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SENIOR-TV

PROVIDING ICT-BASED FORMAL AND INFORMAL CARE AT HOME

Deliverable D3.3
Feedback from end-users V2

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0. Executive summary

Key Research Findings:

1. Seniors' attitudes towards old and new technology are HETEROGENEOUS (e.g. age, culture, emotional state of health, cognitive abilities).

2. The emotional, cognitive and physical HABITS of seniors determine their behaviour in accepting or rejecting technology. Senior-TV or technology itself is less likely to change habits or determine an active behaviour.

3. Seniors who adopt DIVERSE USAGE OF TV SERVICES ALSO TEND TO ADOPT NEW TECHNOLOGIES and are more open towards the acceptance of Senior-TV, comparative to those who use TV in a more traditional way.

4. Senior-TV as a Single Product: Seniors-TV offers eight services: Agenda, Weather, Health, Tracker, News, Events, Wikipedia and Virtual Center. Due to the variety of services, there is NO UNITARY PERCEPTION OF SENIOR-TV AS A SINGLE PRODUCT.

5. Seniors are more interested in ENJOYMENT rather than usefulness with regards to the Senior-TV services. It is the enjoyment, and not the usefulness, which triggers the interest of the seniors in TV applications.

6. EASINESS OF USE affects the perception of how useful and enjoyable Senior-TV services are. New technologies for seniors should be designed with the active engagement of seniors.

7. Active and independent seniors do not perceive HEALTH TECHNOLOGIES as useful.

1. Introduction

This deliverable belongs conceptually to WP3 SENIOR-TV at Home which focuses on evaluating with end users the SENIOR-TV platform. D3.3 Pilot Cycle 3: Feedback from end-users describes the results of the first and second cycle pilot testing as administered in Romania, Slovenia and Cyprus over 2018.

This report firstly discusses the so far conducted research using UTAUT, with three main objectives in mind: a) to offer a critical analysis of the relationship between seniors and old and new technologies, b) to emphasize on the so far results related to the seniors' interest, acceptance and adoption of the Senior-TV product as a whole and its services, and c) to bring out the added value of UTAUT and complementary conceptual models in explaining seniors' interest in new technologies and changing or adding new habits. This is achieved by applying the UTAUT model, on one hand to Senior-TV as a product and on the other hand to each of the services provided, so as to discuss the research results from Slovenia, Cyprus and Romania. At the end, we aim to discuss the insights into the third piloting cycle of the project, as more services and advances in the user-friendliness of each service have been added to improve the Senior-TV product.

Research objectives

How well do seniors relate to the TV Services and New Technologies

The relationship of seniors and Senior-TV through the UTAUT Model

The reltionship of seniors and the Senior-TV services through the UTAUT Model

Insights into the 3rd piloting cycle
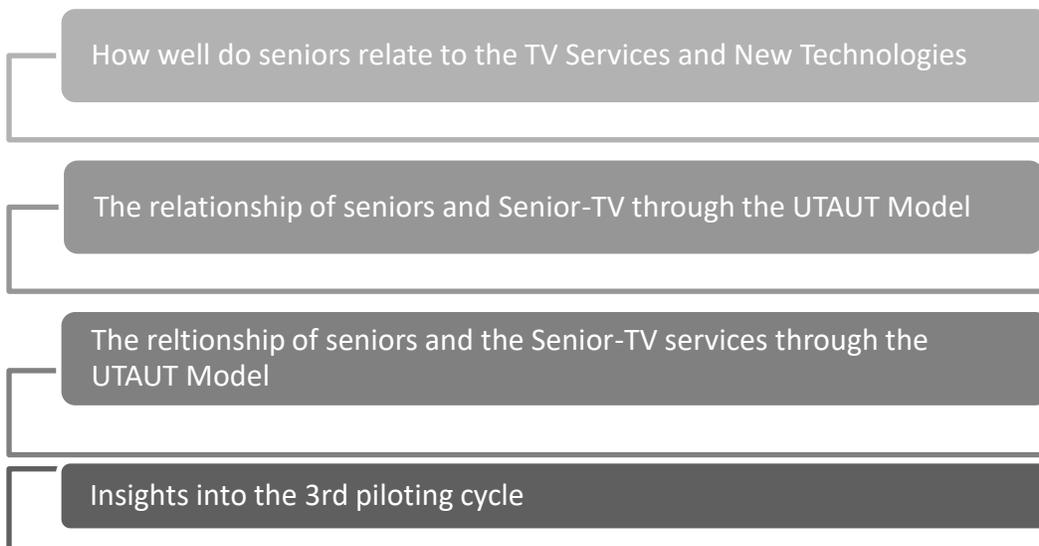
Socio-demographic Characteristics of Participants

In total, 148 end-users participated. 42% of the respondents were from Slovenia, 40% from Cyprus and 17% from Romania. Even though an objective of 300 participants having been set, this was not feasible due to various difficulties encountered on the fieldwork and during the testing period.

Age

The pre-questionnaire was completed by 33 % females and 67 % men, between 60 and 82 years old. The most frequent age was 65 and 66, as the figure below shows, and the standard deviation is 5,62 years.

Figure 1 Age Distribution of Participants
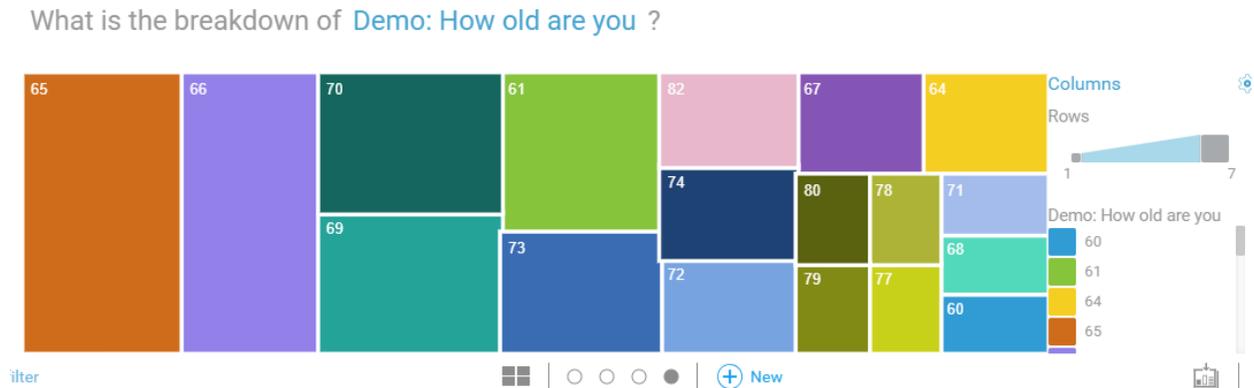
A percentage of 45,6 % of the questioned participants finished professional education, 23,1% finished high school, 17,6% graduated from university and 4,6 % attended and finished post university studies. Considering participants' age group, one can argue that it was an educated sample. Most of the participants stated that they live either alone or with their spouse. Some participants said that they live with 'other members of the family' a few less 'with their spouse and other members of the family'. The minority of the participants stated that they live in a retirement home, as the figure 2 shows.

Living Status

Figure 2 Living Status of Participants

What is the breakdown of Demo: Living status ?
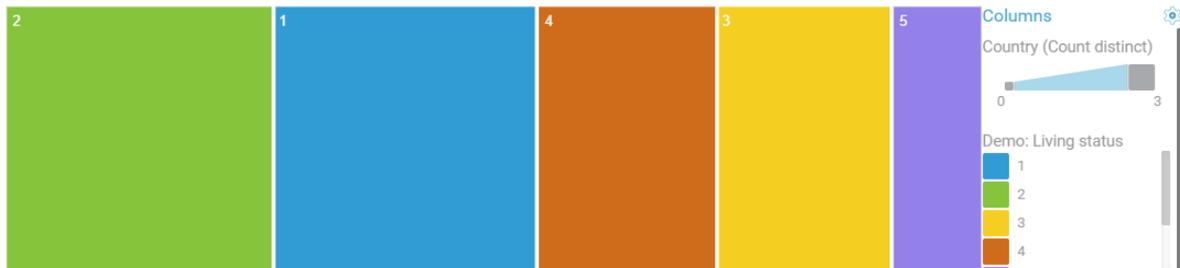
Cognitive Abilities

The Verbal Fluency Test (VFT) is a psychological test, a brief cognitive assessment where participants are asked to produce as many words as possible starting with a given letter within 1 minute. The VFT has been applied to each participant before the actual testing of Senior-TV. A score under 17 indicates concern, although some practitioners use 14 as a cut-off. Typically, if someone scores less than 17, the test administrator will use additional tests to further evaluate cognition. 20,5% from the participants scored lower than 14 words and 53,4 % of the participants registered up to 18 words. The highest score registered for the VFT is 30 words and the lowest is 6. The most frequent scores registered are 18, 17, 21 and 22, as the figure below shows.

Figure 3 Scoring at the Verbal Fluency Test by Participants

Verbal Fluency Test (VFT) Score ?
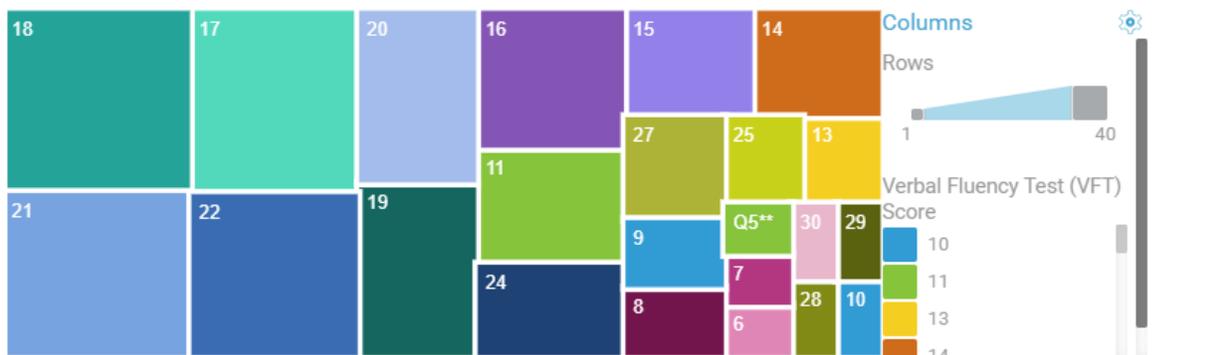
There is a low correlation between the level of education and VFT scoring. Regression analysis show that the ***cognitive abilities of the elderly do not significantly depend on their education and it suggests that they depend on their lifestyle and current activities, comparative to other age groups where education still influence cognitive abilities.*** However, it is worth to notice that comparative to men, women who are better educated show a stronger tendency to score higher at the VFT test.

Table 1 Regression Analysis of Level of Education and VFT Scoring.

	R	R Square	Adjusted R Square	Standardized Coefficients	Sig
				Beta	
Predictors: (Constant), Demo: Highest educational level	.337	.114	.103	.337	.001

As one gets older, the cognitive abilities decrease. The data show that there is a moderate negative correlation between age and VFT scoring. However, age does not influence positively or negatively the intention to use new technologies for being more active. Therefore, the decision to engage with new technology might be affected by other factors, which will be discussed below.

Health-related Quality of Life

The SF-12 instrument is a short version of SF-36 Health Survey which glimpses into mental and physical functioning of the participants. The instrument has been applied before the pre-experience survey. Most of the participants (61.1%) rated their general state of health as being moderate and 18% as very good and good. A lower variance among men comparative to women, has been noticed. Women from Cyprus tended to perceive their general state of health as being better than men's (33% scored it at 4 and 5 and none at 1 or 2, while 9% of Cypriot men scored their general

state of health at 4 and 27% as being as low as 2). In Romania women tended to perceive their general state of health as being poor, 70% as being fairly ok (giving a score of 3) and 30% as very good (giving a score of 4). About half of the men from Slovenia appreciated their general state of health as being quite poor (46,7% giving a score of 2) while 16,7% of women scored it as being very poor (giving a score of 1).

Table 2 Indicators of the Central Tendency of the Self-Perceived State of Health by the Participants

	In general, would you say your health is:	How much did pain interfere with your normal work?	Have you felt calm and peaceful?	Did you have a lot of energy?	Have you felt downhearted and blue?	Did physical health or emotional problems interfere with your social activities?
Mean	2.90	**1.90**	2.04	2.20	3.41	**3.85**
Median	3.00	**2.00**	2.00	2.00	4.00	**4.00**
Mode	3	**1**	2	2	4	**4**

When participants were asked about how much does pain interfere with their normal work (at home and outside home), most of them argued against it, stating they felt most of the time peaceful and calm with a lot of energy. Nevertheless, they stated that sometimes they felt downhearted and blue and that their physical health or emotional problems interfered with their social activities, such as visiting with friends or relatives. There was a weak tendency for women to feel more downhearted and bluer comparative to men, but we should also consider here the factor of social desirability, which may affect men more than women, preventing them from expressing themselves more freely and truly about their emotional states.

Seniors from Cyprus reported feeling more downhearted and bluer than both Romanian and Slovenian participants explained perhaps by the fact that Cypriots participants were of a more advanced age.

The table below shows how various emotional states, ranging from the feeling of peacefulness and calmness to the feeling of pain and downhearted relate to the use of diverse TV services and the adoption of new technologies. The Pearson correlation coefficient, *r*, presented below takes a range of values from +1 to -1, where 0 shows that there is no association between the two variables, while a value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable.

Overall, there is no relationship among participants' self-perceived state of health and diverse usage of TV as well as new technology services. Though, at a closer look, certain differences occur; the more one believes that pain interferes with her/his daily activities, the less likely he/she is to engage in diverse usage of TV services and new technologies.

Table 3 Spearman's Correlation between the Self-Perceived State of Health and Diverse Usage of TV Services and New Technologies

	General health state	Pain interference	Feeling calm and peaceful	Feeling a lot of energy	Feeling downhearted and blue	Emotional problems
Diverse usage of TV services	.095	**-.333***	-.194	**-.358***	**.180***	**.213***
Diverse usage of new technology services	.107	**-.293***	-169	-.174	.060	.009

Significant results

The more energy one has, the less likely he/she is, to engage with diverse usage of TV services but not with new types of technology. On the same note, the usage of new technological services is less affected by seniors' emotional problems and the feeling of being downhearted and blue than the diverse usage of TV, and that is of relevance for our quest. Fewer emotional problems and a lower perception of being downhearted and blue lead to higher engagement with diverse usage of TV services. Indeed, a weak positive correlation between the emotional problems and the usage of TV services has been found and, particularly for those feeling downhearted and blue ($r=.180$). No relation has been found between the declared state of health and the easiness of learning to use Senior-TV, primarily due to a quite low variance in the answers.

2. The Relation between Seniors, TV and New Technologies

Research Question 1. How do seniors perceive the Senior-TV product?

The Senior-TV product is designed to enhance seniors' TV experience as to encourage their cognitive abilities as well as their social, emotional and physical activities. To what extent however does Senior-TV succeed in engaging seniors in active behavioural patterns?

TV Services and the New Technologies

The results show that the more one uses diverse TV services, the more likely he/she will be to use other new technologies, resulting in a a multiplier effect.

Figure 4 Correlation between the Use of Diverse TV Services and of the New Technologies
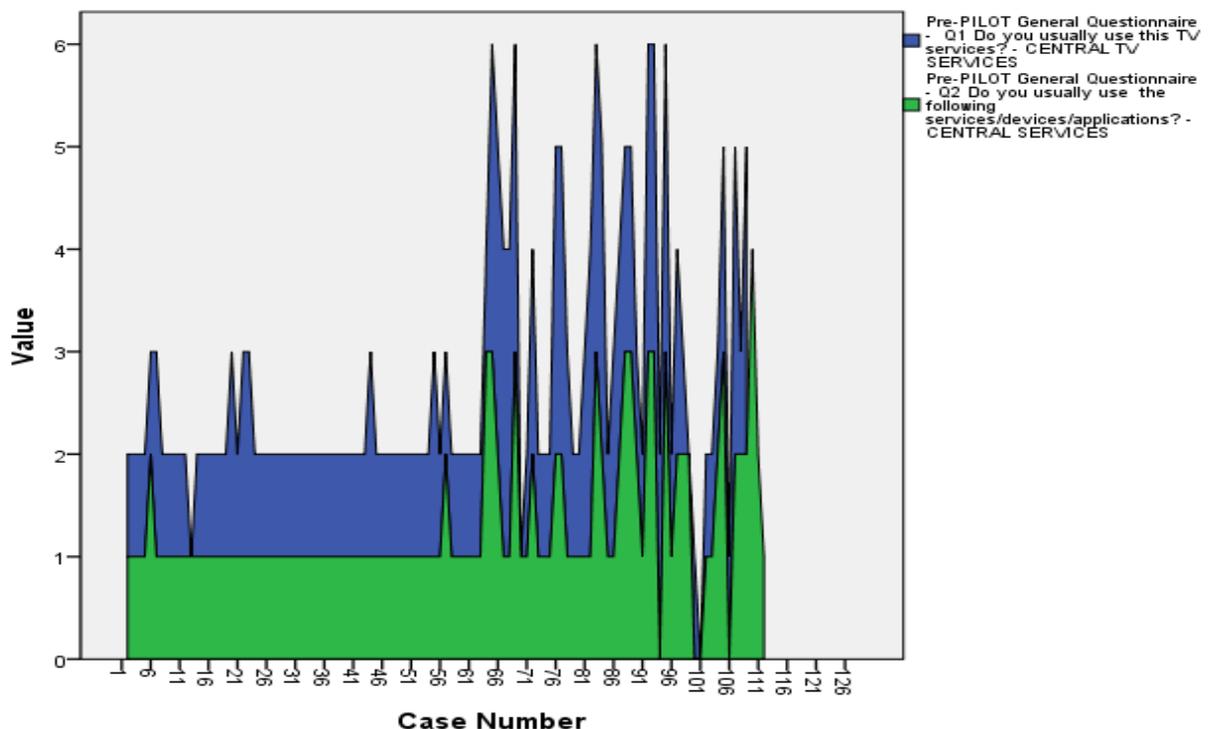
The multiplier effect occurs when seniors are open towards trying new services and engaging with new technological experiences. We may note that seniors either use the TV in a more traditional way; i.e. without being open to diversifying TV services, or in a more diverse way; i.e. with services offered from the TV. We further hypothesize that seniors who prefer to use the TV in a more traditional way are less likely to engage with Senior TV, regardless of their perception of Senior TV as being either another TV service or a new technology service. The perception of Senior-TV as one of many other 'TV services' among Teletext, DVD etc. or as a 'new technology service' determines seniors' openness towards the Senior-TV product. In conclusion, we may hold true that **Senior TV does not appeal to seniors who use the TV in a more traditional way (i.e. watching TV)**.

Higher cognitive abilities and age discourage slightly the diverse usage of TV services but not of the new technologies. The table below shows that the diverse usage of TV services is slightly discouraged by age (r = .-204) and a high VFT score (r = .-270). *The results show that education and living status do not have a significant effect on the diverse usage of TV and other technologies. In conclusion, advanced ages and lower cognitive abilities maintain TV usage habits and decrease the probability of introducing new habits in accessing the TV services.*

Table 4 Pearson's Correlation between Different Socio-Demographic Features and the Diverse Usage of TV and New Technologies

How does the following relate to:	Age	Education	Living status	Verbal Fluency Test Score
Diverse usage of TV services	**-.204**	-.057	-.001	**-.270**
Diverse usage of new technology services	**-.260**	.117	.110	-.096

***High engagement with new technology is discouraged by age**, and it is neither encouraged nor discouraged by education, closeness to other people and a high scoring at VFT. This implies that younger seniors are open to adopt new technologies regardless of their education and living status.*

In conclusion, the more Senior-TV is perceived as a new technological experience, the more seniors will be open to adopt it. In the case that Senior-TV is perceived as just another TV service, seniors of an advanced age and those with higher cognitive abilities will be more likely to reject it. A possible explanation might be that of the pre-existence of a strong habit of using TV in a certain way, for certain purposes. Therefore, more research is needed on seniors' relationship with the TV, a goal which will be set in the 3rd pilot testing. Is it a relationship of a habit/having the status of a companionship or a relationship that seniors would like to change?

3. Research Model

The Technology Adoption Model (TAM)

The first two SENIOR-TV piloting cycles were based on the TAM model, a model developed based on the Theory of Reasoned Action (TRA). Technology Acceptance Model (TAM), proposed by Davis et al. (1989), was at the centre of an overwhelmingly high number of researches regarding technology adoption but, among all, just a few studies focused on senior citizens (Chen et al, 2011). Because research on seniors is quite rare, more research is needed for conclusive results for this specific target group.

Figure 5 Original Technology Acceptance Model. Source: Legris et al (2003)
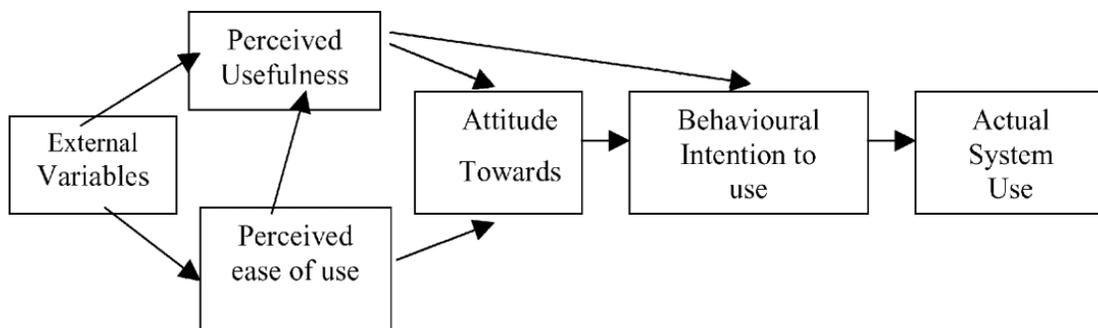
Fred Davis proposed the Technology Acceptance Model (TAM) to investigate how the perceived ease of use and perceived usefulness mediate the relation between the external variables of a system and the probability of a system use. Afterwards, Davis proposed TAM2, adding subjective norms into the model. The model illuminates on about 40% of system's use and empirical research adopting TAM shows inconsistent and unclear results, suggesting that relevant factors are not included in the conceptual framework. More recent TAM models show that PEU and PU are mediated by external variables (Legris et al, 2003).

The first goal of TAM was to predict use, and for that a linear regression model was most often used. Therefore, TAM included the following components: PU, PEOU, AT, BI, and actual use (U).

The Unified Theory of Acceptance and the Use of Technology (UTAUT2) Model

The Technology Acceptance Model used for the first two stages of the Senior TV research needs to be complemented by a more refined and in-depth understanding of the seniors' relationship with the TV, their acceptance, engagement and adoption with new technology, their habits and their very specific social, mental and emotional needs.

Substantial changes have been introduced in UTAUT1 and UTAUT 2 models (Venkatesh et al., 2003, Venkatesh et al., 2012). Here, Social influence as Behavioural intention antecedents and Facilitating conditions which address Use behaviour were added to Performance expectancy and the Expected effort, which play the roles of the previous Perceived usefulness and Perceived ease of use from TAM. Nevertheless, Gender, Age, Experience, and Voluntariness of use are introduced in order to facilitate the understanding of this models. Moreover, UTAUT2 contains additional dimensions for Behavioural intention and Use behavior: Hedonic motivation, Price value, and Habit, ending in conceptualizing a much more complex model for explaining individual adoption of technology (Venkatesch et al, 2007; Macik, 2017). Though, there is a need for the model to be improved and it was proposed to be integrated into broader frameworks which include human and social factors and the adoption of innovation model (Legris et al, 2003).

Social influence also impacts the use of computer by seniors. On the one hand, seniors benefit from the no more used computers or technology of their grown children (Fox, 2004; Saunder, 2004) and, on the other hand, friends and adult children who use technology also influence seniors' decision to adopt that technology (Tak & Hong, 2005).
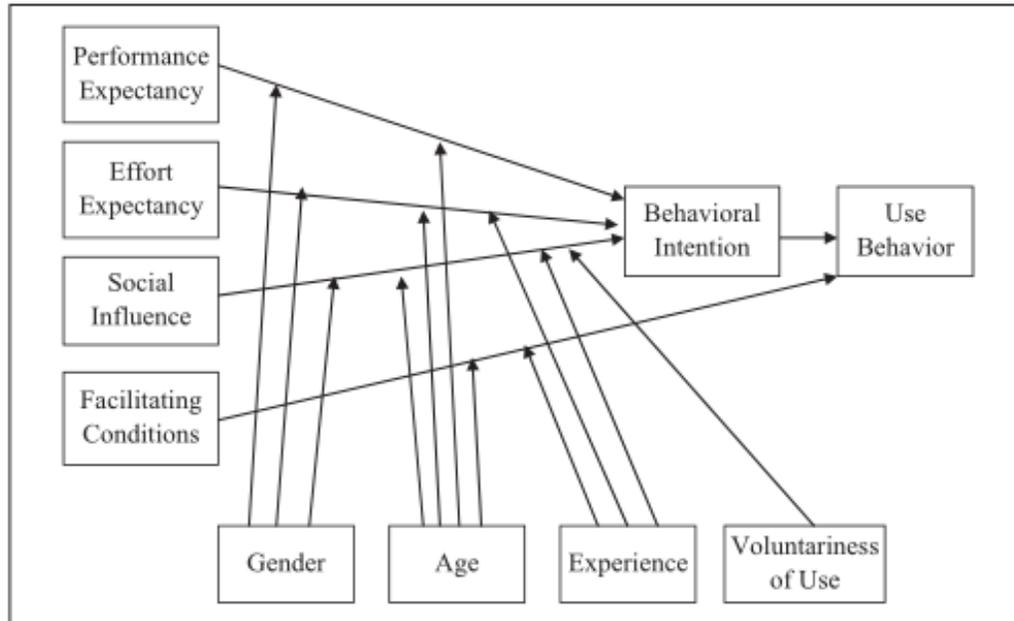
Source: UTAUT (Bing Tan, 2013)

Instrument

For the purposes of piloting, two questionnaires were developed, namely the pre- and post-experience questionnaires. The two questionnaires were developed in English and were translated by the end-user partners in their native language: Greek, Romanian and Slovenian. The pre-questionnaire was handed to all participants at the beginning of the piloting and the post-questionnaire after the testing of the platform. The aim of the pre-questionnaire was to gain an overview of the participants' status and habits (age, gender, residential status, computer and internet usage) and the post-experience questionnaire was developed to assess the functionalities of the platform and the applications having so far developed. Annex 1 and 2 present the two questionnaires used in the present analysis.

Selection of the participants was on the base of non-probability sampling in the form of purposive sampling with control of selected age variable. Participation in the survey was voluntary.

4. Results. Part I: UTAUT Analysis of the Senior-TV Service

Legris et al (2003) show that empirical research using TAM explains about 40% of the system's use and, therefore, new more complex, refined and tailored models are welcomed. Consequently, we have decided to use UTAUT model to the extent to which we may try to better understand seniors' perceived usefulness and enjoyment for each service offered and for the Senior-TV product overall.

Analysis

For the present research we employed the Statistics Package for Social Science (SPSS) system to analyse the data using reliability and validity analyses and descriptive statistics and mostly

correlation analysis and regression analysis. Correlation analysis estimates the degree to which a change in the independent variable will result in a change in the dependent variable. Regression analysis focused on the relationship between a dependent variable and one or more independent variables.

Reliability and Validity

The Cronbach's α value is adopted for reliability analysis and, as shown in the table below, the results reveal the Cronbach's α of the construct Intention to Use ("I would like to", such as "I would like to check an electronic agenda", "I would like to check my town's weather" and all others related to each service offered by Senior TV application) and of the construct "Easy to Use" are strong to optimum, .650 and .786. Values over 0.6 show that the reliability of these measurements are acceptable as suggested in exploratory research (Hair et al., 2011: 145; Hair Jr. et al., 2013). The low internal consistency for PU and PEU mean that some of the items are not correlating well with each other, implying that they are assessing poorly related items, such as Health app and Weather.

The Confirmatory factor analysis (CFA) was administered to check for the validity of the data. KMO & Bartlett's Test of Sphericity is a measure to indicate sampling adequacy, with the score ranging from 0 to 1 and the globally accepted index being 0.6. The resulted KMO values are .721 for Intention to use, which show appropriate values, and so it is for Ease of Use, .624 and for Enjoyment is .630 while for Usefulness is .568. CFA results gave the possibility to calculate CR and AVE values. **Composite reliability and Convergent validity are the lowest for the perception of easiness to use and for usefulness, and significantly higher than required for Intention to Use (IU) and Enjoyment Perception (EP).**

In conclusion, Senior-TV as a product may be assessed only in relation to the intention to use and the perception of enjoyment. Due to the diversity of the services offered, there is no perception of a unitary easiness to use or usefulness of the Senior TV as a whole product.

Table 5 Reliability and Convergent Validity of Measures Used in Senior TV Testing

Constructs	Reliability		Convergent validity (AVE)
	Cronbach's alpha	Composite reliability (CR)	
Intention to Use "I would like to…" (IU)	.786	.860	.554
Perception of the Easiness to use (PEU)	.650	.435	.268
Perception of the Usefulness (PU)	.031	.434	.297
Enjoyment Perception (EP)	.522	.751	.417

Table 6 Seniors Perception of Learning to Use, Usefulness and Enjoyment of the Senior-TV (Scale1-5)

	Perception of Learning to Use	*Perception of Enjoyment*
Mean	3.07	3.30
Median	3	4
Mode	3	4

When assessing the Senior-TV product, more than half reported enjoying it. Most of the participants (67%) reported a low to moderate degree of easiness in learning to use Senior-TV, marking 3 on a scale of 1 to 5, for median, mode and mean. This indicates low variability or large agreement among seniors, regardless of their country of origin and socio-demographic characteristics. The perception of enjoyment is higher, showing a mode of 4, with less than half of the participants scoring low to moderate values.

Table 7 Seniors Perception of Learning to Use and Enjoyment of the Senior-TV (Scale 1-5)

Scale	Perception of Learning to Use Cumulative percent.	Perception of Enjoyment Cumulative percent.
1	2.00%	22.3%
2	27.00%	21.6%
3	**67.6**%	**44.6**%
4	96.6%	81.1%
5	100.0%	100.0%

The easiness of learning to use is appreciated as moderate or low by two thirds of the participants.

Easiness to use Senior-TV scores better than learning to use it.

Figure 7 Perception of the Easiness to Use Senior TV
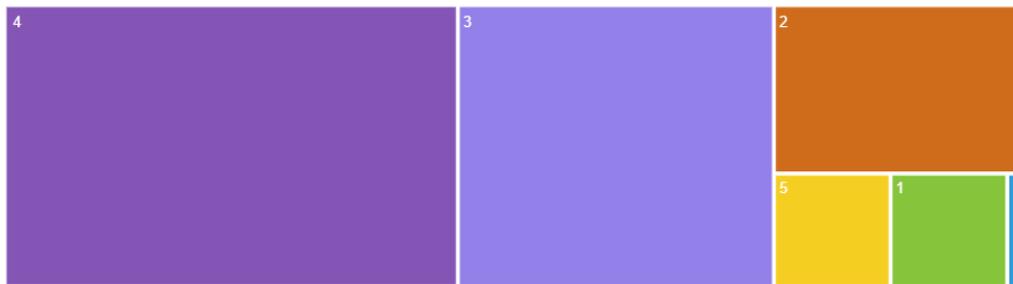
Moderators for Acceptance and Use of Senior TV

Table 8 Correlations between Participants' Socio-Characteristics and the Perception of Using Diverse Technologies

	Age	Education	Living status	Verbal Fluency Test Score
PRE-Senior-TV Experience. **Diverse usage of TV services**	-.204	-.077	.048	-.270
PRE-Senior-TV Experience. **Diverse usage of new technology services**	-.260	.117	.038	-.096
POST Senior-TV Experience. **SENIOR TV is fun**	-152	**246**	-051	**510**
POST Senior-TV Experience. **SENIOR TV enables ICT more quickly**	-150	191	-028	**342**
POST Senior-TV Experience. **Easiness of learning to use SENIOR TV**	-120	204	.074	**287**

We chose to use Pearson's and Spearman correlations based on the nature of the data, aiming to understand if there is a relation between the selected variables and the strength of the relationship. When the r value is closer to +1 there is a positive relationship while a value closer to -1 indicates a negative relationship.

Seniors from Slovenia reported enjoying Senior-TV more than seniors from Romania who reported a moderate to high excitement while half of the seniors from Cyprus did report enjoying it.

Fun perception of Senior-TV is strongly correlated with a higher score at VFT. Nevertheless, a moderate correlation was found between VFT scoring and the easiness with which ICT enables everyday life. A significant positive correlation was also found between education and seniors' enjoyment of using Senior-TV, as well as easiness of learning to use Senior-TV. No correlation was found between living status and the perceptions mentioned above. According to the data, more than a half of the participants stated that Senior-TV helped them utilize ICT services more quickly.

In conclusion, the higher the education and the VFT score is, the more likely one is to perceive Senior-TV as fun, the quicker one learns to use it and the more likely he/she is to perceive Senior-TV as an enabler of learning to use ICT quicker. Cultural differences also play a role in the perception of the product. Senior-TV may positively impact seniors' cognitive abilities and promote a more active and diverse usage of other new technologies.

Impact of Senior-TV Usage

We aimed to understand if Senior-TV (as a product) could improve the psychological and physical health of seniors. Some questions which might help answering this question are: Is Senior-TV more like a TV experience or a new technological experience? Does Senior-TV cognitively engage seniors? What is the added value of Senior-TV?

Table 9 Correlation between the Willingness to Use New Technologies in Relation with Senior-TV and

the Usage of New ICT Services

Correlations	Using Senior TV was fun	Using Senior TV enabled me to utilize ICT more quickly
I would like to use new technologies to be more active	**.343**	**.270**
Learning to use Senior TV was easy to me	**.297**	**.366**
Using Senior TV is fun	**-**	**.641**

Age does not significantly impact the perceived easiness of learning to use Senior-TV but it has an IMPACT on the perception of how enjoyable and useful the service is.

Higher VFT scores positively influence the perceived fun and easiness of learning to use Senior-TV.

Senior TV supports an active usage of technology.
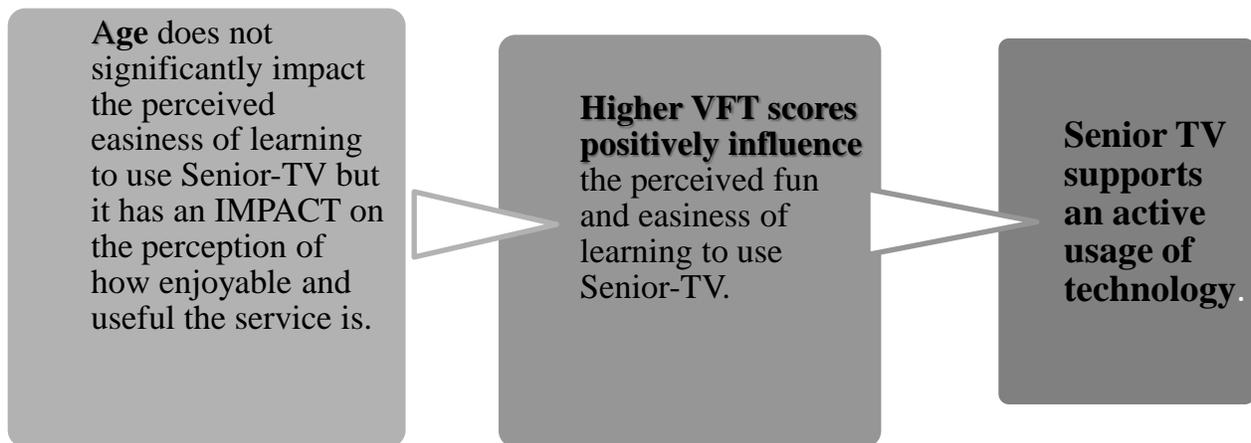
Seniors who perceived using Senior-TV as having fun, are more likely to use new technologies to become more active. Participants showed willingness to engage in new technologies after spending time with Senior-TV, making *Senior-TV as a relatively good enabler for the usage of new technologies.*

Figure 8 UTAUT Model Applied to Senior-TV

Figure 8 UTAUT Model Applied to Senior-TV
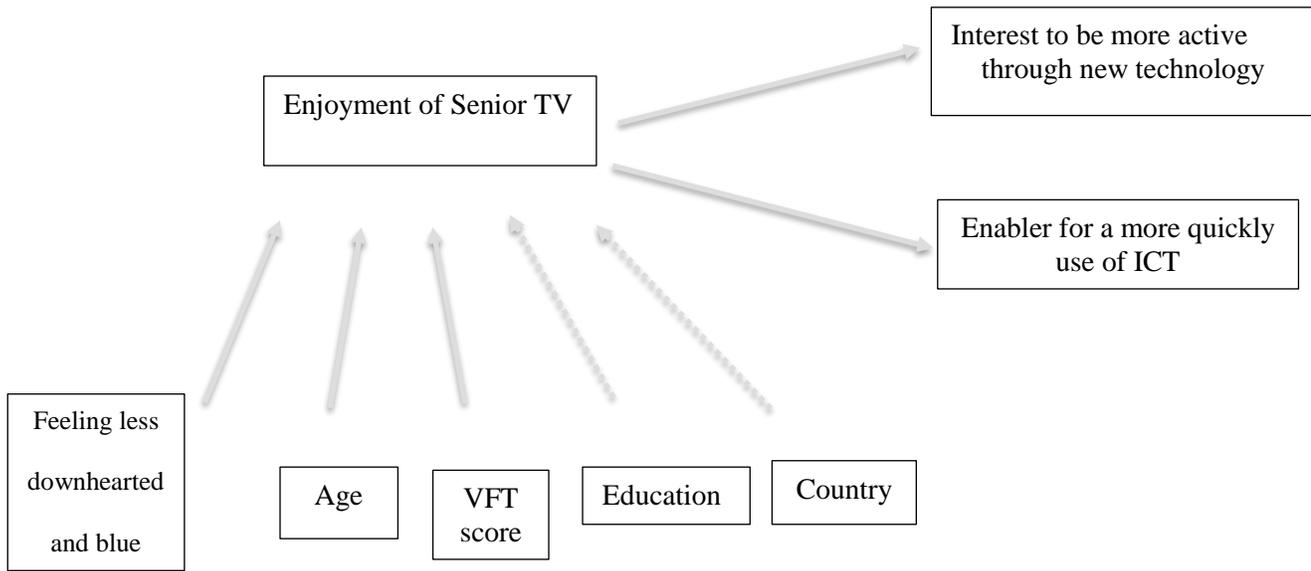
5. Results. Part II: Senior-TV Services UTAUT Analyses

It is not Senior-TV per se which actively engages seniors, but seniors' **attitudes towards Senior TV determining consequently an active behavior.**

This section aims to present seniors' perception with regards to the services developed and provide an overview of their experience with the testing of the platform and the applications developed. It is important to understand which Senior-TV services improve seniors' psychological and physical health and to which extent.

Intention to Use

Table 10 Intention to Use of the Senior-TV Services

	Agenda	Weather	Events	Wikipedia	News	Virtual Center	Tracker
Mean	3.06	**4.19**	3.82	**2.75**	3.33	3.24	3.27
Median	3.00	**5.00**	4.00	**3.00**	3.50	4.00	3.50
Mode	4	**5**	4	**2**	4	4	4

Seniors were mostly interested in Weather and least interested in Wikipedia. We note a high interest in weather and getting informed about events in the city, followed by Virtual Center and Tracker. Seniors were the least interested in the electronic agenda and reading online encyclopaedias.

All that relate to the findings of Workshop 2 organized by the Consortium, according to which seniors are interested in 1) medical information and specific and personalized rehabilitation exercises; 2) cultural and social information and personalized events; 3) cognitive multiplayer games; 4) audiobooks; 5) Skype; 6) YouTube. Therefore, new services are added for the third piloting cycle of the project, such as Social Nest, Audio-visual Channels, Social Media and Games.

Table 11 Correlation between the Intentions to Use Various Services

	EVENTS	AGENDA	NEWS	VIRTUAL CENTER	TRACKER	
	I would like to get informed about events in my city.	I would like to access an electronic agenda on my TV	I would like to view online news on the TV	I would like to follow new training sessions/ courses/ workshops from home using the TV	I used to walk regularly	I would like to know the distance covered by my walks using an application on my TV
I would like to check my town WEATHER FORECAST from my TV	.400	.395	**.461**	**.511**	.404	.380
I would like to get informed about EVENTS IN MY CITY.		.430	**.516**	.394	.409	.360

*Agenda*

Figure 9 UTAUT Model Applied to Agenda Service
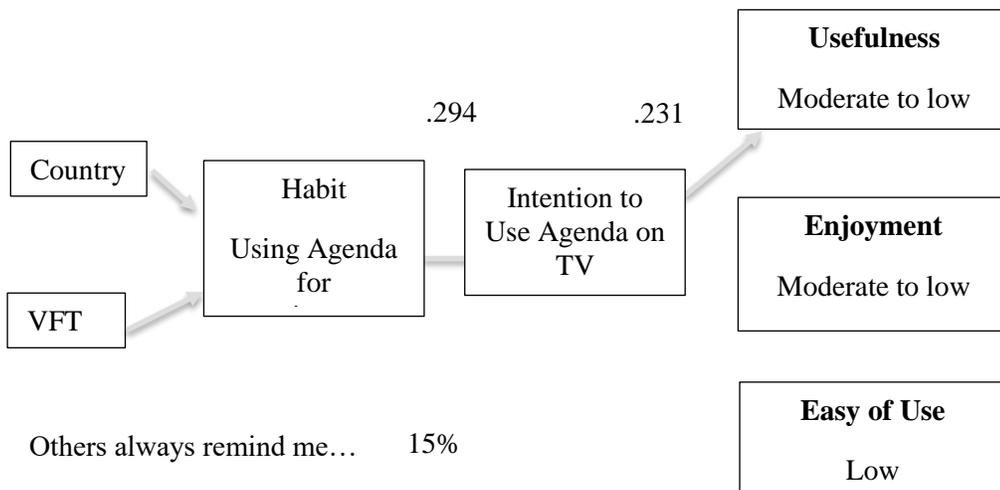
There is a resistance in changing the habit of using a traditional Agenda to an electronic agenda accessible on TV. In contrast to seniors from Cyprus and Romania, nine out of ten seniors from Slovenia (92%) reported using the Agenda for writing down appointments. The respective

percentages for seniors from Romania and Cyprus were 44% and 25%. The scores were similar for using an Agenda for remembering to take the medication. Slovenians were those who perceived the Agenda as being the least useful, enjoying it also less (14%), when compared to Romanians who up to 76% of seniors enjoyed it, and Cypriots (31%). The difficulty in using Agenda on TV was similarly appreciated, regardless of the country of origin.

Those who used an Agenda for writing down appointments were more tempted to access the Agenda from their TV, comparative to those who used an Agenda for writing down their medication. Moreover, when asked "*What is the least interesting functionality of Agenda*", frequently seniors answered the function of reminding them to take their medication.

Weather

Figure 10 UTAUT Model Applied to Weather Service
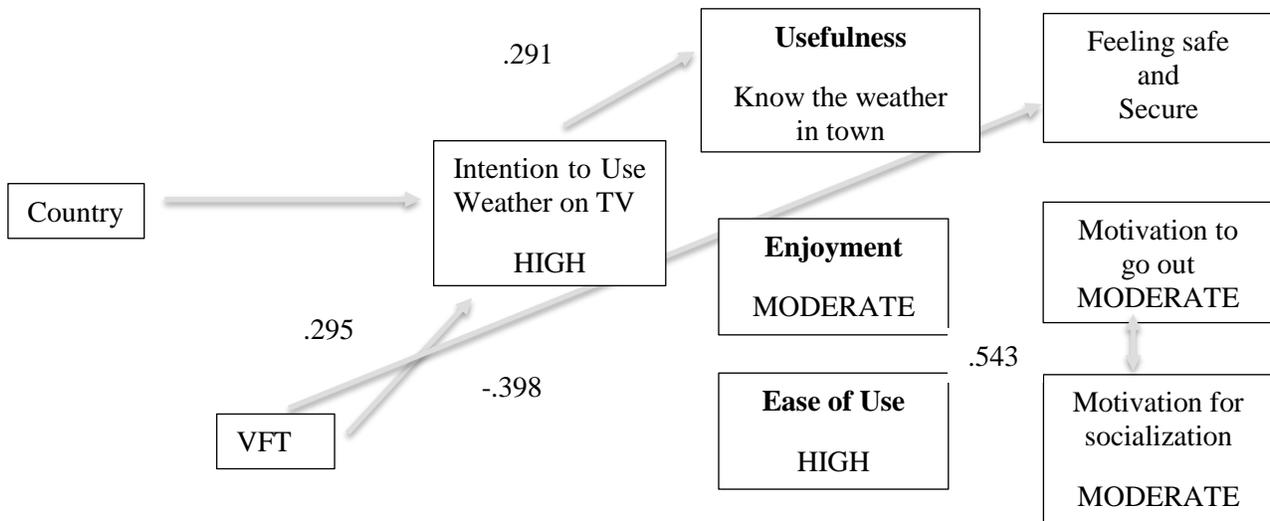
A relationship was found between the intention to use the Weather application on TV and its usefulness, though hardly constituting a motivational factor for going out and socialize.

The interest of accessing Weather on TV is negatively correlated to age. The older one gets, the less interested he/she is in accessing weather on TV (r = -301). The VFT score was also observed

to have an impact on seniors' interest for the Weather forecast (r = .295). The higher the VFT score the less one feels safe and secure to go out due to the weather information (r = -398) and the less useful he/she finds the Weather application.

Usefulness is understood as being important to know the weather in one's town. The impact, namely "Feeling safe and secure" scores low with a mean of 2.41 and mode of 2 while "motivation for going out" and "relating to others" score about 3 for all the central tendency indicators. Therefore, information on weather is a weak motivator factor for people to go out and to socialize.
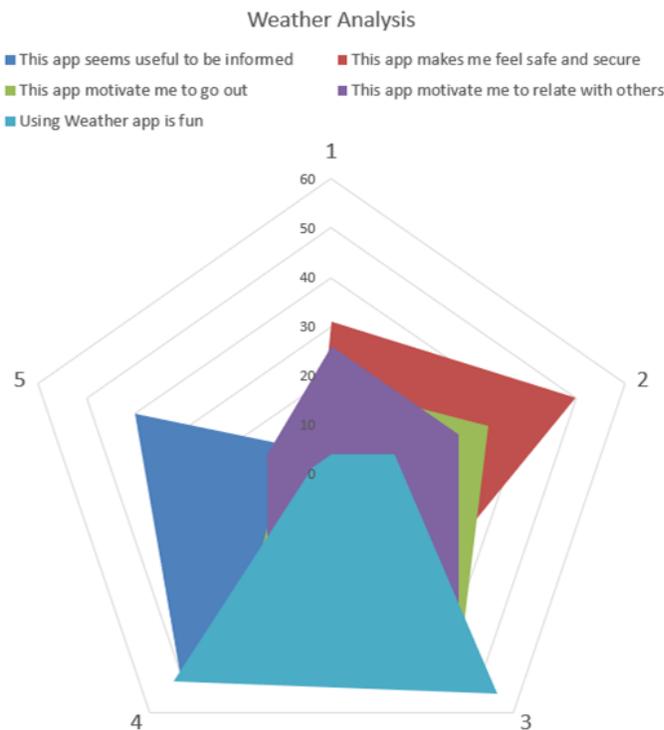
Figure 11 Perception of Weather Features

Does the weather service drive an active behaviour? The **usefulness of being informed on the weather scores the highest on promoting an active behaviour (colour of intense blue on the figure).** A weak relationship was found among high VFT scores and usefulness of accessing weather information from the TV (r = .265). 64,9% of the participants marked 4 and 5 on a scale from 1 to 5. Pale blue designates enjoyment for using the Weather application, scoring moderately-high. Green and purple **represents a moderate to low motivational factor for going out and to relate to others.** 25,9% of participants consider that

this specific feature constitutes a motivational factor for going out and relating to others. As the feeling of safeness and security scores lower, it will not be further considered an indicator for the Weather application. The higher the VFT score the less they appreciate the feel of safety offered by the application (r = -377).

Nearly 8 in 10 participants (78,2%) stated that it is easy to learn how to use the Weather and 46% stated that it is 'fun' to use the application.

News

*Figure 12 UTAUT Model Applied to News Service*
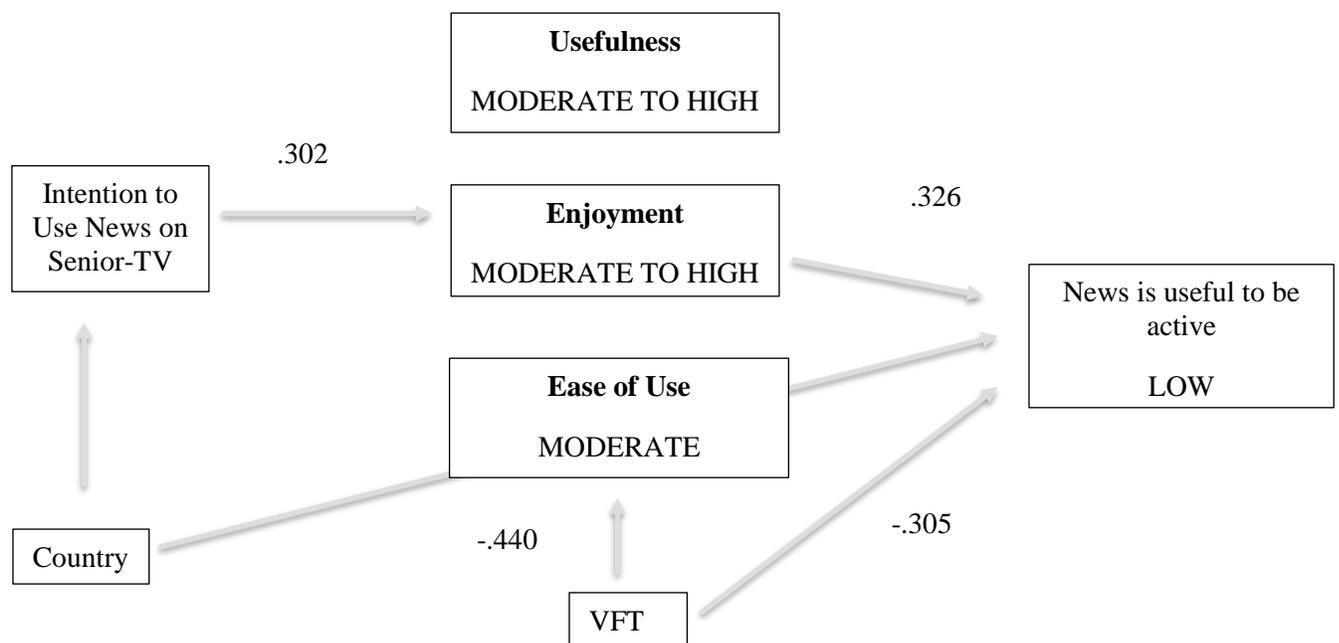
News is one of the TV applications which scores quite high for its usefulness, enjoyment and ease of use. A relationship was found between the intention to use the News app and its enjoyment, though, its usefulness or impact on improving seniors' quality of life quality has not been here investigated.

Romanian seniors are interested in News more than Slovenians, followed by Cypriots. 75% of the Slovenian seniors would like to see news on TV in contrast to 24% of seniors from Romania and 35% of seniors from Cyprus. Cypriots find less enjoyment in News, while Romanians and Slovenians scored from moderate to high. The Perception of Ease of Use (PEU) is determined by the perception of managing News application with a remote (R=.727, Adjusted R Square .524). As for the other cases, age affects negatively the intention to use News on TV (r = -.244).

Wikipedia

Figure 13 UTAUT Model Applied to Wikipedia Application
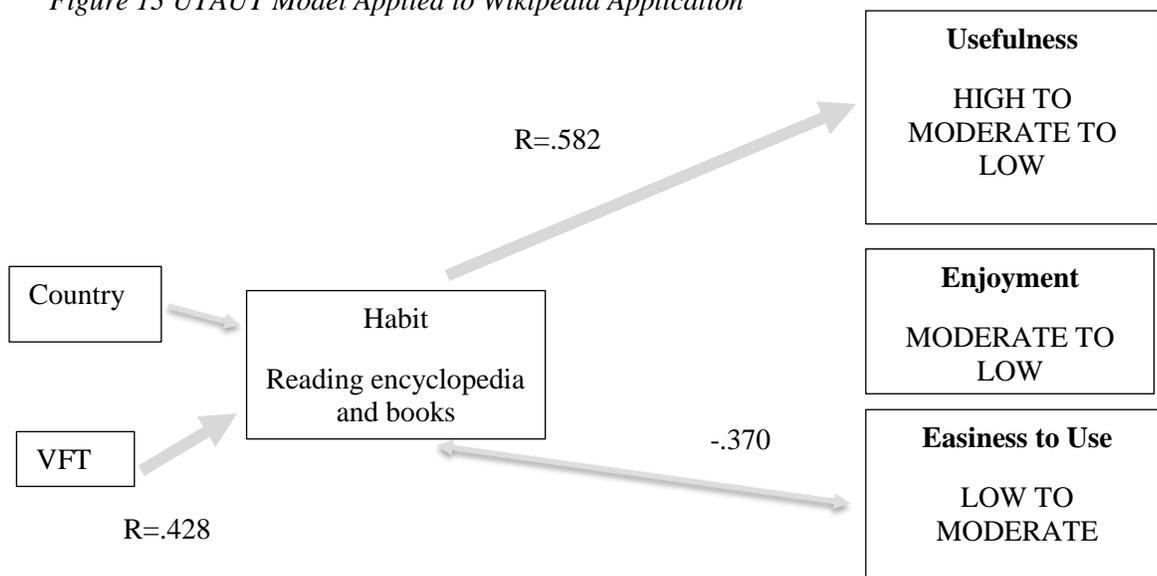
There is a moderate correlation between the VFT score and the habit of reading encyclopaedia and books. Seniors with this habit established consider a virtual encyclopaedia as being more useful when compared to those who don't. The habit nevertheless negatively correlates to ease of use on the TV.

The older one is the less interested he/she is in accessing Wikipedia from the TV (r = -.208) and the less flexible he/she is to interact with it (r = -.247). The higher the VFT Score, the higher users'

perception of how useful the application is (r = .659). Moreover, a high score at VFT is correlated to the Intention to access Wikipedia through TV (r = .403), but negatively to the flexibility to interact with (r = -.414).

All Slovenians reported being very interested in reading encyclopaedia and books, while only one third of Cypriots and Romanians reported being as much interested. Eight in ten Slovenians found it useful accessing Wikipedia from TV, while only one third of seniors from Cyprus and 28% from Romanians showed interest of equal height. Participants scored low on how flexible it is to use the Wikipedia, to interact with it and how easy it is to use it**.** The enjoyment of using Wikipedia is moderate to low, and it is coloured in purple in the corresponding figure.

Figure 14 Perception of Wikipedia Features
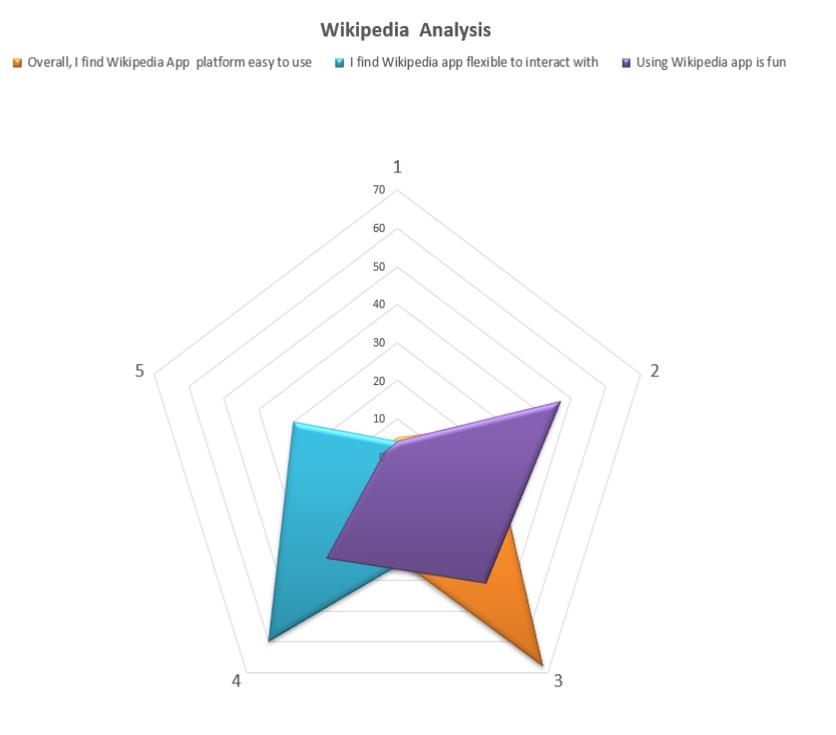
Events

Figure 15 UTAUT Model Applied to Events Service
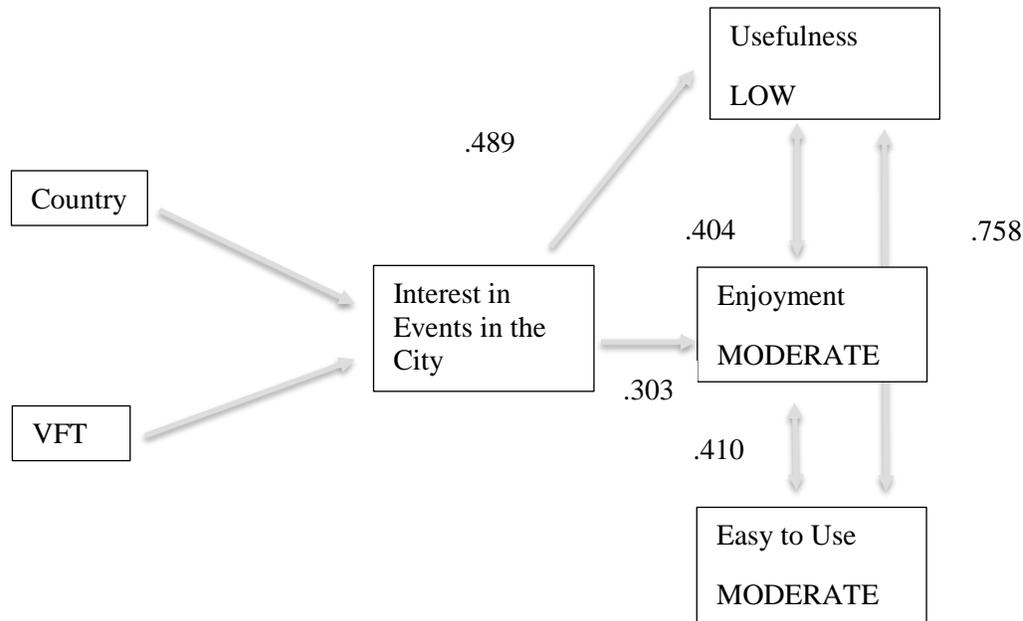
Seniors interested in learning what events are taking place in their city also find the Events application in Senior-TV more useful and enjoyable. However, the Events application was rated of not being particularly useful and enjoyable perhaps due to the difficulties encountered with using the application per se.

The possibility to personalize this service was much appreciated. Slovenians were interested in Events more than the seniors from Romania and Cyprus. Participants found the Events appl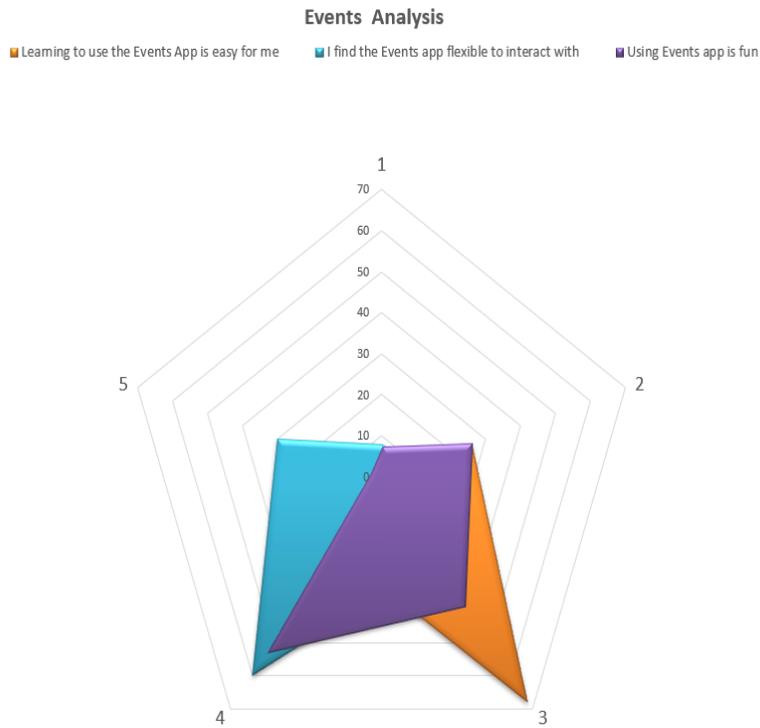ication to be flexible to interact with, of rather fun, but not easy to learn to use. In conclusion, given also the high interest of participants in this application, the ease of learning to use the application should be improved in the future.

Figure 16 Perception of Weather Features

Health

Figure 17 UTAUT Model Applied to Health Service
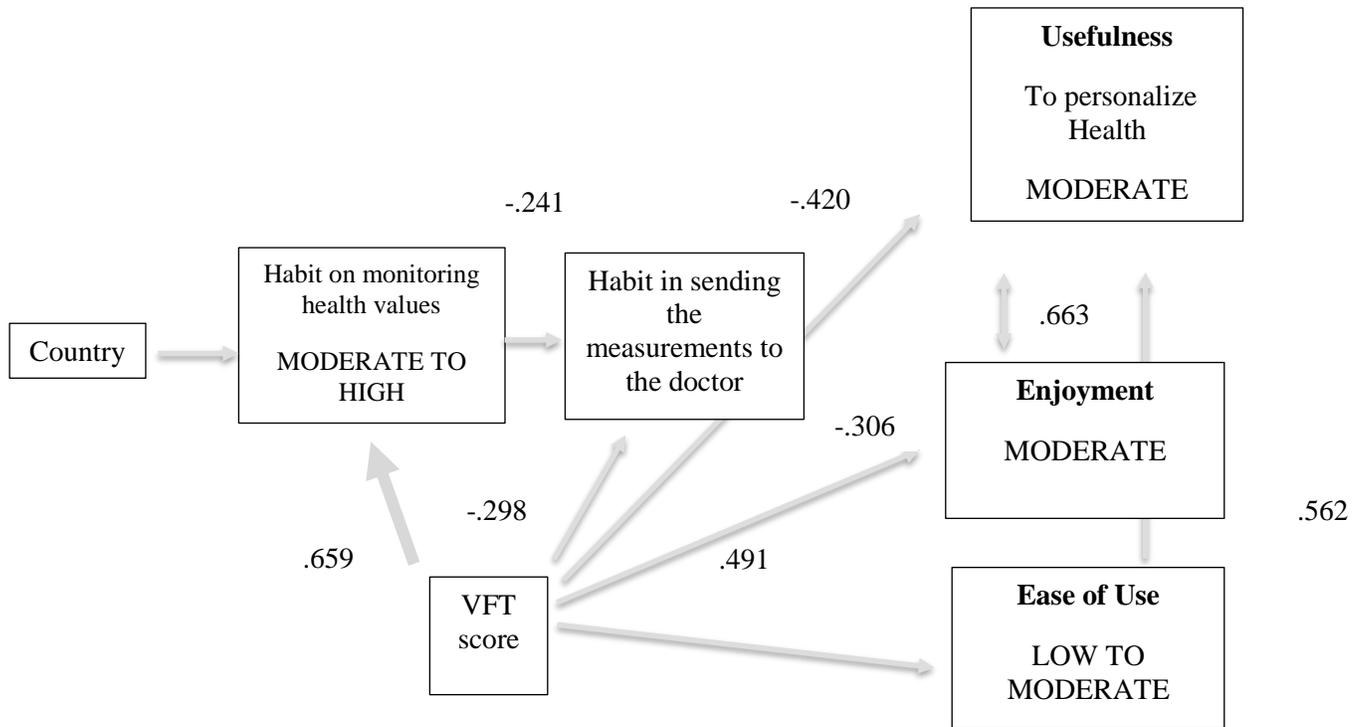
There is no relationship between the habit of monitoring and being interested in sending the health measurements to the doctor, which is also one of the two goals of the Health application. The other goal, which is seniors' consistency in measuring their blood pressure, weight etc. or personalizing the application is more appreciated by the seniors, though the higher one scores on the VFT the less useful and enjoyable he/she perceives the application to be. Seniors who are more cognitively active tend to register their health values in the Health app but are reluctant to send them to the doctor. No links have been found between the habit of monitoring the health parameters and the habit of sending them to the doctor.

Relevant cultural differences exist in the habit of monitoring one's health and informing the doctor. 88% of the Romanians declared that they monitor their health parameters, while none of them

declared that they would send these values to the doctor. Out of the 44% Slovenians who declared that they monitor their health parameters, only 14% would send them to the doctor, while in Cyprus 30% of the seniors monitor the health parameters and half of them, 14% would send them to the doctor.

The higher one scored at the VFT test, the more likely he/she was to perceive the Health application as easy to use (.491). A negative correlation was nevertheless found between a high VFT score and the perceived usefulness of sending health parameters using the TV (r = -420) as well as the enjoyment of using the Health application (r = -306). It should be also noted that the ease of use was highly correlated with the perceived usefulness and that usefulness was highly correlated with enjoyment. Using the Health Application was perceived as easy for half of the participants (49,2%) while 31,3% stated that is neither easy nor difficult. In the open question section, participants explain that the whole process seemed *"a bit too complicated"*. Half of the participants stated that stopped using the application after one month. When asked about the usefulness of sending their basic health parameters to the doctor using the TV, 68% of the participants reported that they would not possibly do it whereas 32% reported finding this feature useful. 82,8% did not enjoy using this application, marking between 1 and 3 on a scale from 1 to 5.

Figure 18 UTAUT Model Applied to Virtual Center Application
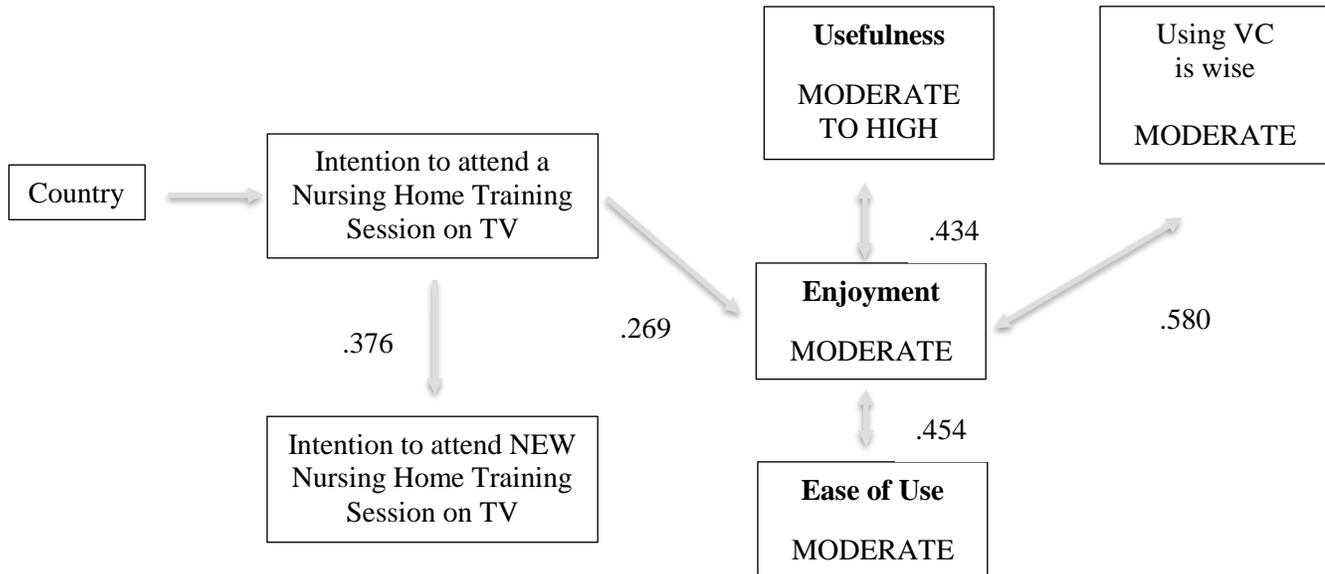
The factors of usefulness, enjoyment and ease of use with regards to the Virtual Center were strongly correlated.

Over 60% of Slovenians would like to attend a Nursing Home Training Session on TV, while none of the Romanians stated having this intention. 50% of the Cypriots argued for a moderate to high interest. 70% of Slovenians 68% of Romanians reported interest in attending new Nursing Home Training Sessions on TV in contrast to only 20% Cypriots. 68% of Cypriots lacked interest in using the VC.

Seniors appreciated the "*Direct conversation*" function of the application and disliked the fact that the application was unstable. They furthermore expressed interest in having conversations with small communities of relatives and neighbors. Therefore, if the technical part is going to be

improved for the third pilot testing, "Social Nets" service will be added to the Senior-TV for the communication purposes.

Tracker

Figure 19 UTAUT Model Applied to Tracker Service
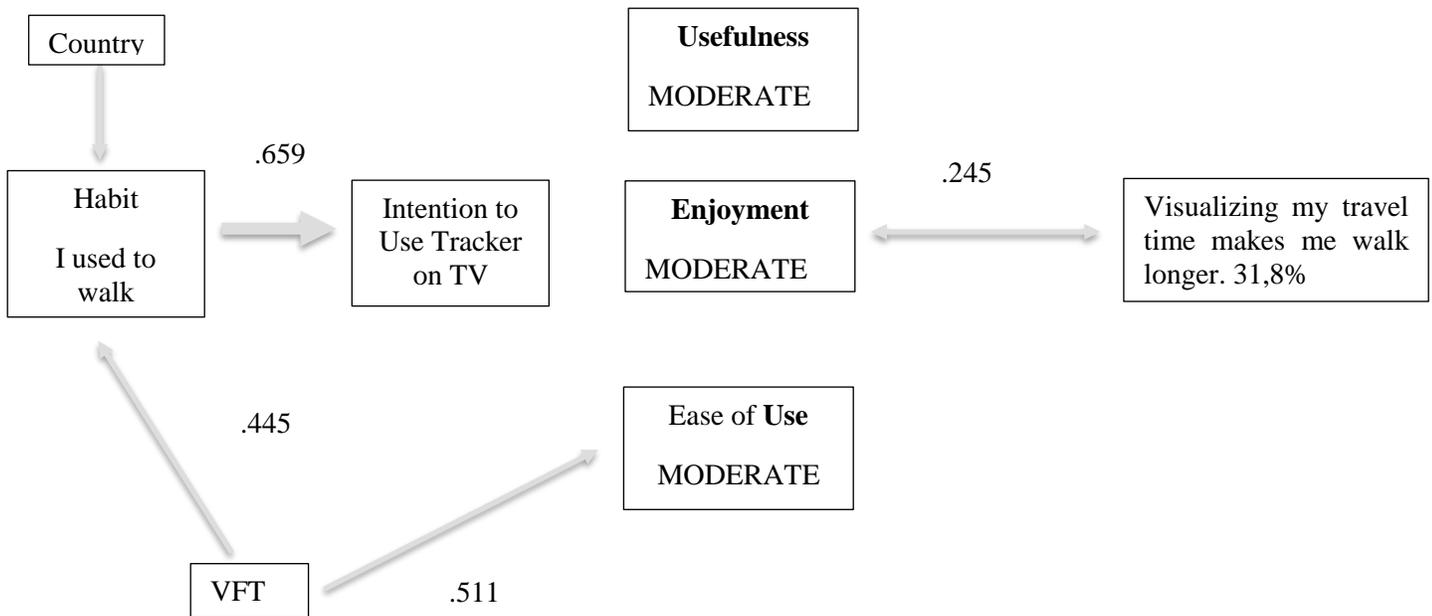
For seniors, a motivational factor for walking longer is visualizing the time and not the recording of the distance covered. Those with the habit of walking regularly manifested a high interest in visualizing the Tracker on their TV, though no relation was noted between interest in the application and how enjoyable it was perceived to be.

78% of Slovenians reported walking regularly, comparative to only 30% of Cypriots and 24% of Romanians. Slovenian seniors reported being very much interested in knowing the distance covered, as was for Cypriots (29%). On the contrary solely 4% of the Romanians showed interest in that.

Ease of learning the application was marked with 3 on a scale from 1 to 5, by 81,8% of the participants. Overall, the application was considered easy to be use and only 22,8% of participants, reported being very easy to learn to use. 31,8% stated that visualizing the travel time made them walk longer, marking 4 and 5 on a scale from 1 to 5, while 68,2% marked this feature with the values of 2 and 3. 8 in 10 participants perceived the application as being of moderate fun and 86,4% perceived the application as positive. The higher one scored on the VFT, the easier they perceived the Tracker application to be (r = .511) but the less enjoyable (r = -.318).

Key Findings of the Senior-TV Services

Table 12 Summary of the Senior-TV Services Analyses

	HABIT	INTENTION	USEFULNESS	ENJOYMENT	EASY TO USE	IMPACT
AGENDA	YES	LOW	MODERATE TO LOW	MODERATE TO LOW	LOW	N/A
WEATHER	N/A	YES	HIGH	MODERATE	HIGH	MODERATE
NEWS	N/A	YES	MODERATE TO HIGH	MODERATE TO HIGH	MODERATE	LOW
WIKIPEDIA	YES	NO	MODERATE TO HIGH	MODERATE	MODERATE TO LOW	N/A
EVENTS	N/A	YES	LOW	MODERATE	MODERATE TO LOW	N/A
HEALTH	YES	NO	MODERATE	MODERATE	LOW TO MODERATE	LOW
VIRTUAL CENTER	YES	YES	MODERATE TO HIGH	MODERATE	MODERATE	MODERATE
TRACKER	YES	YES	MODERATE	MODERATE	MODERATE	LOW

Seniors who already use an agenda are less interested in accessing an Agenda on TV comparative to those who do not use it who report being more open towards accessing it on TV. Those who use Agenda for medication do not appear to be willing of breaking the habit of using a hard copy or an Agenda to a virtual one. By contrary, those who read encyclopaedia and books see the usefulness in accessing Wikipedia on TV. There is a high interest in the News and Events applications, which are perceived to be enjoyable. With regards to the Weather app seniors

perceived it as useful. Rather striking was the finding that enjoyment had a greater impact on seniors' active behaviour rather than how useful the application was perceived to be. The Virtual Center and Tracker applications were also rated as being enjoyable, but the poor internet connection was mentioned as being an obstacle for using services like Weather, News, Events etc.

Despite seniors reported being interested in health monitoring, they did not show intention in sending their health parameters to the doctor. We hypothesize that health technologies are perceived as being less useful for the more active and independent seniors, and consequently being of higher interest to the secondary beneficiaries (such as seniors' relatives) and care service providers. In addition, seniors may be reluctant in sending sensitive parameters over the television as it is something very new and '*weird*' to them, eliciting privacy concerns.

Insights into the Third Pilot Testing

For the third pilot testing the Consortium aims to:

1. Investigate other theories along the classical TAM and the UTAUT models;

2. Go in greater depth about understanding the relations among seniors, the TV and new TV devices;

3. Conduct a short market research with regards to seniors and new technologies;

4. Diversify the target groups to acquire a multifaceted perspective of business opportunities and of stakeholders' "ideal client"

5. Acquire more sophisticated socio-demographic data by adding a psychological perspective on the "perception of age" and a complex data disaggregation. Age perception along the VFT test and SF12 may give a better understanding of the physical and emotional health of the respondents, as well as on their cognitive abilities;

6. Investigate how seniors benefit from each service.

By positioning ourselves against the assumption that watching TV is for seniors a neutral and passive activity (Laslett, 1991) and by endorsing the findings of other qualitative research which show that watching TV is an active process supporting seniors to feel socially integrated, in the 3rd pilot testing Senior-TV will also aim to investigate whether seniors' relationship with the TV influences the adoption rated, interest or willingness to integrate new technologies in their lives and in particular Senior-TV.

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SENIOR-TV

PROVIDING ICT-BASED FORMAL AND INFORMAL CARE AT HOME

Quality Checklist
Quality Control of D3.3

Peer Reviewer	
Reviewer	**Partner**
Aliki Economidou	CNTI

CRITERIA	VERIFIED
1) Conformity to Standards and Project templates	✓
Logos (AAL, SENIOR-TV)	
Project title, reference, author, version, revision, data	
Mandatory statements (disclaimer)	
Conformance to the standard structure required by EACEA (ex. Disclaimer, Executive summary, Acknowledgement, Introduction, page numbers, etc.)	
2) Language check (typing mistakes, grammar, etc.)	✓
3) Coherence with objectives declared in the Technical Annex	✓

Obj. 2: To monitor all project activities and provide quality control of all project results as well as recommendations for improvements and identification of best practices.	
4) Reliability of data	✔
Information and sources well identified	
Data and information are free from factual or logic errors	
The analysis (if applicable) is reliable, i.e. previous studies have been sufficiently reviewed; qualitative information and quantitative data are balanced and appropriate	
5) Credibility of findings	✔
Findings supported by evidence based on data analysis	
Replicability of findings	
6) Validity of conclusions	✔
Conclusions meet evaluation questions and information needs	
Conclusions supported by proper evaluation findings	
No conclusions missing according to the evidences presented	

7) Please indicate any deviations from contractual conditions (WP objectives declared in the technical annex)

8) Comments/Suggestions for revision

9) Implementation of revisions/modifications suggested and explanation for eventual rejections (performed by the Responsible of the Deliverable)

10) Deliverable accepted

☒YES
☐ NO

If NO, please state reasons:

SENIOR-TV

PROVIDING ICT-BASED FORMAL AND INFORMAL CARE AT HOME

Quality Checklist
Quality Control of D3.3

Peer Reviewer	
Reviewer	**Partner**
Iztok Žilavec	RC-IKTS

CRITERIA	VERIFIED
1) Conformity to Standards and Project templates	**Yes**
Logos (AAL, SENIOR-TV)	
Project title, reference, author, version, revision, data	
Mandatory statements (disclaimer)	
Conformance to the standard structure required by EACEA (ex. Disclaimer, Executive summary, Acknowledgement, Introduction, page numbers, etc.)	
2) Language check (typing mistakes, grammar, etc.)	**Yes**
3) Coherence with objectives declared in the Technical Annex	**Yes**
Obj. 1: To elaborate the project's Quality Plan following well-accepted methodologies tailored to the learning domain and based on a detailed description of projects objectives, success indicators and work plan.	

Obj. 2: To monitor all project activities and provide quality control of all project results as well as recommendations for improvements and identification of best practices.	
4) Reliability of data	**Yes**
Information and sources well identified	
Data and information are free from factual or logic errors	
The analysis (if applicable) is reliable, i.e. previous studies have been sufficiently reviewed; qualitative information and quantitative data are balanced and appropriate	
5) Credibility of findings	
Findings supported by evidence based on data analysis	
Replicability of findings	
6) Validity of conclusions	
Conclusions meet evaluation questions and information needs	
Conclusions supported by proper evaluation findings	
No conclusions missing according to the evidences presented	

7) Please indicate any deviations from contractual conditions (WP objectives declared in the technical annex)

8) Comments/Suggestions for revision

9) Implementation of revisions/modifications suggested and explanation for eventual rejections (performed by the Responsible of the Deliverable)

10) Deliverable accepted

☒ YES
☐ NO

If NO, please state reasons: