. Moreover, the age group of participants aged 50 and over was overrepresented in relation to participants aged 18 to 49. This indicates that participants aged 50 and over were likely more active internet users in comparison to all Finnish-speaking adults of the same age group. Therefore, when interpreting the results it is important to take into consideration the selection of participants, who in this study represented active internet users with a relatively high interest in electricity consumption.

The survey questionnaire was composed of 17 questions measuring the use of digital services, with 10 questions measuring the socio-demographic background of the respondents. Out of 17 questions, 11 measured the use of or interest in using electricity company online services. These 11 questions measured the frequency of use of, interest in using, reasons for non-use of, and customer satisfaction with online services.

[1] www.suomi24.fi, www.vauva.fi, www.et.fi, www.anna.fi, www.tiede.fi, www.ksml.fi, www.kaleva.fi

4.1.1. Measurements

In the quantitative analysis, digital participation was measured by the frequency of use of the electricity company's online services in the past twelve months. In addition, challenges and obstacles to digital participation were measured by self-reported reasons for non-use of electricity company online services. The dependent variables consist of eight (8) statements measuring the reason for non-use of online services.

The independent variable consists of age with control variables of household type, education, occupation and income level. Regarding household type, respondents were given five (5) answer categories: single, co-habitation with no children, co-habitation with children living at home, co-habitation with children moved away from home, and other. Regarding education, respondents were given seven (7) response options: no education, vocational training, upper secondary school, post-secondary education, Bachelor's degree, Master's degree and Doctoral degree[2]. Occupation level was determined with five categories (5): employed, student, retired, stay-at-home-parent, and unemployed. Income level was measured in euros and recoded into four (4) income quintiles.

4.1.2. Statistical procedures

The analysis started with descriptive statistics on the frequency of use of the electricity company's online services. A contingency table was constructed with related statistical tests in order to compare the frequency of use between different age groups (18–30; 31–49; 50–65; 66–83). Pearson's chi-squared test was used to assess the significance of the differences between the age groups.

[2] In the final analysis the response options were reduced in order to make the interpretation easier.

The analysis continued with a factor analysis of reasons for non-use of online services. The factor analysis was carried out with the principal axis factoring method and promax rotation to reveal the latent dimension of the variables.

The ANOVA model was designed and executed to examine the effect of age while controlling for other independent variables (household type, education, occupation and income level). The ANOVA model also showed which independent variables were significant predictors of reasons for non-use of online services. The factor scores of reasons for non-use were used as continuous independent variables and age, household type, education, occupation, and income level were used as categorical variables.

4.2. Qualitative data

To deepen and broaden the online survey data, five (5) focus group discussions were conducted for customers of a local electricity, water and district heat provider in the city of Jyväskylä, Finland. Participants (N=29) were recruited in co-operation with a research company. By utilising the database of the research company, an invitation to take part in group discussions was sent via text message to electricity consumers over 50 years of age living in the Jyväskylä area. Consumers of this age group were selected for the focus groups as they represented late middle-agers who are encountering specific life transitions related to work and family life [21]. In total 122 persons responded to the invitation, and 64 persons enrolled as volunteers for the group discussions. Of these 64 persons, 29 were able to take part in group discussions according to the proposed schedule.

The focus group discussions covered research areas derived from the internet-based survey, e.g., electricity consumption, participation in the electricity company's online services, and the usage of digital services in general. Each discussion, conducted as a semi-structured group interview, included three to seven participants and lasted approximately 60 minutes.

All participants were aged 50 to 74. Of 29 participants, 19 were males and 10 were females. There were two researchers moderating the discussions while one researcher took notes. The group discussions were recorded and transcribed, resulting in 104 pages of transcribed text.

4.2.1. Qualitative analysis

In order to reveal the multidimensionality of age in association with digital participation, focus group discussions were analysed by using a qualitative content analysis method. Analysis was guided by theoretical and conceptual presumptions on the role of age in digital participation [8, 12, 13, 19, 30]. In the first phase of the analysis, all expressions related to digital technologies were separated from the main text. In the second phase, expressions were categorised under three categories: bodily ageing, mental ageing, and biographical ageing. In all phases of analysis, the analysis unit was a sentence or statement articulated by one interviewee. The data expressions were interpreted in order to understand and explain the association between age and digital technologies [15].

5. Results

5.1. Digital participation among senior electricity consumers (RQ1)

Table 1 shows the contingency table comparing the use of the electricity company's online services in the past 12 months among different age groups. Online consumers aged 50 to 65 and 66 to 83 utilised the electricity company online services most frequently. Of consumers aged 50 to 65, 25% participated in the electricity company's online services two to three times in the last 12 months, and among consumers aged 66 to 83, the amount was 31%. Among young consumers, only a small percentage participated in online services more than six times in the last 12 months, but among seniors aged 66 to 83, 19% utilised the electricity company's online services more than nine times in the last 12 months.

Table 1. The frequency of use of electricity company online services in the past 12 months among different age groups, % (N)

Age group	18–30	31–49	50–65	66–83	Pearson's Chi Square
0	64.4 (177)	39.5 (118)	25.7 (134)	19.1 (37)	***
1	22.5 (62)	22.4 (67)	20.3 (106)	18.6 (36)	
2-3	7.6 (21)	20.7 (62)	25.3 (132)	30.9 (60)	
4-5	2.2 (6)	5.7 (17)	7.7 (40)	8.2 (16)	
6-9	1.1 (3)	3.3(10)	6.0 (31)	4.6 (9)	
> 9	2.2 (6)	8.4 (25)	15.0 (521)	18.6 (36)	
Total	100.0 (275)	100.0 (299)	100.0 (521)	100.0 (194)	

*** $p < 0.001$;

To further investigate the role of chronological age in the use of online services, a factor analysis was conducted to reveal the latent dimensions of reasons for non-use of electricity company online services (Table 2). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.693 and Bartlett's test of sphericity was significant at the level of p=0.000. In each of the three factors, the rotation sums of squared loadings varied from 1.10 to 1.45 based on the factor loadings of the statements.

Table 2. Reasons for non-use of electricity company online services, factor analysis

	Lack of usability	Lack of knowledge	Lack of skills	Lack of routines
Registration for the service is too complicated	.508			
Services do not function properly	.675			
I didn't remember or wasn't aware of the service		.526		
I don't have enough information about the service		.652		
I don't have the skills and know-how that are required for the service			.801	
Using the service is too difficult for me			.475	
I generally don't favour online services				.699
I'd rather use traditional services				.369
Eigenvalue, % (cumulative %)	18.4 (18.4)	10.3 (28.7)	8.6 (37.3)	8.0 (45.4)
Cronbach's Alfa	.472	.475	.603	.442

The factor scores of the dimensions were tested in the ANOVA model, with main effect tests for age and other socio-demographic variables. The factor scores were included in the model as dependent variables. The overall statistical significances of the independent variables are indicated by the F values. The unstandardised parameter estimates (*B*) describe how much the means of the different categories of independent variables deviate from a reference category. The reference categories (0^{a}) used in the model were selected on the basis of the lowest value or the reference category with the highest number of cases. The adjusted coefficients of determination (adjusted R^2) show the proportions of variance explained by all independent variables together.

In the ANOVA model for reasons for non-use of the electricity company's online services, age did not remain a statistically significant predictor for lack of usability, lack of skills, or lack of routines. In lack of usability, education level, occupation level and income level were more significant determinants of reasons for non-use than chronological age. Respondents with a vocational degree, upper secondary degree or university degree reported lack of usability less frequently than respondents with no education. The employed as well as those with a lower income reported lack of usability most frequently. Respondents in higher income quintiles reported lack of usability less frequently. Household type did not remain a significant predictor for lack of usability.

In lack of knowledge, age remained a significant determinant for non-use of online services Lack of knowledge was least typical for respondents aged 50 to 65. In addition to age, income level predicted lack of knowledge, and the respondents in higher income quintiles reported lack of knowledge least frequently. In lack of knowledge, education, occupation, and household type did not remain significant predictors.

In lack of skills, age and other socio-demographic variables did not predict non-use. In lack of routines, the only statistically significant determinant of non-use was income level, and the respondents in higher income levels reported lack of routines least frequently.

Table 3. Determinant for reasons for non-use of electricity company online services, ANOVA

	Lack of usability	Lack of knowledge	Lack of skills	Lack of routines
Age (ref. over 65) *(F)*	n.s.	F=3.183*	n.s.	n.s.
18-30				
31-49				
50-65		-.211*		
Household type (ref. single) *(F)*	n.s.	n.s.	n.s.	n.s.
Co-habitation, no children				
Co-habitation, children at home				
Co-habitation, children moved away				
Single parent				
Other				
Education (ref. no education) *(F)*	F=3.659*	n.s.	n.s.	n.s.
Vocational degree	-.411			
Upper secondary degree	-.399			
University degree	-.377			
Occupation (ref. unemployed) *(F)*	F=4.319**	n.s.	n.s.	n.s.
Employed	.300**			
Student				
Retired				
Other				
Income level (ref. quintile I) *(F)*	F=3.432*	F=3.762*	n.s.	F=4.100**
Quintile II				
Quintile III				
Quintile IV	-.290*	-.324*		-.339**
R Squared (Adjusted R^2)	.029 (.018)	.039 (.028)	.011 (-.001)	023 (.011)

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5.2. The role of life course stage in digital participation among senior consumers (RQ2)

In the ANOVA model of reasons for non-use of online services, chronological age thus appeared to be a less significant predictor in non-use of online environments than other socio-demographic variables. Therefore, six focus group discussions were analysed in order to consider other dimensions of ageing in relation to digital participation. The focus group discussions provided an approach to the reasons and purposes behind digital participation on a broader level and therefore extended the analysis of participation beyond just a certain electricity company's online services.

5.2.1. Bodily aspects of ageing

Particularly female consumers discussed participation in digital environments in relation to bodily dimensions of their daily life. Bodily consequences that accompanied ageing were conceptualised as challenges to digital participation. Female participants mentioned physical symptoms such as discomfort and aches that related to using a digital device, e.g., dry eyes or a dizzy feeling that were caused by spending time at the computer. Physical discomfort was associated with increased time spent online, particularly if the respondent was still in working life and had to use computers during the work day:

> Don't your eyes suffer [from being constantly online]? My eyes dry out and I start to feel dizzy, my back and shoulders ache. I just hate it, I really hate it when being online takes so much time. (Female, B2)

For those participants who were not actively participating in working life, bodily aspects were perceived as triggers and motivators for digital participation. Some interviewees mentioned that engaging in online activities provided opportunities for a more active lifestyle, indicating that participating in digital activities is justified as physical and mental activity in the same way as other leisure activities. Thus the lack of routines did not prevent active online engagement:

> It doesn't consume my time away from anything else. Previously I was reading and watching movies. Now I have replaced it by being online, it's a bit more active. (Female, B3)

Digital devices were also evaluated with respect to time management, where digital participation was conceived of as a risk threatening healthy and active living. Spending time in online environments results in limited time spent doing other activities, and particularly the respondents who were actively engaged in working life preferred offline activities to online ones in order to support a physically active lifestyle. A female respondent who had children living in the household was worried about the addictive features of digital devices in the children's everyday life:

> You get so addicted to it. I have two sons, and I am constantly wondering why they are staring at the screen all the time. How can you get pleasure from watching a screen that blinks and sparkles, there must be something that affects your brain. (Female, B2)

Usage of digital technologies was thus described in relation to bodily activities, such as sleeping, sitting on a computer, sitting on a couch, and staring at a screen. As such, digital participation aroused many emotions that varied from wonder to excitement and from worry to anger [45]. Excitement with digital participation was connected to practices that enabled active engagement, whereas consternation was experienced when the perceptions of digital technologies contradicted the ideals and values of the environment. Anger was experienced in frustrating and time-consuming practices such as registration for online platforms. Questions of time, therefore, revolved around certain daily routines such as sleeping, and they were interrelated with online participation:

> If I watch television late in the evening, I might fall asleep. But if I'm online, I can stay awake very late and not even notice the time that I spend at the computer. (Female, B3)

> I won't let myself get into it, I won't approve it. (--) I have only once visited the online service system. I try to avoid sitting at a computer because it takes time, you go deeper and deeper into it. It consumes all your time. And when you have to register for something… It makes me so angry (---). I don't want to spend my time at the computer. (Female, B2)

For senior females, bodily positions in the usage of digital technologies thus significantly affected level and style of engagement. Some referred to an unpleasant position such as sitting at a computer being the main obstacle to online activities. Others had developed daily routines that supported active online engagement, such as standing up while being online. Traditional computer screens were favoured in comparison to small screens as they provided more individualised and personal opportunities for incorporation of technology into daily life:

> I have an old-fashioned computer at home, it's the best option for me. It's ergonomical (---) because of the sitting position. You have the possibility to stand up and leave whenever you need. I like that the computer is in certain place at home. I don't want to carry it with me, or like to use my cellphone online. It has such a small screen so it's not a pleasant experience. (Female, B3)

Limited mobility was not perceived among seniors as restricting active engagement in consumer environments. Bodily dimensions of ageing may result in restricted mobility, as in later life, people may not be able to travel to new and distant destinations. For senior consumers, enjoyment and experiential aspects related to consumption were perceived as important, and new experiences were obtained through digital consumption such as information and learning based e-shopping:

> [Ordering from the internet] is so fast. You are sitting at home on your couch and I have ordered books from Amazon for a much cheaper price than in Finland. Two days, and the package is at my door. It's so much faster than if you order something from Helsinki. I'd rather order it from New York. (Female, B3)

5.2.2. Mental aspects of ageing

In group discussions, both male and female respondents reflected on ageing in terms of changes that occurred in their outlook on the environment and other people. These mental aspects of ageing revolved around participants' own reflections about the role of age in daily decisions regarding consumption and online environments. Many participants shared the understanding that ageing is accompanied by changes in the ways they perceive themselves and other people, such as changes related to routines, mindsets, and viewpoints. This 'mental

ageing' was embodied in practices such as turning off the lights, saving energy, questioning the needs and necessities of daily life, and it was associated with becoming older:

> Now when I'm becoming older, I relate differently to electricity consumption. I'm turning the lights off when it's not needed. I use energy saving lights and I try to consume energy as little as possible. (--) Maybe it's the age that makes me think more profoundly. (Female, B2)

A female participant characterised how her attitudes, thoughts, interests and 'state of mind' have changed with ageing, and these changes in particular are emphasised in environmentally conscious practices. Young adulthood was conceived of as a life stage characterised by a carefree attitude, but when people become older, they become more aware of how their own actions influence other people, which may inspire them to act in a more responsible way. This responsible and altruistic attitude was pronounced among male participants, who contemplated the contradictions between personal desires and actual needs and necessities in daily living:

> I am constantly thinking, what do I need personally. I own a lot of stuff. What do I even need anymore. And then I will focus on that. And learn it. (--) But it doesn't make any sense to go online just for fun, for me, there's no value. (Male, A7)

Participants thus articulated mental ageing in association with contradictions between personal needs and desires. In middle age and late midlife, people typically become less self-centered as they need to adjust to other people's needs and limit social conflict [21]. For senior consumers, this altruistic attitude was embodied in appreciation of and satisfaction with the current stage of life, instead of desiring something new and missing. Mental ageing manifested in willingness to strengthen existing bonds and practices instead of desiring novel ones [6]. This emotional aspect was associated with digital participation, as seniors were willing to learn in relation to existing practices and equipment that they already perceived as meaningful and important [44]. However, seniors were selective in what kind of online

environments they conceived of as worthwhile, as pure enjoyment or pleasure was not a sufficient motivation to participate online.

> It would be good if someone helped us to use them [digital technologies]. If I just go to a store and buy [a device], it's just an impulse buy. Then I forget it and it just lays somewhere. After six months, the batteries are empty and I don't know how to use it. Of course they are interesting, at least I am very interested in trying out new things. (Male, A4)

In digital participation, senior consumers thus longed for purposeful participation and social connectedness that was related to online and offline interaction [37]. Seniors were interested in new technological devices and wanted to buy them, but without a profound meaning attached to purchases, they did not recognise the value of some technology. Consuming in online and offline environments thus appeared as a social activity, and through social interaction, seniors obtained abilities and expertise to utilise technological devices. Seniors were open about their limited skills, but the skillset was perceived as a less important obstacle than the desire for the technology to have meaning, which supports the findings of the quantitative analysis.

For seniors, communication in online environments may thus give rise to difficulties despite eagerness and interest in participation in online communication. Differences are not necessarily evident in the technical aspects of use, but in the social and conventional style of use. Conventions and habits shared by seniors may have conflicted with the styles and fashion of juniors, leading to communication difficulties in consumer environments:

> I chatted with the online bank's customer service a few days ago. I had a problem, they couldn't help me. I didn't get the response I was looking for. And, I wanted to contact one online store since I was looking for a pair of jeans. I called them and asked (---). They couldn't help me. (Female, B3)

5.2.3. Biographical aspects of ageing

Older adults reported life transitions as motivators to go online and take part in various digital platforms. Retirement was identified as a transition that leads to a decline in social networks.

As people retire, their daily social contact might decrease, and online activities provide a way to connect socially and take part in activities that enhance the feeling of connectedness. A retired female participant described how engaging with online platforms provided a sense of belonging to communities and improved the opportunities for social communication:

> I am retired now. I have a computer and the internet is the only possibility to be in contact with other people. For me the computer is the straightest way to other people. (Female, B3)

Retirement was thus perceived as a transition that is followed by limited mobility and limited social contacts. For older adults, meaningful leisure time was nevertheless important, and many older adults wanted to participate in activities that involved aspects of enjoyment, fun, and entertainment. Spending 'too much' time at the computer was perceived as a risk, yet online activities provided a sense of enjoyment that outweighed the negative aspects of use:

> I have a bad habit of game playing on the computer. I don't gamble but I play just for fun and entertainment. For me it's normal to spend eight hours at the computer when my husband is at work. I'm online during that time. (Female, B3)

The participants who were still actively involved in working life identified accidents or single events that may have influenced their orientations towards online environments. A female participant described how power cuts at the workplace affected daily practices of online engagement, as they resulted in a more conscious and cautious orientation towards computer use. Being prepared for risks involved in online activities was especially related to work environments:

> A year ago we had a power cut in our workplace. It lasted 45 minutes. It is unbelievable, how much electricity you need for various purposes. You have to be prepared for power cuts, and now we have electric torches on our desks. Now I've learned to save each file I'm working on to the computer. (female, B2)

Thus, biographical changes as well as occasional accidents affected practices related to online environments. Biographical changes in late midlife are typically associated with increased leisure time [21] that offers older adults new opportunities for entertainment and cultural

activities [41]. In participants' speech, online environments offered a new sense of freedom, as they provided opportunities for fast decisions and instant responses which enabled individualised routines for leisure time:

> When I went to see a show, I bought the ticket one hour before the show, it was very handy. You could just 'ex tempore' decide that you'd go. I was messing a bit with the online system because it had so many phases, you had to register first, it was complicated. I would like to have it more straightforward. I'm impatient, I need it easier and faster. (Female, B2)

Despite older adults' encountered difficulties with participation in digital platforms, increased leisure time turned out to be an important driving force for digital participation. Biographical changes thus helped overcome the challenges related to the usability of the device. In this sense, digital participation enabled 'successful ageing' in terms of active engagement with life [39]. Digital technologies contributed to the strengthening of interpersonal relationships as well as exchange of information, emotional support, and direct assistance. Senior consumers, therefore, desired digital participation to support the cultural activities that enable ageing successfully. Through digital media, seniors may thus acquire new cultural capital that helps them to participate as consumers and acquire new and desirable products while simultaneously giving them a sense of belonging in consumer culture:

> I was looking for a car for my wife. Certain model and such. Then I started to receive advertisements on my Facebook account. So of course, it's much easier to make a decision. (Male, C4)

6. Conclusions and discussion

By utilising multiple triangulation, the study investigated the participation of senior consumers in digital platforms and the role of age and life course in digital participation. In response to RQ1, the study reveals that online consumers aged 50 and over utilise electricity company online services more frequently than younger consumers. Senior consumers, typically possessing more ecological attitudes towards consumption than young adults [23],

may have a stronger interest in tracking electricity consumption online in order to minimise the environmental effects of electricity consumption. In contrast to previous research [19, 33, 38, 41, 48], older adults do not report lack of skills as a reason for the non-usage of digital services more frequently than young adults. In fact, adults aged 50 to 65 report lack of knowledge as a reason for the non-usage of electricity company online services least frequently in comparison to other age groups, indicating that the knowledge gap is perhaps becoming a less relevant predictor of older adults' digital participation. Particularly older adults who already have access to digital devices and services possess advanced digital skills, although the usage of the devices is associated with socio-economic position, such as education and income level [19, 41]. This supports the idea that not only skills, but also access to technology affects digital activity, since access and skills are closely intertwined [44]. If access declines across the life course, skills may remain undeveloped, and without skills, access is difficult to maintain across different life stages. This makes mediated participation vulnerable to and highly dependent on outside circumstances.

In response to RQ2, the study suggests that while the significance of chronological age in digital participation might be decreasing, the role of life course factors and other dimensions of age persist. These life course factors that aim to characterise the multidimensionality of age may be utilised when explaining the usage of electricity company online services. On a bodily level, physical discomfort associated with the use of digital devices may reduce interest in taking part in electricity company online services, but also improve opportunities to maintain an active daily life and improve physical routines associated with electricity consumption. On a mental level, environmentally conscious attitudes may decrease older adults' interest in purchasing new technology [23] but simultaneously motivate them to track and save energy online. These changes occurring in relation to the self and other people may have an influence on the type of digital activity older adults prefer in later life. Due to the

changes in everyday routines, activities and relationships, older adults may prefer face-to-face interaction, which may reduce interest in digital activity but provide opportunities for social connectedness [28, 35, 37, 44]. On a biographical level, both normative life events, such as retirement and accidents affect willingness to engage in digital servicescapes. A transformation in social networks [6, 28] creates new needs and desires to improve social communication, and increased leisure time may result in more active participation in consumer culture. This may minimise the perceived negative aspects of ageing in relation to digital technologies [13, 17, 19] and provide new mechanisms to apply digital technologies in ingenious ways. These life stage factors thus provide tangible instruments to define the multidimensional role of life stage in mediated participation. Through these instruments, it is possible to build an understanding of the association between ageing and digital consumption that expands the generational experience of chronological age in digital participation.

Consumer participation, revolving around internet-based interaction between consumers and service providers [26, 27], involves many symbolic attributes that may give rise to contradictions between senior consumers and service providers. The results of this study suggest that, among senior consumers, engagement in the prosumption of personal data is compromised due to difficulties in communication with service providers. Among senior consumers, online communication with customer service, connecting with a company's social media networks, receiving advertising information and status updates, and sharing personal data with a social network requires a sense of meaningful contact. Maintaining interaction and dialogue with senior consumers requires sensitivity to enhance the customer experience in digital servicescapes. To investigate mediated participation across the life course, these issues should be explored in more detail, to create new mechanisms for including the aged population in the co-creation of digital services.

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The study contains certain limitations concerning the representativeness of the data. The respondents of the survey represent only Finnish internet users who probably possess better access to the internet and other digital devices than the population on average. With a web-based survey it was not possible to reach respondents who lacked internet access. The selection of participants was focused on adults aged 50 and over, in particular. Older adults may be more likely to use electricity company online services in general, and therefore they were overrepresented in the survey sample. Therefore, the survey sample covers mostly users who are both active online in general and interested in electricity consumption in particular. In addition, the interview data covered local electricity consumers from a certain company and area. Despite these limitations, the study was able to shed light on the multidimensionality of age in relation to digital participation and contribute to the discussion of older adults' usage of digital technologies across the life course.

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Highlights

- Older adults utilise the electricity company online services frequently
- Older adults report lack of knowledge regarding online environments less frequently
- Chronological age appears less significant predictor for non-use of online services
- A framework for life course factors in digital participation is proposed
- Digital participation is conseptualised in bodily, mental and biographical levels

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