



Delivering Information of General Interest Through Interactive Television: A Taxonomy of Assistance Services for the Portuguese Elderly

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Abstract. In the context of an ageing population, providing relevant information to support seniors' daily activities plays an important role to promote these citizens' quality of life. This study is part of the +TV4E project, which aims to develop an Interactive Television (iTV) platform to transmit personalized information regarding Services of General Interest (SGI) to senior citizens. In order to better assess seniors' preferences and expectations this study aims to propose the Assistance Services of General Interest for Elderly (ASGIE) concept and taxonomy. To achieve this, we set out to collect contributions from specialists in welfare promotion and public policies development for the Portuguese elderly to elicit detailed perceptions on the information needs of these population segment. The validity and relevance of contributions gathered along with these specialists were subsequently confirmed in a survey with 23 seniors recruited in the context of the +TV4E project. The ASGIE taxonomy is composed by 7 domains of information: Healthcare and Welfare services, Social services, Financial services, Culture services, Security services, Transport services and Local authority services. Findings from this study are relevant for authorities in charge of designing, implementing and monitoring public policies for seniors, as they present valuable indicators of information needs of these citizens.

Keywords: Information needs · Taxonomy · Public policies
Social services · Seniors · +TV4E · Portugal

1 Introduction

Ageing is one of the most important social challenges of the 21st century. Though increased longevity is something to be celebrated, for a considerable part of the population ageing may be distressing and problematic if there are no conditions for being independent, active, and healthy for as long as possible.

In many countries people live significantly longer than they did a few decades ago. The number of senior citizens in 2000 came from 600 million to nearly one billion in 2015 and this number is projected to reach 2.1 billion by 2050 and 3.1 billion by 2100

[1, 2]. Particularly, between years of 2015 and 2030 population aged over 60 years in European countries will increase by 23%, while in less developed regions such as South America and Africa this population segment is projected to grow around 50% or even 70% [1]. These changes have resulted in an expressive reversal of the age pyramid and caused great economic impacts on public health and pension systems. So far, the leading response for the social and economic implications concerning older people is the development of active ageing initiatives to enhance participation, health and security, as well as to achieve quality of life as people age [3].

In what concerns Portugal, between the years of 2001 and 2011 the senior population increased from 16% to 19%, leading the population ageing index from 102 to 128, which means that for each 100 young people there were 128 elderly people [4]. According to PORDATA Institute report [5], in 2015 the number of Portuguese inhabitants aged 60 or more finally surpassed the number of children, adolescents and young adults (less than or equal to 24 years), which puts Portugal as one of the most advanced countries in the society ageing process in Europe. Moreover, even the most optimistic projections (considering high levels of fertility and lower levels of mortality and migration) indicate that in 2060 the number of seniors in Portugal will be around 2.7 million, leading the population ageing index to 287 [4]. In 2080, it is expected that for each 100 young people there will be 317 elderly people [6].

The European Commission (EC) recognizes the ageing population theme as a common challenge to all European countries. To address this challenge it was established an European Innovation Partnership (EIP) on Active and Healthy Ageing (AHA), which focuses on actions developed in 3 work fronts: prevention, screening and early diagnosis; care and cure; and active ageing and independent living [7]. Also, the EC has launched several programs, flagship initiatives and action plans to foster structural measures to create and improve public and social services. Some of these measures are e-government solutions, creating new sources of growth and social cohesion according to a quality framework and promoting the deployment and usage of modern accessible online services [8]. These measures were envisioned by the EC as an opportunity to all European countries to lead the world in active ageing projects, by creating innovative technologies that enable older people to live independently and more active in society [9]. These technologies play a vital role by enabling individuals with the access and the ability to obtain information and knowledge about several areas of their daily living situations [10]. Portuguese government has been also strongly investing on this way to provide public and social services. According to comparative studies based on the digital public administration of European Member States and published by the National Interoperability Framework Observatory [11], Portugal stands out in three important metrics concerning public electronic services implementation: (i) user centric (to what extent information is provided to users and perceived by them); (ii) key enablers (to what extent technical pre-conditions regarding information security are present) and (iii) transparency (to what extent the government is transparent on its own responsibilities and performance, on public services delivery and on personal data involved).

Strategies and measures implemented in recent decades put Portugal at the forefront of Member States in terms of provision of public electronic services, with performance levels above the average of European countries in the field of national electronic

government [11]. However, despite being among the top three in Europe concerning quality and availability of public electronic services, Portugal still faces low levels of adoption of these new digital interfaces due to a set of structural factors, such as “low levels of computer skills of the population” [12]. Moreover, much of the population still not reached by these new sources of information regarding public services, as usually they require direct searches in the media, previous registrations, among others.

The reach of information about public and social services is even lower when considering the elderly as the target audience. In Portugal, given the current scenario of info-exclusion [13] and low literacy levels [14] of seniors, they are commonly in a disadvantaged position for not being aware of the welfare benefits available to them, though they are the ones who most need assistance and information [15]. Such exclusion contributed to the fallacious perception of older people as being passive individuals, family-oriented only and disinterested in social and political participation [16].

According to Everingham et al. [17] providing information needed by older people is critical to “age well and socially included”. In this way, effective delivery of public services information considering elderly needs is vital for a successful development of public policies. Furthermore, fulfilling information requirements of elderly using personalized and acceptable methods may give them more independency and autonomy.

In this context, the +TV4E project comes up as a platform for interactive television (iTV) to enrich the television experience with the integration of informative contents about public and social services in a personalized way [18, 19]. The target audience of this project is the Portuguese elderly population considering their characteristics, specific needs and expectations in the use of public and social services. This project aims to leverage the proximity and familiarity that elderlies have with the television (TV) to develop an iTV platform in a promising way to access information that otherwise would not be easily accessible. The +TV4E project is an on-going research action project, and to achieve this goal, it provides mechanisms for gathering and transmitting informative contents regarding public and social services, which in turn, must be properly classified to meet the user requirements and interests. In addition, this classification of services is discussed in this paper and will be used as input for the +TV4E content recommender system [20, 21], which is responsible for selecting and matching the informative contents with the users in a personalized way.

The research presented in this article sought to find out a list of public and social services available for seniors in Portugal and, according to this list, the concept and taxonomy of *Assistance Services of General Interest to the Elderly* (ASGIE) is proposed. Such taxonomy categorizes not only services, activities, resources, and social programs directed to the elderly, but also the ones that might assist them in their daily activities.

This paper is structured as follows. The theoretical framework section reviews some concepts regarding public and social services in Europe as well as some literature works on information needs of elderly that supported a preliminary version of the taxonomy. Section 3 describes the methodology applied by this study and in Sect. 4 a proposal of taxonomy of Services of General Interest tailored for the Portuguese elderly population is presented. Finally, in Sects. 5 and 6, discussions and final remarks are given singly, especially with respect to the context of +TV4E project.

2 Theoretical Framework

Over time, a set of transformations occurred concerning the terminology of “public services”. Following it is presented a historical view evolution of the concept of Services of General Interest (SGI), as well as the information needs of elderly people, in Portugal.

2.1 Services of General Interest

In the late 1990s there was a change in the terminology used in the EC to designate public and social services due to discomfort and misunderstandings around the multiple possible meanings and interpretations of the many-faceted “public” word, which can refer to the group of beneficiaries of the services or to the public institutions providing it. Though there is no precise definition given by the EU [22], the term SGI has emerged as the main designation in Europe to comprehend the services tailored to fulfil the citizen’s wellbeing, considered to be of general interest by the public authorities and thus subjected to a set of predetermined public-service regulations [8, 23]. The SGI comprehend a wide range of activities, functions and resources, from telecommunication networks, postal services and water supply to healthcare, education and financial services [24]. These services are vital for the daily life of citizens and enterprises, essential for ensuring the sustainable development of the European Union (EU) in terms of higher levels of employment, social inclusion, economic growth and environmental quality [8]. Also, these services are important to promote social, economic and territorial cohesion throughout the EU.

Some other terms related to the SGI are also applied and considered by a set of EC communications, reports and papers. The concept of *Services of General Economic Interest (SGEI)*, sometimes used interchangeably with the term SGI, covers services of an economic nature which Member States or the Union have elected to subject to a series of public-service obligations by virtue of a general-interest agreement [23]. It includes economic activities that public authorities recognize as being critical to citizens and that would not be supplied (or would be supplied under distinct conditions) if there were no public regulation.

The concept of *Social Services of General Interest (SSGI)* refers to a subset of SGI which plays a crucial role to improve quality of life and provide social protection of citizens, in order to enable economic and territorial cohesion, high employment, social inclusion, environmental quality and economic growth [25]. These services are person-oriented, designed to respond to vital human needs, particularly to support the ones who are in vulnerable position, and are addressed to the whole population, independently of wealth, income or any other idiosyncrasy.

Finally, the term *Universal Service Obligation (USO)* consists of predetermined rules and requirements stated to make sure the SGI will be available to all citizens according to certain parameters of affordability, quality and accessibility [8]. Setting up specific USO at a European level is essential for the market liberalization of service sectors, such as transports, postal services and telecommunications.

Other SGI related definitions and concepts may be found in scientific literature and in project research reports. Tagarev et al. [26] elaborate on the concept of *European*

Essential Services (EES) as functions that “allow to preserve the functioning of government, economy and citizens under extreme conditions”. In the context of the SeGI ESPON project [27], the concept of SGI is divided in SSGI and SGEI only. Hence, SSGI are composed by labour market services, education, healthcare, childcare, social care, housing and social assistance services; while SGEI comprehend services of gas, electricity, postal services, transport, Information and Communications Technology (ICT) and electronic communications as well as water and waste management [27].

Debates on the “lack of clarity on terminology” and on the fact that “concepts are used interchangeably and inaccurately” still draw attention [8]. In their research work, Bjørnsen et al. [24] discuss to what extent SGI can be meaningfully determined and interpreted based on scientifically procedures, as the definition of SGI itself implies no clear guidelines about what specific types of activities, processes and resources are involved. Nevertheless, according to the authors some exemplifications typically involve “areas into which the economic and/or government activities of a country are divided” and industries. These areas refer to the main institutional sectors (public and private), as well as to policies involving actors, activities and resources of these sectors. Some examples of SGI could be implied based on the *Green Paper on Services of General Interest* division of SGI in “non-market as well as market services which the public authorities class as being of general interest and subject to specific public service obligations” [23]. Thus, market services would comprehend activities delegated to mostly private entities (e.g. water and natural gas supply, transports, electricity and telecommunications), whilst non-market would designate services delegated typically (or fully) to public entities (e.g. justice, social security, financial services, housing and health care) [23].

This concept of SGI was intentionally built to replace well-established concepts, such as “public services”, to promote a common language in the EU and respect local heterogeneities. So, all definitions made by the EU regarding SGI do not reflect any national terminologies on what should be provided or regulated as a service. For service obligations typically vary among the Member States and local historical, economic, cultural and political developments can lead to different understandings, agreements and definitions. Therefore, despite the several normative statements concerning the delivery of SGI specified at the European level, the development of policies and, in many instances, the provision of the services themselves remains mostly a responsibility of each Member State. So, the development of public policies regarding SGI as well as the activities, resources and functions entrusted to public authorities’ regulation are decided in a local perspective, considering particularities and requirements of the citizens who benefit from them.

The development of SGI to address citizen needs have been receiving growing attention of EC and EU Member States, which considers these activities, resources and functions as essential components of the modern European society’s model, as they are of great importance to foster high competitiveness of the European economy as well as to enable social and territorial unity among Member States. This premise is stated by the *White Paper on Services of General Interest* [28], which emphasizes the importance of the SGI as one of the main pillars of the modern European society model. Thus, it is necessary to “ensure the harmonious combination of market mechanisms and public service missions” to achieve the EC objectives in terms of European cohesion and

convergence policies. Therefore, the development of SGI according to certain parameters of availability and accessibility as well as according to a proper territorial distribution represents a key strategy for the EU. These developments intend to ensure that all citizens and enterprises will be provided with affordable and high-quality services.

Given the importance of the SGI to maintain and enhance older citizens' quality of life it is also important to consider this specific population information needs when developing new services and improving the existing ones.

2.2 Information Needs of Elderly

Though there has been an increasing interest among researchers in investigating the information needs of elderly [29], research studies on this subject are still scarce in scientific literature [30]. Considering elderly information needs is fundamental for effective planning and implementation of services and public policies to assist this population segment.

Zou and Zhou [30] conducted a survey with 600 respondents in a rural community of China in order to list the sources and types of information on which elderly often rely. Based on the survey results, a typology of five categories of information needs was established: physiological (food, clothing, care and shelter); safe (healthcare and pension policy); affective (friends and family activities and club activities), Respected (self-assessment and social evaluation) and self-realized (jobs and knowledge skills). Also, the results showed that information accessibility, reliability, and relevance highly influence elderly choice of information sources. With respect to information sources, audio-visual media were preferred (e.g. TV and radio).

Similarly, audio-visual media were the most preferred source of information for elderly according to a research based in Nigeria [29]. This study sought to identify Nigerian elderly needs of information as well as the sources they are familiar with. Findings revealed that elderlies are mainly interested in information about health conditions, pension/finance, government policies, current affairs, and transport. Also, the authors pointed out some factors influencing the information seeking behaviour of older people, such as problems with access and availability.

Information must be relevant, accessible and appropriate to older adults' expectations to be effectively delivered and consumed. This is aligned with a study by Barret [15], which investigated and analysed the information needs of older people in the United Kingdom in a nationwide survey with 1630 respondents. Questions regarding the most common day-to-day problems, areas and sources of information older people were aware of, and preferred means of getting such information helped to evaluate issues on finding information about formal support. Results showed that respondents demand for information about financial and practical help, housing, products and home adaptations, support and services at home that are available to them.

Some authors consider that elderly often find it very hard to point out subjects and information they are really interested, as usually they only require such information at a time of crisis or life change. So, instead of investigating about topics of interest, Everingham et al. [17] preferred inquiring about people recent information needs. The authors conducted a study to "understand issues impacting on older people's capacity to access relevant information" as a part of a larger project which developed a model of

local collaboration in eastern Australia. Conclusions show that older people seek information about availability of programs for delivering hot meals, home health care, special transportation, and other assistance services. Also, they wish to know all the benefits, concessions, rebates and subsidies they are entitled to.

There are two paths available to receive information: information may be deliberately sought and retrieved or may be opportunistically received by chance and, thus, be discovered and noticed. In this way, assuming that information discovered and noticed reflect people's everyday life problems, concerns and lifestyle, Pálsdóttir [31] proposed an exploratory study about opportunistic information discovery by elderly people in Iceland. According to the author, it is consensual for elderly that authorities should disseminate in a more efficient way information regarding formal support from the state or the municipality (e.g. house cleaning, driving service, home delivery of meals, assistance with bathing, administering medications, etc.), available healthcare programs, and financial support or reimbursements that older people are entitled to.

The aforementioned studies on seniors' information needs show that information about healthcare, financial help, pensions and local policies are recurring demands among senior citizens from many countries. To cope the lack of studies concerning the information needs of the Portuguese elderly, previous works of our research team consisted in assessing the SGI on which the older adults of this country would like to receive information about [10]. These works served as basis for a draft of the services belonging to the taxonomy proposed by this research. The development of a proper taxonomy of SGI considering senior citizens information needs presents a valuable artefact for government entities so that they can effectively propose and implement more adequate policies for a promotion of the quality of life. Details on the process of composing this taxonomy follows.

3 Methodology

This study forms an early stage of +TV4E project, a two-year action research project conducted at University of Aveiro, Portugal, which proposes an iTV platform for delivering personalized informative contents about SGI to senior citizens. Thus, in order to achieve a more adequate and personalized approach for the content delivery it is necessary to create a proper categorization of such information [21].

In order to consider particularities of Portugal as well as to establish the validity of the current study, our research team decided to invest in a preliminary exploratory approach to gather information about: (a) development and implementation of SGI in Europe; (b) common information needs of elderly and (c) respective sources of information. This approach consisted of a literature survey of research in international databases with the keywords "elderly" and "information needs". As result, it was produced a list of services in which elderly would be interested in receiving information.

This list was composed by three categories of services: (a) Healthcare services; (b) Social and financial services, and (c) Local (nearby) services. Though rather incomplete, it already had most of services available to Portuguese seniors, and served as basis for guidelines and questionnaires used in subsequent phases, which consisted of:

- A semi-structured interview with an expert in public health promotion for Portuguese seniors;
- A focus groups carried out with experts in public policies development in Portugal;
- Surveys with seniors.

Figure 1 shows in a schematic form the methodological process that allowed the creation of *Assistance Services of General Interest for Elderly* (ASGIE) taxonomy.

The process of categorizing the SGI tailored for elderly was an evolutionary process where the outputs of a given phase served as input for the subsequent phase in order to evolve, improve and validate the taxonomy proposed by this study. The output of the phase “**Semi-structured Interview with a Specialist**” was a first draft of the taxonomy, while the phase “**Focus Group with Experts**” provided contributions for the composition of a second draft. Afterwards, the second draft version was validated through a survey with seniors recruited in the context of the +TV4E project. Finally, after the preliminary phase of literature review and the application of three different research methods the final version of the ASGIE taxonomy was achieved (see Fig. 1). Details on the application of these several research techniques are presented below.

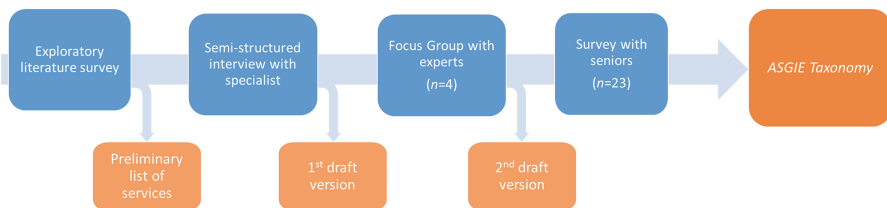


Fig. 1. Methodology towards ASGIE taxonomy [10].

3.1 Semi Structured Interview with a Specialist

Formal caregivers are the closest professionals of the elderly. Hence, in order to assess needs and sources of information of elderly with respect to SGI, it was carried out an interview with a formal caregiver. Due to times constrains, related to the schedule of +TV4E project in which this study is under development, it was only possible to carried out the interview with one formal caregiver with consolidated know-how in this field.

The selected interviewee, S.R.¹, is a gerontologist and expert in seniors’ welfare promotion and active ageing in Lisbon. S.R. has 6 years of experience as formal caregiver of seniors and is a technical coordinator of a non-profit organization whose mission is to fight loneliness and isolation by providing personalized solutions. Currently, this organization provides support for 118 aged citizens living in Lisbon Downtown. An important part of her job is ensuring companionship, administering healthcare treatments, and supporting aged people with everyday activities, such as buying groceries, home cleaning and repairing (many times supported by third-party and associated services providers).

¹ The interviewee has her names hidden for ethic privacy reasons.

This interview involved questions on the following subjects: (1) the interviewee's profile (academic and professional background); (2) the organization where the interviewee works; (3) seniors' needs regarding social public services, and (4) media used by seniors to discover information about SGI. Hence, the questions below were asked:

- Which public services are the most searched by the seniors supported by your organization?
- Which are the most used ways by seniors, to access information? (e.g. flyers, internet, newspapers, TV, radio, others).
- How do seniors look for and receive information about Public Services?
- What role the formal and informal caregivers play in informing seniors about Public Service activities?
- Where do caregivers seek information? Can you help us to realize how often they look for information?

According to the interviewee, seniors usually demand information regarding general subsidies (e.g. social tariffs, housing complements and subsidies in medicines), nearby professional services (e.g. vet, house cleaning and house repairing), income taxes, retirement rules, social and civil rights, juridical support and social security. Considering the objectives of this study and of the +TV4E project, the major findings of this interview were: (a) the average digital literacy of people attended by this expert is rather low; (b) almost all seniors choose TV as the main digital medium for receiving information and for being up-to-date with general news and (c) there are many governmental and third-party Web portals currently providing public information that may be leveraged by +TV4E platform [18]. In addition, the interview provided new inputs for the services tailored for Portuguese seniors unidentified during the exploratory literature survey.

Then, the first draft version of the taxonomy was composed based on the compiled services list built during the exploratory phase as well as the contributions noted from the interview (see Fig. 1). This first draft version counted with three different domains of information: (a) Healthcare services, (b) Social services and (c) Financial services. Local (nearby) services listed during the literature research were distributed all over these three domains. In addition, some services were categorized as part of more than one domain (e.g. hospital social tariffs are both part of healthcare and financial services).

3.2 Focus Group with Experts

A focus group may be treated as a mix of participant observation and in-depth interview to characterize participants' perceptions, spontaneous opinions and attitudes [32]. It is a very useful tool for getting information about how people or a group of people think about certain topics in a session moderated by an element with experience and leadership ability.

In the context of +TV4E project, a focus group with experts in public policies development in Portugal played a key role to assess services, activities and social programs available for elderly in the country. Then, this two hours long focus group

occurred in October 2016 and was formed by four research experts, three researchers of +TV4E project with expertise in designing technologies for seniors and one moderator.

Even though it is a challenging and time-consuming task, it is highly valuable to promote and learn from discussions and debates of professionals with know-how in different fields of knowledge. Concerning the peculiar inter-disciplinarity of the +TV4E project as well as the concepts covered by it, this focus group was developed with four professionals from different areas:

- a senior academic researcher on the relationship between new information and communication technologies and people/organisations;
- a researcher with background in gerontology, with research works in technology assessment for the elderly, including Ambient Assisted Living products and services, and in the field of assistive technologies use and evaluation of human functioning and environmental factors using the International Classification of Functioning, Disability and Health;
- a senior researcher and specialist in public policies planning and development; territorial governance; and economic, social and territorial impacts of Information and Communications Technologies;
- a gerontologist working in a Portuguese town hall, in the social action office, with responsibilities ranging from interventional planning to action and/or referral of problematic social situations of the elderly population.

The main purpose of this focus group was to validate the first draft of taxonomy, which was subjected to extensive review and analysis of the experts. Firstly, the participants were introduced to the main objectives of the +TV4E project. Then, the focus group was divided in four parts: (1) an initial brainstorming on the information needs of Portuguese seniors, where the participants were motivated to think about which services, resources or activities entrusted to the government they would like to receive information on TV by filling the sentence: “*If I were a senior, I would like to see on my TV the following information regarding SGI...*”; (2) validation of the service list which composed the first draft of the ASGIE taxonomy; (3) validation of the information sources, previously defined, for each of the domains of information, and (4) validation of the ASGIE concept.

Considering the objectives of the current study, the main contributions of this focus group consisted of a series of insights to reformulate the first drafted taxonomy. The experts stated that it would be necessary to come up with more than three domains of information to cover all the possible activities and social programs provided by Portuguese government authorities. Hence, the inputs gathered from these experts enabled the creation of a second draft version of the taxonomy containing seven domains of information that would be of interest of the Portuguese elderly: (a) Health Care and Welfare Services; (b) Social Services; (c) Financial Services (taxes and fees); (d) Culture, Informal education and entertainment; (e) Security services; (f) Transport services, and (g) Local authority services. These domains were formed by services, activities and social programs regulated by Portuguese authorities to benefit senior citizens. This second draft version supported the next phase and guided the survey with 23 seniors that have been already recruited to take part in the participatory design process of +TV4E project.

3.3 Survey with Seniors

Participatory design techniques are vital to research and development projects since they involve potential target users enabling a more adapted and personalized approach to improve engagement with the developed solutions. So, as a final step of the current study, involving seniors who can benefit from the +TV4E platform granted the drafted taxonomy relevance and validity.

As it is challenging to elicit valid and useful inputs from seniors in designing innovative concepts [33], a simple survey based on the second drafted taxonomy was carried out with 23 seniors. This sample was recruited in Aveiro (Portugal) and neighbouring cities. This survey occurred in November 2016, and had the list of services, activities and social programs addressed in previous phases. Thus, based on their information needs, seniors were asked to classify every item in a total of 30 items, in the list according to three levels of importance (1 = not important, 2 = important and 3 = very important). An analysis of the results achieved is presented in the Results and Discussion section.

Surveys helped to quantify interests of seniors regarding the services that comprise the taxonomy proposed by this study. The final version of the *Assistance Services of General Interest for Elderly* (ASGIE), which was the result of the preliminary literature review and the application of three research methods, is presented and discussed following.

4 A Taxonomy of Assistance Services for Seniors in Portugal

Created considering the context of SGI tailored for old citizens of Portugal, the concept of *Assistance Services of General Interest for Elderly* (ASGIE) comprehends services, activities and agreements assumed to be of essential importance to elderly citizen welfare, quality of life and social inclusion, as well as to inform about civil rights and obligation regarding public authorities. It includes all SGI related to support the elderly in Instrumental Activities of Daily Living (IADL), which are the tasks needed to enable seniors to live independently (e.g. managing finances, handling transportation and health care).

From the ASGIE concept, a taxonomy formed by seven domains was derived. These domains were organized according common interests of senior citizens regarding services, activities and social programs provided by public authorities (Fig. 2).

The taxonomy organization in domains and sub-domains, is topic-based and not necessarily “service provider”-based. In other words, this organization considers the kind of benefit obtained by the seniors and not the service provider. Therefore, each domain comprises a range of information considered to be relevant for the elderly daily activities and quality of life in a specific area. The seven domains are: Health Care and Welfare Services; Social Services; Financial Services; Cultural Services; Security Services; Transport Services and Local Authority Services.

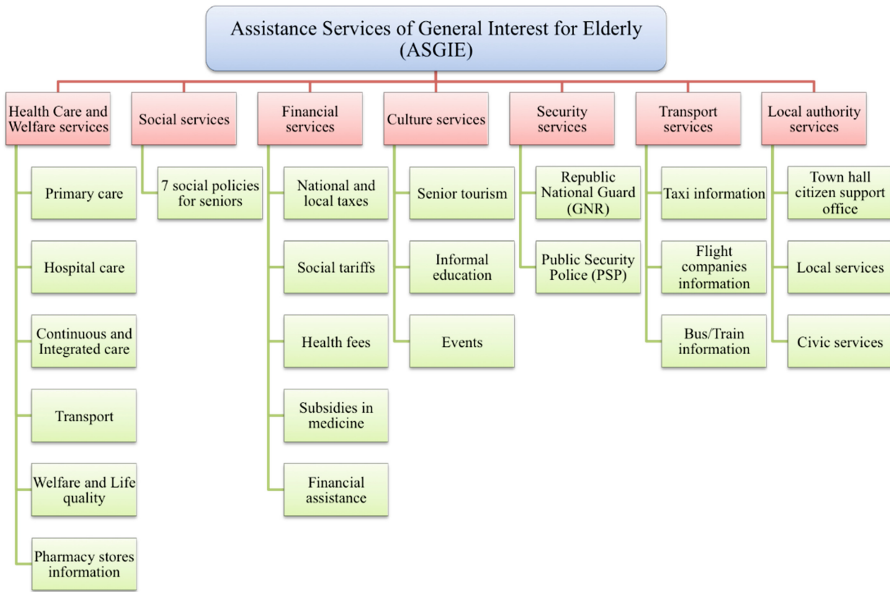


Fig. 2. The ASGIE taxonomy domains of information [10].

The **Health Care and Welfare Services** domain comprehends services, activities and social programs related to health management, divided in six areas:

- **Primary Care** – general practitioner consultation at the health centre and health promotion, such as vaccine programs and preventive methods.
- **Hospital Care** – emergency arrangements, urgency and specialized medical attendance at hospital facilities.
- **Continuous and Integrated Care** – promotion of care in an integrated manner, continuous treatment of chronic diseases, situations of dependency and loss of autonomy.
- **Transport** – emergency and continuous treatment transports.
- **Welfare and Life Quality** – healthy ageing recommendations.
- **Pharmacy Stores** – information regarding nearby pharmacies (addresses, timetables and discounts).

Concerning the **Social Services**, these play an important role in European societies by contributing to social protection and social inclusion. Considering the context of Portugal, this domain is composed by the **Seven Social Policies for Seniors**: home care services, social living centre, day care centre, night care centre, host family, nursing homes, leisure activity centres.

Portuguese authorities have several social specific measures to help lower income persons and elderly to benefit from public services. In this scenario, **Financial Services** have social programs, including lower **National and Local Taxes** (e.g. IRS², IRC³, IMI⁴, IUC⁵), **Social Tariffs** (discounts on water supply, telecommunications, electric, and natural gas bills, transport fares, and cultural tickets)⁶, lower **Health Fees** (co-participation fees charged for using the Public Health System), **Subsidies in Medicine** and **Financial Assistance** (e.g. pensions, social security and complementary security income).

Culture Services are important for preventive health promotion as they support citizens staying active and functional for longer. These services, activities and social programs include **Senior tourism** trips; **Informal Education** courses – often provided by the Portuguese Senior Universities (www.rutis.pt); and **Events** (e.g. recreational, leisure and cultural activities).

Considering the Portuguese context of SGI tailored for old citizens, **Security Services** are composed by social programs, alerts and advices promoted by the **Republican National Guard (GNR)** and the **Public Security Police (PSP)**. Likewise, the domain of **Transport services** comprises **Taxi Information, Flights Information** and **Bus/Train Information**.

Finally, the **Local Authority Services** are composed by services, activities and social programs promoted by the local authority. These services are responsible for the **Town Hall Citizen Support Office** (local representative of the central power), **Local services** (exclusively services and programmes provided by the local authority), and **Civic Services** (e.g. volunteering networks).

Lastly, it is worth to mention that some services, activities and social programs may be transversal to more than one domain of information, but, for the sake of simplicity, they are mentioned in one domain only. For example, specific **Health fees** and **Subsidies in Medicine** are programs concerning the domains: **Health Care and Welfare Services, Social Services** and **Financial Services**. Also, **Social Tariffs** and **Financial Assistance** are programs transversal to both domains: **Social Services** and **Financial Services**.

5 Results and Discussion

The European Commission (EC) defines guidelines to foster homogeneity among the Member States, but the implementation itself of public policies is a role of every Member State. Hence, considering that it is a role of every local government to define, organize, finance and monitor their own SGI, the ASGIE concept proposed in this work

² Portuguese individual income tax.

³ Portuguese corporate income tax.

⁴ Portuguese municipal property tax.

⁵ Portuguese motor vehicle property tax.

⁶ Social Tariffs are measures launched by the Portuguese Government in order to guarantee access to the essential services taking into account socioeconomic inequalities.

is based on specific services, activities and social programs available for Portuguese elderly. Moreover, as Portugal is a Member State of the EU, some coincidences of services, activities and social programs listed in the taxonomy may be noticed in other European countries. Also, to clarify what is provided or regulated by public authorities as well as to avoid any misunderstandings on the *public* word, the ASGIE concept uses the same terminology of “general interest” created by the EC.

Though no specific studies on information needs of Portuguese seniors were found, studies conducted by researchers from other countries reveal trends of information demanded by this population segment. These studies contributed to define a first draft of the ASGIE taxonomy. In addition, as noticed during the literature survey, services, activities and social programs related to **Healthcare and Welfare Services**, **Social Services** and **Financial services** are often mentioned by seniors when it comes to their information needs. Afterwards, discussions with research specialists in welfare promotion and public policies development helped to evolve the ASGIE concept by adding four more domains: **Culture Services**, **Security Services**, **Transport Services** and **Local Authority Services**.

To check the validity of the ASGIE concept and taxonomy it was conducted a survey with seniors recruited in the context of the +TV4E project, which helped to quantify their interests regarding the services, activities and social programs that form the taxonomy. Respondents were asked to score a list of 23 items (sub-domains) using a Likert scale with 3 levels of importance (1 = unimportant, 2 = a bit important and 3 = very important). The analysis based on *Mean* and *Standard Deviation* (SD) of the collected data is presented on Table 1. The sample addresses a total of 23 respondents, who were recruited by convenience. The female gender represented 56.5% of the sample ($n = 13$), and male 43.5% ($n = 10$). The ages ranged from 62 to 77, with an average of 69 years old. Almost all items listed in the survey were classified as important, with average of 2.1 points or more. Particularly, services, activities and social programs belonging to **Healthcare and Welfare Services**, **Social Services**, **Financial Services** and **Security Services** domains were considered very important (as depicted in Table 1). This result indicates that these domains may be considered as having essential information for daily living of seniors. The information domain considered as less important was the **Transport Services**, maybe because public transportation is not a common choice of seniors or, perhaps, because they often depend on family members and caregivers to get around. At the end of survey the respondents were able to propose additional services, activities or social programs but nobody used this field, which indicates the completeness of the taxonomy.

Categorizing information regarding SGI tailored for the Portuguese elderly is a key aspect of +TV4E project. Organizing this information according to parameters that would reflect preferences and needs of elderly is a prerequisite for a proper content selection. In this way, for example, the +TV4E iTV platform will deliver to users who are interested in the local authority roles, informative contents related to the domain of **Local Authority Services**. Thus, the content selection and matching with user preferences will be supported by the content recommender system of the +TV4E platform using the taxonomy proposed in this study [20, 21].

Table 1. Descriptive analysis of data collected in surveys with 23 seniors [10].

ASGIE domains and sub-domains of information	Mean	SD
<i>Health care and welfare services</i>		
Primary care	3.0	0.00
Hospital care	2.5	0.59
Continuous and integrated care	2.6	0.74
Transport	2.7	0.45
Welfare	2.6	0.50
Pharmacies	2.3	0.69
<i>Social services</i>		
Social support and programs	2.7	0.47
<i>Financial services</i>		
National and local taxes	2.6	0.50
Health fees	2.4	0.58
Subsidies in medicine	2.6	0.50
Social tariff	2.5	0.60
Financial assistance	2.6	0.58
<i>Culture, informal education and entertainment</i>		
Senior tourism	2.7	0.48
Entertainment	2.2	0.81
Informal education	2.1	0.83
<i>Security services</i>		
National republican guard	2.6	0.59
Public security police	2.6	0.59
<i>Transport services</i>		
Taxi number by district	2.5	0.67
Number of public transport	2.5	0.67
Airlines contact	2.1	0.71
<i>Local authority services</i>		
Town hall citizen support office	2.1	0.68
Specific benefits of local authorities	2.3	0.63
Civic services	1.4	0.59

6 Conclusions and Future Work

Around 40 years ago Childers and Post [34] wrote that “probably one of the most serious problems facing elderly people today is the lack of information and knowledge about existing programs and the available community resources which could meet some of their needs” [34]. Though the number of information sources available may have been increasing over the past forty years, mainly due to improvements in information and communication technologies, the current study suggests that seniors still don’t access adequate information regarding services, activities and social programs they could benefit from.

This work aimed to provide a classification for SGI focused on the Portuguese elderly. Thus, this paper elaborates on a list of assistance services endowed by public authorities to old citizens and, considering the Portuguese context, proposes the concept and taxonomy of *Assistance Services of General Interest to the Elderly* (ASGIE).

To fundament and validate the ASGIE concept and the taxonomy, research experts in welfare promotion and public policies development were called to participate in an interview and a focus group. Contributions from these specialists served as guidelines to a survey conducted with 23 seniors. This survey allowed the validation of the relevance of the domains and sub-domains structuring ASGIE taxonomy.

In addition, as a future research study it is necessary to assess acceptable data sources regarding the ASGIE domains to retrieve information from. Though some contributions in this regard were noted during the interview and the focus group with specialists, a detailed study should be performed in a near future to gather adequate information about this topic. This is a very important subject as these sources will be used as feeds for the +TV4E platform to automatically generate video informative contents.

The reduced size of the sample of the survey may limit the significance of achieved results. Although it should not be overlooked that the findings show homogeneity and agreement, both across literature and the participants of this study, which gives consistency to the results that supported the proposed taxonomy. Thus, as future steps, the research team intends to extend the survey application, so that the results can be representative of the Portuguese population.

Findings from this research will be very valuable for the +TV4E project in its upcoming development stages towards a personalized system for the elderly, enhancing the probabilities of adherence and acceptance by its target users. An appropriate categorization of the informative contents handled by the iTV platform guarantees a proper implementation of the +TV4E recommendation system [21].

Finally, in order to accomplish the Europe 2020 guidelines for development of innovative Services of General Interest [9], Portuguese authorities in charge of designing, implementing and monitoring public policies for seniors can use these findings as indicators of information needs of this population segment. Furthermore, studies like this can be an asset to other countries to evaluate information needs of their senior citizens. Fulfilling seniors' information needs is essential to promote their health and quality of life.

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