Potential of e-Travel Assistants to Increase Older Adults' Mobility

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Abstract. In this empirical study we examine the willingness of travelers to use small screen devices providing electronic travel ("e-travel") services. As in the near future increasingly more and older adults are travelling around, it is a basic question how we can support this wish for mobility. However, electronic travel services on mobile device are only accepted if it is understood in how far these devices meet the actual travel behavior on the one hand and user requirements respecting the usability of devices on the other. Yet, only little knowledge is prevalent regarding the individual reasons for the choice of means of transportation as well as the perceived needs when being supported by a device providing travel services. In order to get a broad insight into age-related mobility patterns, users of a wide age range (N = 151; 18-75 years of age) were questioned in a survey, in which the travel experience (frequency of using different means of transportation and their evaluation) as well as technical experience (Internet usage and handling of small screen devices) were explored. The findings show that age (but not gender) is a crucial factor regarding the acceptance of electronic travel assistants, and services. The crucial factor underlying age effects is the technical experience and travel expertise: The higher the familiarity with electronic services in general (Internet usage) and specifically (handling of mobile devices) and domain knowledge (travel experience), the higher is the perceived usefulness of future e-travel services. Outcomes might be helpful for the development of e-travel applications especially with for the intention to keep the elderly mobile and fit for travelling.

Keywords: e-travel, Aging, Mobility, social inclusion, tourism in the elderly.

1 Introduction

The demographical change is one of the dominating topics of our century. The public discussion asks for the influence of the aging process and its impact on future societies. Forecasts announce that we will have a contingent of 34% 65+ olds in Germany in 2060 [1], [2]. In comparison, in 2008, there was a proportion of 20% in the group of 65+ [3], [4]. This aging structure is not restricted to specific countries, but is valid for many nations. Thus, in the future we are confronted with more and older adults than ever before but in many respects this generation of seniors is different from former

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ones: In contrast to earlier times, the group of current and future older adults are - physically and mentally- much fitter than earlier generations were, due to a generally higher living standard. Basically, we can emanate from a cohort with sufficiently high nutrition status and health standards, accompanied by a higher longevity [5], a higher economic standard as well as a higher educational level [6]. Also, due to the higher economic independency, this generation is able to afford travelling and does have broad access to the achievement of mobility [6].

Studies show that travelling is an important if not the most important feature of an attractive life style for older adults [7], [8], [9], [10]. Keeping one's mobility is therefore an essential feature for older adults [11], in order to participate actively, self-determined and independently in social living. Interviews with older adults [8], [9] revealed that mobility is used as a synonym for freedom, life-control, societal status and self-worth. Traditionally, the car as traditional mean of transportation represents all these values. Thus, even though public transport facilities are advancing in many cities, still the automobile is the most important means of conveyance to access these services, especially in the view of older adults.

However, drivers aged 65 and older have the second highest accident rate and an increased crash risk [12], [13], [14]. From a cognitive point of view, driving is a complex multitasking demand, especially for older drivers. As drivers have to process information from multiple sources in order to maintain safe vehicle control [4], [15], [16], [17], and follow time-critical and context-adaptive traffic demand, older drivers and those with age-related disabilities are especially penalized as they are known to have limited cognitive resources to process complex and large amounts of information, to time-critically react and to cope with multitasking demands [14], [16], [17].

Public transports are therefore highly needed within modern societies. According to Burkhard (2000) [6] "we need non-auto-driver transportation alternatives. It is mandatory that these alternatives provide two features: the physical mobility to safely afford real connectedness with community opportunities and the consummately American psychic rewards now associated with auto-ownership- independence, self-reliance, and a sense of dignity and self-worth" (Burkhard, 2000, p. 120).

Public transportation is thus part of the answer to aging mobility. There is a need to redefine the traditional concept and to increase accessibility and availability of information within public transports. Recent developments in Information and Communication Technologies (ICT) in combination with high quality mobile devices, as well as an increased perceived value in public perception (e.g. iPhone) could represent a promising alternative concept of public transport in form of so-called e-travel assistants. E-Travel assistants are mobile portable devices which provide a wide range of travel information, e.g. trip planning, purchase of tickets, information about connecting trains/buses, potential delays and alternative routes. In addition, these devices provide city information, alternative routes and navigation aids, if the traveler gets lost. Those electronic travel services delivered by small screen devices are highly developed in the meanwhile [18], [19], and travel and mobile services can be retrieved at any time, at any place, with travel information being wirelessly delivered, continuously actualized, context-adaptive and even targeted to user profiles.

In combination with an increasing infrastructure of public transport and diverse means of transportations (rail, bus, underground) in many cities and countries, the cognitive concept of mobility could move into a new era, increasingly reducing the focus on auto mobility.

Especially for older adults, e-travelling has two prominent benefits: (1) the chance to actively and safely participate in public transportation without the burden to drive a car and risking an accident (2) the reliability to be instantaneously informed about the newest information about travel possibilities, or changes in connecting trains/buses during their journey by means of their smart phone.

The e-travel concept though requires three main prerequisites: (1) the broad acceptance of such a mobility concept, in combination with an understanding of the perceived benefits and barriers, which are associated with the different means of public transport (2) and the easy usage of small screen devices [18], [19], [20], [21]. In addition, (3), we need to understand, to which extent the experience with technical devices [22], [23], and the experience with travelling per se influences the acceptance of e-travel services, especially in the older group [18].

In this context not only age but also gender could be a relevant factor: Among the older adults of the future a large portion will be female [24], due to a shorter life expectancy among men [5]. In addition, at least in the current generation, still there is a high portion of (older) women, which do not have a driving license and which are therefore relying on using public transportation means. Furthermore, different societal (family) roles might also form a specific mobility pattern, which could be in line with electronically supported public transportation. Last but not least women show a reluctant usage and acceptance of technology and a comparably low self-competence when handling technical devices [25], [26], [27], [28], [29].

1.1 Aging and Mobility

Mobility is one of the main future topics in our society [9], [10]. The demographic change make it essential to explore the mobility needs and wants of the elderly. There will be more people with cognitive and physical handicaps who still have touristic plans or other needs for which mobility is necessary.

But even if mobility is not always a question of covering long distances, travelling becomes more and more and important role in the life of older people. The so-called "third age" means for many older people the time in one's life in which travelling is a central topic. After a long working life people have earned enough money to realize their individual dreams. Many older Germans target to an evening of life on the Canaries or Balearic islands. Others don't plan their emigration but also are delighted by the possibility of long voyages out of the busy season. But not only long distant trips play a role. Especially city trips are very popular in the elderly. Above all the elderly are intellectually interested and looking forward to make new cultural experiences in their retirement age.

In this context the demographic change confronts the tourist industry with a huge group of well-founded old people with special needs during their voyages. It is to figure out if mobility in the elderly could be supported by e-travel services delivered on portable mobile devices. In this context it is indispensable to look at the technical expertise of older users.

1.2 Aging and Technology

In order to make e-travel services in combination with small screen devices ("e-travel assistants") a true benefit for mobility in the elderly, interfaces have to be easy to use

and to be perceived as useful. In this context it is essential to refer to the concept of technology acceptance.

The most popular model for acceptance analysis of ICT is the Technology Acceptance-Model (TAM). It is based on the theoretical ground of the Theory of Reasoned Action [28]. The TAM gives the option to link the technology acceptance and actual utilization behavior. The TAM assumes that users' decision to use a new technology is determined by their behavioral intention of using a special technical application [29]. The behavioral intention is formed by perceived ease of use and usefulness. The ease of use characterizes "the degree to which a person believes that using a particular system would be free from effort" the perceived ease of use is "the degree to which a person believes that using a particular system would enhance his or her job performance" [30]. According to studies older adults show to have a specific technology acceptance pattern in which especially the usefulness of technology is more strongly weighed over the ease of using a system [31], [32], [33], [34], [35].

In our context it is necessary to analyze the technical experience of people in different age groups, to find out if there are any correlations between the technical expertise and the acceptance of such services.

1.3 Question Addressed, Research Model and Hypotheses

This paper addresses two major points:

(1) On the one hand we want to explore older adults' travel patterns and their individual needs and wants for a comfortable travelling as well as the perceived barriers when using different means of transportation.
(2) On the other hand we want to identify the personal factors (their technical expertise and travel experience), which might influence the positive evaluation of e-travel systems.

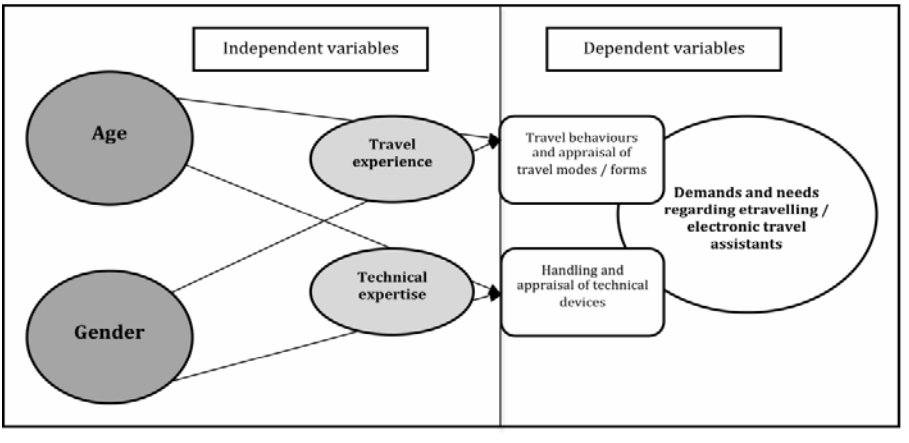

Fig. 1. Research model: Influence from personal factors and experience on travel behavior and technical expertise and its effects for an acceptance of an e-travel assistant

Our research model (see Figure 1) illustrates the theoretical approach and the assumed relation between and across variables. As independent variables we analyzed age and gender, and their impact on users' acceptance of e-travel assistants (H1). As moderating variables, we assumed the level of previous travel experience (H2) and the degree of technical expertise to influence the acceptance of e-travel assistants (H3).

H1: The individual factors age and gender are related to users' acceptance (perceived benefits/barriers) of e-travel assistants.
H2: Individuals with a high travel experience show a higher acceptance of e-travel assistants.
H3: Individuals with a high technical expertise show a higher acceptance of e-travel assistants.

2 Method

2.1 Variables

Independent variables: Independent variables are age, gender as individual factors which influence the mobility behavior, and subsequently, the positive/negative attitude towards the usefulness of electronic travel assistants. Also, the extent of travel-experience and technical expertise are further independent variables, which are assumed to influence the acceptance of electronic travel assistants.

Dependent Variables: Dependent variables are the acceptance (positive and negative attitudes) towards the usefulness of e-travel assistants.

Respondents indicated the frequency of using different means of transportation (car and public transportation) in different travel contexts (business and leisure). To analyze the motives for the use of means of transport respondents marked the reason for using the one or other mean of transportation and to indicate the pleasantness of using them. Here, multiple-choice items had to be answered on six-point Likert scales ranging from 1 (do not agree at all) to 6 (fully agree).

2.2 The Questionnaire

In order to examine a large number of participants and to consider the diversity within the older age and group, the questionnaire-method was chosen. The questionnaire was designed to obtain information about (1) demographic data (age, sex, education), (2) travel experience (frequency of using different means of transportations and the comfort of using these means of transportations) (3) technical experience (frequency of using different information and communication technologies) and the ease of using these devices, (4) Perceived pros and cons of using an electronic travel assistant.

In the following, the different sections of the questionnaire and the respective items are detailed. Also answering modes and scales are explained.

Travel-behavior: Frequency, aim and evaluation
Participants were instructed to indicate the frequency of using different means of transportation (car, public transportation (trains, underground, bus), airplane, bike) in business contexts (commuting to work, business trips) and leisure (private tours;

visits; holiday). To analyze the motives for the use of special means of transport participants were asked to mark the reason for using the one or other mean of transportation and to indicate the pleasantness of using them.

Technical expertise: Frequency of usage and ease of use
Participants were requested to indicate the frequency of using different ICT devices (cell phone, PDA/Smartphone, PC, GPS, and digital camera) and ease of using these devices. Here the following usability items had to be answered:

Table 1. Ease of use items for handling of devices (1 = agree to 4 = disagree)

Typing on small keys is not easy for me
I often lose the orientation in the phones' menu
It is hard for me to recognize objects on small screens
On Web pages, I often lose the orientation
I have problems to maintain a high attention for a longer period of time
I have problems to remember key allocations of my cell phone

Table 2. Items for cell phone usage (1 = daily to 6 never)

I use the my cell phone for
… telephone calls
… short messages
… MMS
… ringtone/music downloads
… information services with costs
… mobile Internet account for pc or laptop
… emails check via cell phone
… writing emails

Experience with the Internet: Frequency and ease of use
In addition, we wanted to know which activities were accomplished by using the Internet, how frequent these activities were carried out and how easy to accomplish these activities are.

Table 3. Items for Internet usage (1 = daily to 6 never) and evaluation of the ease of using it (1 = very easy to 6 very difficult)

I use the Internet for
… browsing
… purchase items
… online banking
… travel arrangements (booking flights)
… emails
… chatting
… reading online (news)

E-travel

The last item set of the questionnaire was a set in which we asked questions about a still existing form of e-travel service in Germany. This is the Internet information platform of the Deutsche Bahn[1]. We asked respondents if and if so, which of the applications they would use, and how often. Also, the ease of using these applications was assessed. As highly frequented services on the Internet platform are planned to be available on the electronic travel assistants as well, the information about the handling of the Deutsche Bahn online services represents a good source for the acceptance of e-travel assistants.

Table 4. Items for the frequency (1 = daily to 6 never) and the ease of using of an e-travel application (1 = very easy to 6 very difficult)

How often do you use the DB Web page/ How easy is the usage of the following possibilities of the DB Web page
… to buy a ticket
… to search a train connection
… to check the punctuality of a train
… to get more information about new offers of the DB
… to book a city trip
… to rent a bike
… to get some inspirations for holiday
… to read the news

Evaluation of future e-travel assistants

The last section of our questionnaire includes an items set of pro using arguments of e-travel assistants and one of contra usage. Table 5 and 6 are giving an overview about the aspects, which were considered. All items had to be answered on a six-point scale (1- totally agree; 6 = totally disagree).

Table 5. Items for the pro using arguments of e-travel assistants

I would use an e-travel-assistant because…
… I hope to never miss a connecting train
… I want to be more flexible
… I do not want to rely on information delivered by the conductor
… I want to get more information about the stations passed and coming next
… I feel more relaxed during traveling
… the perceived disadvantages of rail travel could be balanced by the device support
… rail traveling would be less exhausting

[1] Deutsche Bahn is the German national travel company.

Table 6. Items for the con using arguments of e-travel assistants

I would not use an e-travel-assistant because…
… I do not want to be depending on a device
… I am not sure if a e-travel assistant is reliable
… I don not want to deal with an additional technical device
… I do not want to lose the contact with the conductor
… it is not necessary for me and my travel pattern
… I am afraid that third persons could get an insight in my travel plans
… I do not want to have such technical devices close to my body
… I have problems with technical applications anyway
… I fear that the data on my e-travel assistant could be interrupted by other electromagnetic fields

2.3 Participants

A total of 152 respondents participated, with an age range between 18 and 70 years of age (M = 34.3; SD = 13.6). Participants were recruited through the social network of authors. All participants volunteered to take part and showed a very high and personal interest in the topic. Participants were not gratified for their efforts.

The sample was allocated to three age and traveler groups, respectively, on the base of two criterions. One was to match different traveling profiles (using information provided by the Deutsche Bahn) and the other was to reach three groups of about the same size.

(1) *"Young travelers*" (N = 52), in an age range 18 to 25 (M = 23.1 ; SD = 1.8), 75% were female and 25% male. This group is characterized by being mainly in vocational training. The age of 26 marks a turning point, at which- statistically- switch into the professional life.

(2) "*Middle aged travelers*" (N = 52), in an age range of >26 - 40 years, (M = 29 SD = 3.3) 38.5% female; 61.5%. This group is characterized mainly by working and family life.

(3) "*Grown up travelers* (N = 46), in an age range of > 41 - 70 years of age, (M = 53.1; SD = 7.6). 63% were female, and 37% male).

All participants lived in or near urban areas in which a rich supply and offer regarding different transportation means (rail, bus, underground) is available.

3 Results

In order to learn to which extent people are willing to use public transportation means and Internet-based travel services, it is insightful to study

a) travel experience and mobility patterns (Section 3.1)
b) experience with small screen devices (Section 3.2)
c) Internet experience (Section 3.3) and
d) experiences with e-travel services (Section 3.4). Within all these analyzing contexts we differentiated effects of age and gender.

Data was analyzed by ANOVAs and nonparametric statistics (Mann-Whitney-Test and Kruskal-Wallis-Test), the level of significance was set at $\alpha = .05$.

3.1 Travel Experiences

Frequency of travelling for the factors age and gender
In order to obtain information about the travel experience, participants were asked to report the frequency, evaluation and aim of their usage of different means of transportation.

ANOVA analyses with the factors age and gender on usage of different means of transportation revealed that the three age groups differ significantly in their frequency of using tram, bus and underground and local/intercity traffic trains ($F(12,252) = 4.84$; $p < 0.01$). The young travelers are the group, which uses all forms of public means of transportation most often - about 1-3 times a week to every 1-2 times per month ($M = 2.2$ out of 6 points max; $SD = 1.1$). Middle-aged travelers use them also quite often ($M = 2.7$; $SD = 2.6$), less compared to the younger group, but more often than the oldest group, which uses public means of transportation ($M = 3.7$; $SD = 1.4$) significantly less frequent in comparison to both other age groups (Figure 2 tram, underground and bus, Figure 3 Local/intercity rail traffic).

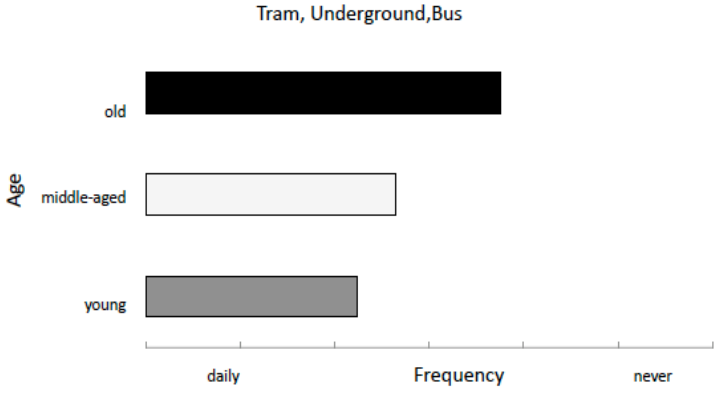

Fig. 2. Frequency of using tram, bus and underground: older travelers: 51-70 years; middle-aged travelers: 31-50 years; young traveler: 18-30 years

There were no significant gender effects in the context of the frequency of travelling and different means of transportation.

Evaluation of different means of transportation for the factors age and gender
When asked how the different means of transportation were evaluated (regarding comfort and performance), no differences between age and gender groups were revealed.

Furthermore we analyzed for which purpose travelers report to use the different means of transportation. As can be seen in Figure 4, there were different travel patterns within the different means of transportation across age groups. The tram, bus

and underground are used especially for commuting to work by the younger and the middle-aged traveler group (young: 56.9 %; middle-aged: 48 %). Older traveler use tram, bus and underground equally for commuting to work (23.8 %), private every day travels (23.8 %), as well as for visits and leisure times (26.2 %).

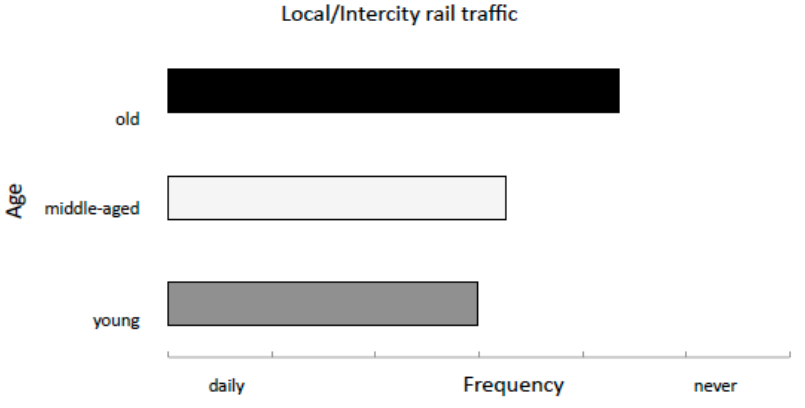

Fig. 3. Frequency of using the public rail traffic: older travelers: 51-70 years; middle-aged travelers: 31-50 years; young traveler: 18-30 years

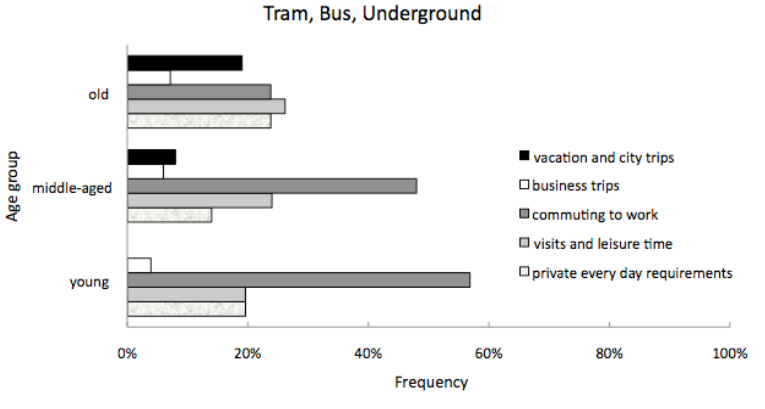

Fig. 4. Frequency of using Tram, Bus and Underground within the age groups: older travelers: 51-70 years; middle-aged travelers: 31-50 years; young traveler: 18-30 years

All respondents use the local rail traffic for visits and leisure time equally. The same applies for intercity rail traffic, which is used for vacation and city trips.

The car is the most central mean of transportation, which is used basically for private every day requirements by all age groups. Here gender differences were present showing that men in contrast to women more often use the car. All age groups use it mostly for vacation and city trips. The same applies to the bike which is - as a non-motor driven mean of transportation - equally used by all travelers, independently of

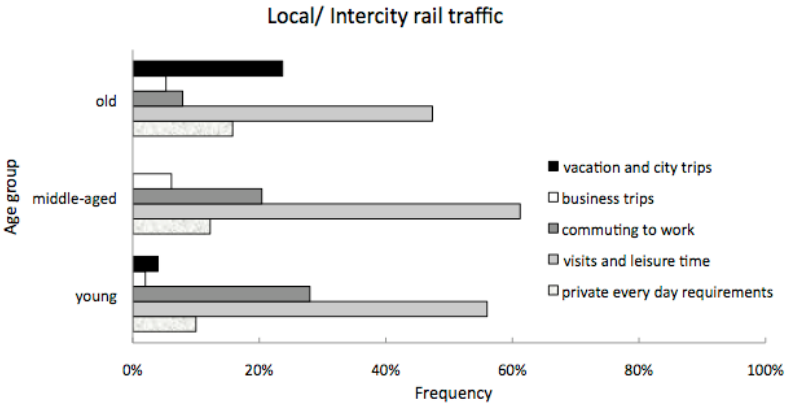

Fig. 5. Frequency of using the local/intercity rail traffic within the age groups: older travelers: 51-70 years; middle-aged travelers: 31-50 years; young traveler: 18-30 years

age and gender, mainly used for private every day requirements and visits and leisure time followed by commuting to work.

When summarizing this survey, we see a highly expected picture. The younger the travelers, the higher is the frequency of traveling in general, and the more diverse is the usage of different means. However, and this was the central focus here, we see that older adults still tend to use the car, but they do use the public transportation means for specific purposes (especially for leisure, city trips and excursions). Thus, respecting the tailoring of electronic travel services, this should be kept in mind.

3.2 Technical Experiences with Small Screen Devices

Regarding the technical experience when interacting with small screen devices significant differences between age groups ($F(12,278) = 7.7$; $p < 0.001$) were identified, revealing a higher technical experience in the younger group, when compared to the middle-aged and older group.

Table 7. Means of age groups regarding the reported ease of use (N = 152). Older adults show the largest problems (grey shaded in Table 7).

	Young (18-30 years)		Middle-aged (31-50 years)		Old (51-70 years)	
	M	SD	M	SD	M	SD
Typing on small keys	3.3	.72	3.0	.85	2.1	.95
Disorientation in phones' menu	3.5	.67	3.4	.66	2.6	1.0
Readability and legibility problems	3.6	.63	3.5	.64	2.4	1.0
Disorientation within Web pages	3.4	.68	3.5	.64	3.1	.86
Problems to remember key allocations	3.6	.64	3.5	.7	2.9	.98

In Table 2 (Section 2.2), the evaluation regarding own competence and technical expertise is depicted, differentiated for age groups (1 = very difficult, 4 = very easy).

Table 7 reports that the older participants have more difficulties with typing on small keys, regarding the disorientation within the mobile phone menu, the disorientation on Web pages, and regarding the understanding and memory of key allocations. Within all these ergonomic issues, gender differences did not show up, revealing that a suboptimal interface design does equally affect male and female users when using small screen devices.

Frequency of using different small screen devices

Additionally, we analyzed the frequency of dealing with different types of mobile devices (e.g. cell phone, PDA, GPS, digital camera or mobile computer). In this context we found significant differences for cell phone, PDA and ($F(10,268) = 4.1$; $p < .001$) between the age groups. Throughout, the frequency of using the devices was higher in the younger group in comparison to the older group.

Though, also older adults show to have a sufficient experience using cell phones at least 1-2 times a week (young: $M = 1.$; $SD = .19$; middle-aged: $M = 1.1$; $SD = .38$; old: $M = 1.7$; $SD = 1.0$). Gender effects were found for cell phone and PDA usage ($F(5,134) = 5$; $p < 0.001$). Women use the cell phone more frequently ($M = 1.2$; $SD = .44$), with a nearly everyday usage. Men report to use their cell phones less frequently but still between everyday and 1-2 times a week ($M = 1.4$; $SD = .89$).

Comprising the outcomes, the usability of small screen devices is a serious barrier, especially for the older group. These barriers are not restricted to "hardware-design issues" (as the difficult usage of keys, and the low legibility of information delivered by the small display). More important, it regards the navigation efficiency in the menu, covering disorientation behavior, the not knowing where they are and where they have to navigate to within the menu structure. Also, the functions and keys' naming is a serious problem. When considering the time critical situations while traveling, we cannot expect a fast and trouble-free usage of small screen devices and the handling of complex menu structures. Respecting the tailoring of electronic travel services, this should be kept in mind, providing flat menu hierarchies and easy to reach navigation targets, which do not urge users to navigate through complex menus.

Frequency of using the Internet

The navigation in electronic travel assistant broadly relies on experience in using Internet platforms and applications. Therefore, it is essential to learn the Internet experience and the perceived ease of using it, especially in the older group.

ANOVA analyses revealed that there are significant age effects regarding the frequency of Internet usage ($F(14,262) = 3.7$; $p < 0.001$). For all Internet options we asked for browsing, purchase items, online banking, chatting and reading online (news) significant differences between the group of middle-aged and older users. In all cases significant group differences were revealed. Plus we found distinctions for the items browsing, online banking and reading online between the young and older users. Table 8 shows that – as expected- the young group shows basically the largest experience in Internet usage, followed by the middle-aged and older user group. But is becomes evident that there are also applications that are less used across all age groups (chatting and reading online).

Table 8. Means of age groups for the frequency of Internet usage (N = 152). Older adults show the lowest frequency of the respective Internet application (grey shaded in Table 8). Low values indicate high frequency (the six point scale complies 1 = daily to 6 = never).

	Young (18-30 years)		Middle-aged (31-50 years)		Older (51-70 years)	
I use the Internet for…	M	SD	M	SD	M	SD
…browsing	1.4	.63	1.2	.48	2.0	1.4
…purchase items	3.4	1.6	2.8	1.2	3.9	1.7
… online banking	3.9	1.4	3.3	1.2	4.0	1.6
…chatting	3.8	2.1	3.6	2.3	4.7	1.9
… reading online (news)	3.5	2.1	2.7	2.0	4.8	1.9

Evaluation of different Internet applications

We also asked for the preferences respectively dislikes within using different Internet applications. While gender differences were not detected throughout, age effects were present, showing that online banking, travel arrangements (booking flights) and chatting were not used within the older group. As taken from personal remarks data safety is a serious problem (online banking) in the perception of older adults and the fear that personal dates could be misused.

These results confirm -once again- that older people are not only more unfamiliar with using Internet applications, they also have higher demands on privacy and data security and safety, compared to other age groups. Future mobile travel services should consider this in order to include the seniors and in order to reach a high acceptance of these electronic services.

3.3 Experiences with e-Travel and Its Evaluation

Frequency of using e-travel services

To analyze the potential and benefit of an e-travel assistant we asked users whether they already have experience with any form of e-travel services. For the German

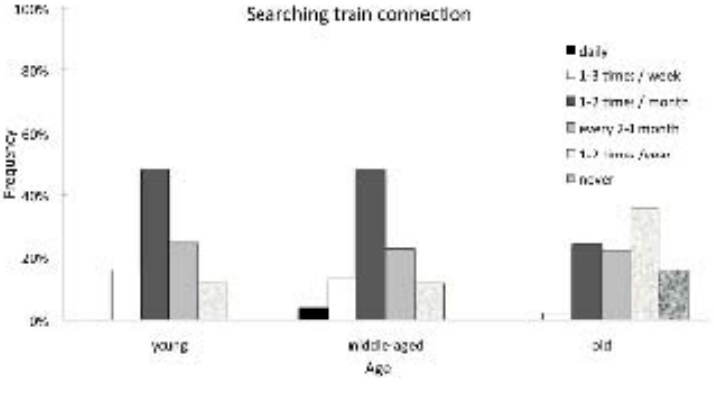

Fig. 6. Experience with e-travel: searching a train connection

context we analyzed the experience with the Deutsche Bahn Web presence as a free and popular e-travel service in Germany.

In this context we found significant differences between the age groups. Older adults report not to use the service regarding searching for a specific train connection. The young (M = 3.3; SD = .88) and the middle-aged travelers (M = 3.3; SD = .91) use this service about 1-2 times a month, in contrast to the older group, which reports to use this service about 2- 3 times per month (M = 4.4; SD = 1.0, Figure 6).

Furthermore, older adults reported mostly not to check the punctuality of a targeted train. The younger traveler group (M = 4.8; SD = 1.5) and the middle-aged users (M = 4.7; SD = 1.5) use this service every 2-3 months or 1-2 times a year, while older users use this service at best 1-2 times or, rather, never (M = 5.6; SD = .82, Figure 7).

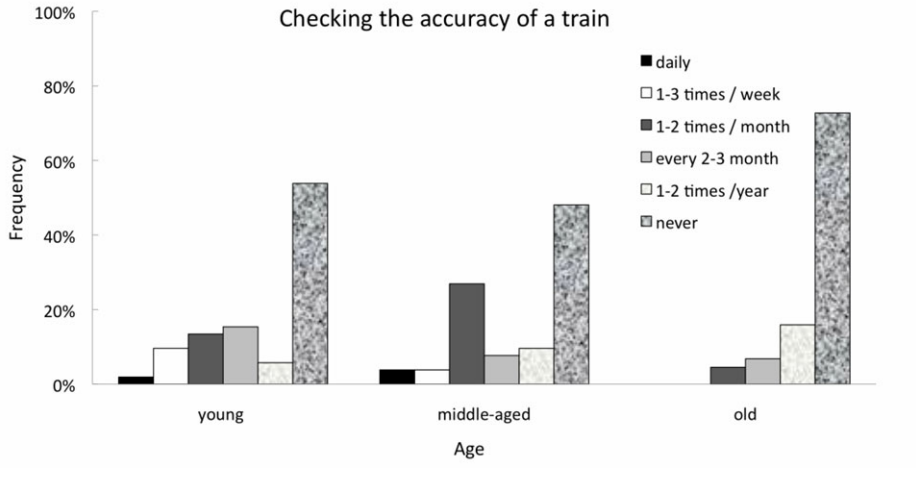

Fig. 7. Experience with e-travel: checking the punctuality of a train

Other offers of the DB Web presence, like searching for special offers and booking online tickets revealed no significant differences between the age groups.

Taken together, it can be roughly concluded that we have to assume age differences regarding travel behaviors, technical expertise, and the experience with e-travel services. All aspects are less pronounced in the older age group, therefore penalizing the senior group when it comes to the confrontation with modern electronic travel services. Gender, in contrast, did not affect the mentioned aspects. When looking into detail, young travelers show a frequent use of the public means of transportation (in contrast to the older group, which still uses predominately the car) In the context of the technical experience (especially with small screen devices) again the younger group shows the best performance, and the older group shows the largest usability barriers and also has the lowest technical experience. For the experience with Web services and Internet applications as well as with e-travel services, the picture is the very same. Younger adults can rely on a high experience, while older adults show basic shortcomings and seem not to be well prepared to use electronic travel services delivered by small screen devices.

In the next step we look for relations between the frequency of use and ease of using a) means of transportation, b) small screen devices and Internet as well as the attitude towards e-travel application. This is important to see the big picture, to identify the age-specific drivers for the sustainable usage of e-travel services and to isolate future research duties.

3.4 Age Drivers for the Evaluation of e-Travel Applications

To find out whether there are age specific drivers for the evaluation of e-travel assistants we correlated the positive[2] ("I would use it, if…") and negative[3] ("I would not use it, because") arguments with individual user characteristics (age, gender, technical expertise, travel experience).

Correlation outcomes confirmed age as a main factor for the travel experience, the technical expertise with small screen devices and experience with e-travel applications. It is an insightful finding that persons, which evaluated the benefit of e-travel applications as more negative, were predominately aged ($r = -.28$; $p < .001$) and have a lower technical experience. But also travel patterns and the preferred choice and high frequency of using a specific mean of transportation show correlations to the acceptance of e-travel assistants. It was found that persons, who report to not frequently use the local rail traffic, tend to negatively evaluate the availability of e-travel services ($r = .46$; $p < .000$) and show higher levels of confirming to barriers. As these persons are predominately young (Section 3.1), we can conclude that younger travelers do prefer e-travel services.

Regarding the experience with the single Internet applications (browsing, purchase items, online banking, chatting and reading online) there was a basic high correlation of Internet experience and the positive evaluation of electronic travel services. Also, people who report to have a high experience in existing electronic Travel services (searching for a train connection / checking the punctuality of a train) show higher pro-using motives for future e-travel assistants in comparison to person, which do not have any pronounced experience with electronic travel Web applications.

Summing up outcomes, we can state that the crucial acceptance mediating factor is experience and expertise, the more people are "unfamiliar" with electronic services in general (Internet usage) and specifically (handling of small screen devices) as well as regarding domain knowledge (travel experience), the more negative are attitudes to and the lower is the perceived usefulness of future innovate e-travel services.

4 The Revision of the Research Model and Discussion

We started this research with the question, how age and gender but also travel experience, the experience with the usage of electronic travel services as well as the technical experience (Internet and small screen devices) are interrelated and how these factors might impact the acceptance of e-travel services.

[2] To get an overall picture, for this analysis, all pro items were comprised.
[3] To get an overall picture, for this analysis, all pro items were comprised.

First, in contrast to expectations, gender did not play a significant role, neither within to the overall acceptance of e-travel services, nor to the choice of different means of transportations (contradicting hypothesis 1). But age revealed to be a key factor: Age effects were found within the travel behaviors experience with technical devices and the experience with e-travel services. All these age-specific attitudes impact the acceptance of e-travel services, which is currently quite low. It is noteworthy that age itself is not more than a mere carrier-variable. The prominent factor, which is underlying age effects, is the experience: experience with travel services and with technology (confirming H2).

It is an interesting finding that the positive attitudes towards e-travel services reveal no significant correlation with technical expertise, travel type and the experience with e-travel. It is exclusively the negative attitude and the reluctant behaviors towards the using of such systems, which shows significant relations. Thus, the hypothesis (H3) according to which a high technical expertise results in a higher acceptance of e-travel assistants is basically confirmed. However, here now confinements to this general assumption can be done. Technical expertise specifically influences the negative attitudes toward the usage of an electronic travel assistant, while there was no relation to the pro-using arguments. This means that a low technical expertise is connected to a strong confirmation of any arguments, which militate against the usage of such an electronic device (this is a typical age-specific cognitive model). But this means on the other hand, that if there would be enough experience in the older group, the negative evaluation could change and, then, could lead to a positive intention to use innovative future e-travel systems, whenever older users could rely on sufficient domain knowledge.

With our results in mind it might be interesting in future research to analyze specific traveler profiles and travel groups (e.g. families, professional travelers, handicapped travelers) and to learn more about the acceptance of e-travel services. Also, as there is always a gap between envisioned scenarios and real life experience, we will have to examine if acceptance increases when users really interact with travel assistance. In order to support the validity of the results and to complete the them with rich qualitative insights about key 'soft issues and needs' related to age that may influence their acceptance of e-travel (such as emotions and feelings elicited by distrust, frustration, etc.) this work should be complemented with an ethnographic study (e.g. including observation and in the field interviews).

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