ICT perception of elderly people and the role of infomobility services in their everyday mobility

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Abstract

This paper examines whether a significant part of the society, that of elderly people, is excluded from the use of Information Communication Technologies and the extent to which they could benefit from such services, focusing on infomobility services. A questionnaire survey including participants of >65 years of age was conducted for analysing the familiarity of elderly people with the latest improvements in the field of ICT in transport and mobility, their willingness to use them, the features that deter them from engaging with such services and possible ways of increasing their user-friendliness. Results show a significant correlation of education level and closeness to younger people with familiarity, acquaintance and use of such services with a considerable degree of frequency. Moreover, findings of the study are interpreted towards a sounder development of such systems and services included in info-mobility services (e.g. trip planning, routing or rerouting, or other ICT services), as recommendations and suggestions are drawn towards facilitating elderly’s habituation and overall social inclusion with transport- and mobility-related ICT.

Keywords: Elderly people; information communication technologies (ICT); mobility; social equity

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1. Introduction

In recent years, increasing attention has been paid to the impact of Information and Communication Technologies (ICTs) on people’s everyday mobility and the extent to which such technologies actually influence peoples’ behavioural approach on how they travel, due the vast technological advances in the field. Under ICTs fall those technologies that combine, integrate and converge several technologies (telecommunications, computers, electronics etc.) along with all necessary operational software, that allow end-users to access, store, spread and process information. The most representative forms of ICTs include a vast variety of communication devices, such as radio, television, cellular and smart-phones, computer and hardware, along with a series of a services and applications associated to them. Yet, ICTs are constantly redefined as the concepts and methods out of which they are formulated are continuously evolving. In general, it can be said that ICTs are concerned with one or more of the following regarding digital data: storage, retrieval, access, processing, and transmission (Giannopoulos et al., 2012).

In recent years, ICTs have revealed a vast array of communication and information exchange possibilities to people both ex-ante, ex-post and at real-time of an event’s occurrence. This fact has largely encouraged their use in the mobility area, where information are processed and delivered as an end-product in various occasions: from being able to book long-distant flights through the push of a button in a smart-phone, plan door-to-door trips combining various modes of transport, while taking into account individual time schedules, to receiving personalized assistance and prescriptive or subscriptive, en-route or pre-trip advice on route choices given prevailing traffic conditions. The key principle behind ICTs’ growing involvement in everyday mobility decisions is that the more informed a user is, the more likely he is to take a suitable decision. Proponents of ICTs argue that such technologies and the hitherto associated services can significantly facilitate travellers’ decisions, offering among others various routing and info-mobility services (Morfoulaki et al., 2011). In general, the significance of ICTs according to the European Commission is mostly related to the cost-and time-efficient access of people to information, rather than to the technological developments themselves (EC, 2007a; 2007b).

With more than 2 trillion € already spent on ICT worldwide since the late 1990s (Federal Information Technology, 2014), this is with no doubt a market worth analysing, in terms of penetration to several geographical, societal, age and educational groups. Although “digital divide” initially referred to the division between those with and without telephone access under geographical criteria (rural vs. urban areas) (Norris, 2001), long before the definition was broadened to also include separation due to internet area coverage, it can nowadays be claimed that within the same boundaries a similar division can be observed; that of people able to grasp all latest technological trends and of those who cannot. Elderly people (usually over 65 years of age) belong to the latter and European statistics show that as life expectancy continuously grows since the beginning of the last century and birth rates are descending (Eurostat, 2014), the absolute number of elderly people in EU will continue to rise. The elderly people have not been actually involved in the evolution of the Internet and technology: they have merely observed advances come by as they never extensively used computers or similar devices for work or leisure. Thus, the fact that these people have in principle limited access to such services and are often left overwhelmed in light of constant and interminable developments in the field, gains additional importance (Wikman, 2008). Various reasons account for that, relating to their socio-economic position, the level of education, the place of residence or the frequent exposure to younger people, as it is more likely for an elder to get excluded from information flows and networks, when income is low and/or residence is away from the centre of activities (UN, 2003).

Overall, the greying of the population, along with the intense “technologicalisation” of life, has been the focus of various recent research studies in an effort to reveal the degree of adoption of ICT by elderly people and the extent of their social exclusion. It is generally feared that unless technologically illiterate population groups have a chance to catch up, the increasing advances will only serve to extend the already-existing digital gap among various societal groups that might further “e-exclude” elderly people from the informational era (Vandebosch et al., 2005).

It is therefore the objective of this paper to identify the penetration of ICT in the societal group of elderly people within the area of Thessaloniki - a Greek city with established, long-running and sustainable infrastructure infomobility services in private and public transport, highlight the reasons behind their acceptability and conclude on their proclaimed assistive nature come to everyday mobility decisions.

2. Materials and methods
A user-centered methodology was implemented with shift-of-focus to direct collection of self-reported data. This was mainly an exploratory study and the main objective was to identify any factors affecting adoption of ICT technologies in everyday transport activities for covering daily needs. Furthermore, it aimed to gather anonymised feedback by users of infomobility technologies who are elderly, taking into consideration variations in existing-and potentially affecting- personal and extraneous factors. For example, ICT literacy and age group membership (e.g. elderly people still in work force with limited ICT literacy or in retirement for several years with sole use of public transport for carrying out specific daily activities) bear user characteristics that unavoidably affect acceptance of such technologies and might predict future penetration of advanced intelligent infomobility services. The survey was conducted for over a month, from 01/05/2014 to 10/06/2014.

2.1. Participants

Participants were derived by existing user databases (i.e. from users participating in other studies but agreed their details to be retained for future communication). A number of users expressed interest to participate when they learnt about the study taking place (i.e. application of a convenient sampling technique). Two inclusion criteria applied: respondents had to be over 55 years old and to be somewhat familiar with ICT technologies. Additionally, two exclusion criteria were applied: a) presence of any psychiatric illness not allowing the user to efficiently communicate with interviewers and, b) users who live at sheltered care. In particular, users who still retain their autonomy in their daily living activities and have a keen interest in the application of ICTs in their everyday transport activities were the main target end-user group. Though, the scope was not to derive only these user types from a convenient sample, but to identify them in the convenient sample recruited for accommodating the main study objectives.

In total, 33 (age range: 55-80 years old) participants completed the infomobility questionnaire. Representation from both genders (N Male = 22, N Female = 13) and mainly two different age groups (Early older transport users = 15 and Early retirement older users =16) was attained. Only two respondents were over 75 years old. The majority of respondents hold university degrees (N=20), live with their spouse (N=26), meet their other family members very often during the week (N=29), are retired (N=22) and prefer to drive wherever they want to go (N=19). One third of respondents (N=12) choose to use the bus to move about. Choice of transport mode is not affected by gender as it would be expected for these age groups (i.e. in Greece, older drivers are in majority male). More than two thirds of respondents use a computer and have internet connection. Therefore, participants are active retired older citizens who live independently and are still active with adequate ICT literacy and knowledge.

2.2. Materials

A 15-item questionnaire was constructed and reflects the following thematic areas (clusters of questions):

- Basic background information (Identification of infomobility users within the older citizens in the area of Thessaloniki) including:
  - Working status (in employment/retired)
  - Living status (independence/co-dependence/other)
  - Family ties (frequency of contact with family members)
- Preferred transport mode (e.g. private passenger car, public transport)
- Use of ICTs and frequency of use (e.g. use of navigation systems at least once per month)
- Investigation of attitudes towards ICTs (statement proposition)
- Familiarity with ICTs
- Identification of relevant problems (open-ended)
- Crucial issues/problems related to implementation and efficient penetration of relevant systems and services

The questionnaire was available in both electronic and paper-and-pencil versions for accommodating the user preferences.

Question items serve different purpose in the infomobility questionnaire and, thus, their response format differs accordingly. Question items were selected in order to include several aspects, which have been shown to be of importance (e.g. educational level, previous work engagement, independence level, transport needs and preferences, etc.) for investigating modal choice with or without use of infomobility services. Hence, the first section of the questionnaire is devoted to clearly qualitative and objective data (background information) which creates the user persona or profile and the second section of the questionnaire defines this profile in categorizing users in anticipated four infomobility clusters:
a) *Early adopters, personal transport gain:* Younger elderly users (55-65 years old) with high ICT familiarity and personal infomobility services (e.g. in-vehicle navigation system);  
b) *Average adopters, personal and public transport gain:* Elderly users (65-75 years old) with medium use of ICT technologies (e.g. personal pc/internet use) but no familiarity of infomobility services;  
c) *Late adopters, public transport gain:* (>65 years old) limited ICT familiarity, keen to obtain knowledge but might not apply any, use mainly public transport;  
d) *Limited adopters, public transport gain:* (>75 years old) very limited ICT familiarity, keen but difficult to retain new, complex knowledge and uses mainly public transport (sometimes alone).

There are other user groups that are not addressed in this study (e.g. elderly users as leisure travellers and elderly users of medical infomobility services (e.g. periodic visits to daycare centers, reminders to GP visits, etc.)

### 2.3. Procedure

The questionnaire was completed in face-to-face sessions lasting approximately an hour. Participants were introduced to the main scope of the study and information was provided in both written and oral form. Participants were informed that the questions investigated their own attitudes, beliefs, ideas and preferences with regards to ICTs and, specifically, about infomobility related technologies, devices, and services and it was not a measurement of their own ICT literacy and competence skills. Written consent was obtained prior the completion of the infomobility questionnaire (one copy was available for the participant and one remained with the authors; copies of obtained consent are safely kept along with any original data). Facilitators identified any difficulties in completing the questionnaire or if users seemed they were trying too hard to give only “good” answers (i.e. experimenter bias), they were reassured and reminded that their true preferences were required. For example, older adults occasionally might elaborately hide their lower familiarity and literacy when exploring and finally using such devices. It was up to the facilitator and experimenter to identify such problems quite early (if possible during recruitment phase) and diminish such miscommunication instances and misconceptions about the purpose of the study.

In case respondents had any questions or needed clarifications about any specific questionnaire items, they were advised to ask the facilitator who was present at all times. Any personal information was eliminated from the electronic data file. Data were anonymised prior to the conduction of any analysis. Participants were volunteers and did not receive reimbursement for their participation. In case participants had any questions, they could contact the principal investigator and if they wanted a copy of the main findings they were advised to leave their details to the secretary desk.

### 3. Results

#### 3.1. Accustomedness with new technologies

The most frequently used technologies (>80%) among elderly people are the TV set and the mobile phone, followed by the Internet connection, the radio and the personal computer (which are related to the ability to use them, which is close to 75%). Other devices, such as fax machines or printer-scanner present a lower use, but they are not present in the daily life of most people, especially to those who are not employed at the time. Yet, “modern” technologies, such as navigation devices or tablets, are less used between elderly people (15-25%) a significant part of which claims inability to use them (36%).
It should be highlighted that there is no clear answer to the questions related to privacy, cost and complexity of technology since the percentages of agree/strongly agree and disagree and strongly disagree are quite similar (Fig. 2). It can be seen however, that according to the participants view, Internet is not an expensive technology, indicating its significant potential among elderly people.

**Fig. 1: Type of technologies used**

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**Fig. 2: Level of agreement with the technology-related statements**
The main use of a PC within the elderly group is Internet (including the access to specific information and to receive/send mails), while other activities, such as playing games or writing are less common. The most common profile related to the use of a PC is of a frequent user (more than two hours per day) with more than 5 years of experience. The main problems are basically related to the complexity of using a PC and the size of the screen.

In relation to smart phones, the common profile is a non-tactical user with less than 2 years of experience that basically uses it for Internet purposes (e.g. e-mails). The main problems using a smart phone are, as in the PC, the size of the screen and the complexity of using a touch screen.
Coming to the infomobility services offered by ICTs, and in relation to the ability of elderly people to plan their route, 3 out of 4 are able to use the Internet, but only 1 out of 3 is able to plan trips through the Internet. Oppositely, only the half is able to use a GPS, but they are always able to find the route, which is expected since the GPS navigators are dedicated to this purpose. Combining both values, the ability to find it and the ability to use the related technologies, only 1 out of 4 is able to plan a route using the PC, while 1 out of 2 is able to do it using a navigator.
There is consensus on the difficulty of using other ICT related devices and services, and that there is a lack of services dedicated to elderly people. The main needs of such services highlighted during the interviews are personalization (each elderly has different needs and impairments), security, accuracy and a better ICT infrastructures support, while the main impairments are the poor digital literacy, the difficulty of following the technological advances and the expensive cost.

4. Conclusions
The conducted questionnaire and the performed analysis have shown that elderly people are in fact quite familiar with ICTs. Yet, there seems to be a substantial gap from being able to comprehend the modernization of everyday life to being able to catch up with it. The analysis revealed a series of problems and hindrances when it comes to the actual use of ICTs for everyday purposes, focusing on infomobility services; from the design of such devices themselves, to the need of personalizing solutions at a reasonable cost.

Following the international paradigm of the United Nations, it is therefore crucial to establish at both national and regional/local level organizations that will aim at the promotion of ICTs in the elderly people, assist the later in their acquaintance with the latest advances and offer them a variety of options for managing their everyday decisions, including all mobility-related aspects.

**References**


