



ACTIVE ADVICE

DECISION SUPPORT FOR INDEPENDENT LIVING



Decision Support Solutions for Independent Living using an
Intelligent AAL Product and Service Cloud

D4.8 Finalized service module prototypes

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1 Introduction

The ActiveAdvice project, aiming at creating an active advising and decision-support network across Europe, presents a collection on available AAL services and technologies, offered at regional, national and international level, which are stored in an Intelligent AAL Product & Service Cloud. The ActiveAdvice platform offers a number of service modules, each connected to a specific objective (information, advice, promotion). Since ActiveAdvice addresses three target groups, i.e. older adults and their relatives (AAL2C), businesses (AAL2B), and governmental agencies, like municipalities who determine the policy and services in the healthcare domain (AAL2G), these service modules are fitted to their particular needs. Thus, the ActiveAdvice platform becomes an integrated communication tool which can also bridge the gaps between these different stakeholders and integrate the whole AAL stakeholder ecosystem.

This document builds on *D4.3 Service Modules Status Report*, which described both the service modules themselves and the status of their implementation, updating on the development and presenting the final service modules. All service modules were based on the research conducted in WP2, analysing the different users' needs and requirements. This report is the result of the development activities, and, more specifically, of *Task 4.3: Programming of ActiveAdvice service modules, gateways and a product and service decision support system*, during which, based on the results of WP2 and WP3, service modules, gateways and decision support logics were programmed for all relevant end user groups. This report, therefore, documents all decisions taken during the development process.

1.1 Connection to other WPS

Describing the ActiveAdvice service modules, this deliverable is connected to a number of tasks within the ActiveAdvice project. First, it is based on the user requirements which were analysed in WP2 (described in deliverables *D2.2 Stakeholder and Target Groups Report* and *D2.3 User requirements, decision workflow and use cases report*) and transferred into technical requirements in WP3 (described in deliverables *D3.1 ActiveAdvice environment concept*, *D3.2 Technical framework and requirements specification including mock-ups* and *D3.3 Content structure and decision support logic report*).

Furthermore, the user feedback gathered in WP5, more specifically in task *5.3 Perform usability and user experience tests, feedback loops and surveys with selected end users and validate the prototype*, consisting of multiple testing loops with end users from different target groups. Therefore, this report is also closely connected to task 5.1, which consists of the deployment of a functional and responsive web-based demonstrator including end-user customization.

Lastly, this deliverable is closely connected to task 6.3: *Elaboration of a business plan with revenue model specifications and sustainable marketing measures*, as both the user feedback (WP5) and the decisions with regards to the exploitation strategy influence the development, as outlined below. Therefore, there is a close connection to *D6.6 Updated Business plan including revenue model specifications and marketing measures*.

2 ActiveAdvice service modules

A number of service modules planned within the ActiveAdvice project, some of which are already outlined in the proposal and specified in detail during the requirements analysis. As mentioned above, the ActiveAdvice service modules address three main stakeholders: older adults and their relatives (AAL2C), businesses representatives (AAL2B) and government representatives (AAL2G). The functionality and the individual modules of the ActiveAdvice platform are based on the outcomes of the user requirements analysis. The three user groups targeted by ActiveAdvice share requirements for basic functionalities such as a desire to gather comprehensive information on AAL products and services and a holistic market overview being offered. At the same time, there are also stakeholder group-specific requirements: For example, consumers and government representatives both share a need for comprehensive information and decision support, as well as community exchange and feedback. Such a feedback function, especially when connected to a rating and review functionality, however, is in contrast to the business representatives' needs, as they showed a preference to 'privately' (i.e. not in a public sphere contact) in contact with their customers.¹ Based on these user requirements, the ActiveAdvice platform provides three main functionalities aimed at the three target groups (see Table 1).

Table 1: Main goals and functionalities of the ActiveAdvice platform

Objective	Functionality
Information	Providing up-to-date information on AAL products and services.
Advice	Offering feedback, advice and decision support.
Promotion	Giving businesses the opportunity to present their products and services.

Based on these requirements and the main functions deduced from them, the ActiveAdvice service modules were developed. The need for information (and, at a later stage, knowledge exchange) is met in the ActiveAdvice Awareness & Information Hub, while the need for advice is met with the different digital (and, ultimately, human) advisors. Core functionality is the digital advice and decision support. Guidelines, use cases and use stories in order to illustrate AAL products and services are offered both in the Awareness and Information Hub and with the previously called "Category Advisor".

The ActiveAdvice Service Modules, as outlined above, can roughly be divided into three categories: (i) Information Modules; (ii) Advice Modules; and (iii) Promotion Modules.² Among the stakeholder groups, these have different priorities. Primary stakeholders, i.e. clients/consumers, are looking for three main functionalities: (i) digital advice; (ii) guidelines, use cases and use stories; and (iii) review and rating (feedback function). Businesses, on the other hand, are looking for (i) vendor & product profiles to upload information about products and services they offer; (ii) consumer contact and consumer interaction to collect feedback in a "private" sphere; and (iii) promotion and networking, to provide up-to-date information on their products and services. Governments, on the other hand,

¹ See in detail in D2.2 Stakeholder and Target Groups Report, available at http://project.activeadvice.eu/wp-content/uploads/ActiveAdvice_D2.2-Statekeholder-and-Target-Groups-Report_revision.pdf, and D2.3 User requirements, decision workflow and use cases report; see also A Multi-perspective View on AAL Stakeholders' Needs - A User-centred Requirement Analysis for the ActiveAdvice European Project, available at <http://www.scitepress.org/DigitalLibrary/PublicationsDetail.aspx?ID=h6YnwwJ96Mk=&t=1>

² For more details about the connection to the users' requirements, see D4.3 Service Modules Status Report.

showed a need for the following three service models: (i) guidelines, use cases and use stories; (ii) accessibility guides and awareness sheets; and (iii) a knowledge channel providing insights in e.g. costs, procurement rules, information about the (successful) implementation of AAL solutions etc.

In the following, an overview of the planned and realized service modules and their target groups is given, before they are described in detail and decisions in the development are outlined.

Table 2: ActiveAdvice overview of planned service modules

Service Modules		Targeted End-Users
Information Modules	Awareness & Information Hub	AAL2C, AAL2B, AAL2G
	Review & Rating	AAL2C (AAL2B, AAL2G)
	Showcase & Expert Finder	AAL2C, AAL2G
	Accessibility & Awareness Guides	AAL2G (AAL2C, AAL2B)
Advice Modules	Catalogue Advisor	AAL2C, AAL2G (AAL2B)
	Category Advisor	AAL2C, AAL2G (AAL2B)
	Product & Service Advisor	AAL2C, AAL2G (AAL2B)
	Product Locator	AAL2C, AAL2G
Promotion Modules	Product & Service Cloud (database)	AAL2B
	Customer Contact & Interaction	AAL2C, AAL2B
	Payment Module	AAL2C, AAL2B, AAL2G
	Vendor, Product & Service Profiles	AAL2C, AAL2B, AAL2G

2.1 Information modules

Information modules are mainly aimed to provide consumers and governments with much-needed information about AAL solutions, both products and services, that allow them to address specific challenges within their individual context. At the same time, these modules allow businesses to provide information about their products and services in informing about new developments and solutions, thus guaranteeing the information provided is up-to-date and validated. Furthermore, businesses welcome awareness on AAL solutions in general and on their own solutions in particular. Lastly, information modules allow Authorised Active Advisors to share knowledge, e.g. in form of blog articles, and to provide testimonies, user stories or similar.

Through these knowledge channels, the ActiveAdvice platform also contributes to raising awareness on AAL in general and AAL products and services in particular; providing both an information feature and a first way for businesses to promote their products and services to a certain degree.

2.1.1 Awareness & Information Hub

Especially the AAL2C target group is in need of comprehensive and accessible information about solutions and assistive technologies; and especially when acting as advisors/consultants, government representatives value high-quality and up-to-date information. The ActiveAdvice Awareness & Information Hub provides information about use cases and user stories, as well as new products, market insights, AAL projects etc. in the following categories:

- **News & Information:** up-to-date information, providing the readers with the latest news about developments in the field of AAL and smart health in general;
- **Market & Insights:** insights on the latest developments in the market, especially about new products and emerging technologies;
- **Practices & Stories:** use cases and user stories, providing information about experiences with AAL products and services;
- **Products & Services:** The characteristics of certain products and services, as well as of certain product groups, are described in this section, thus giving an overview on existing solutions;
- **Concepts & Projects:** descriptions of current projects in the field of AAL and smart health are given; as well as new concepts developed in these projects, and other outcomes;
- **Community & Events:** Information about current and upcoming events and activities of the community, e.g. project activities, conference attendances etc., is provided in this category.

The ActiveAdvice Awareness & Information Hub was implemented in May 2017 and provides useful, marked-oriented and up-to-date information fitted to the ActiveAdvice target groups, available at <https://www.activeadvice.eu/>. Regular blog posts from various experts within and outside of the project consortium, as well as articles by the AAL Market Observatory, ensure ongoing and constant information flow.

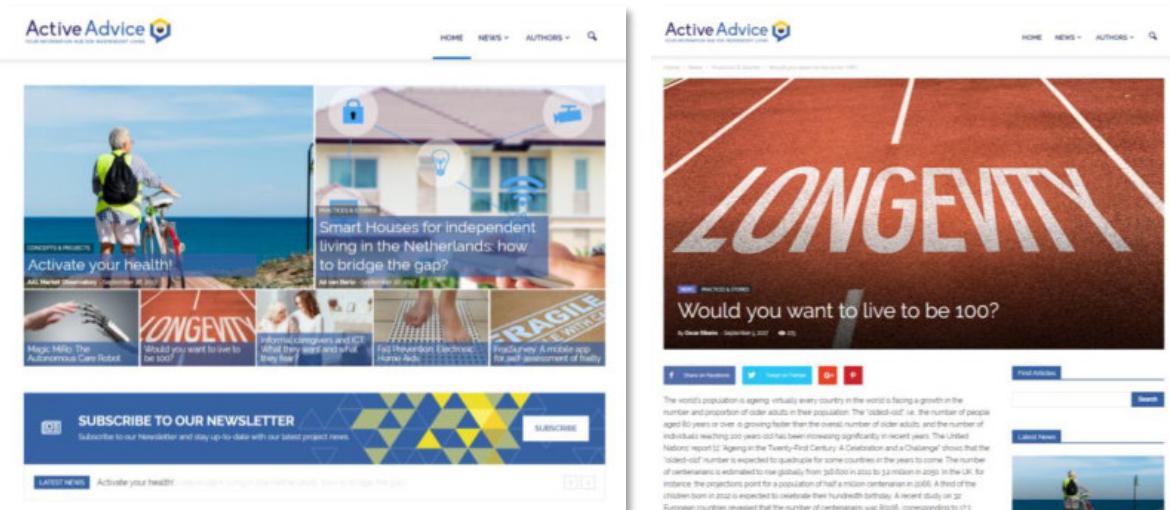


Figure 1: ActiveAdvice Awareness & Information Hub

Articles are about 500 words long and contain both text and images to showcase the respective topic. Furthermore, keywords are added for search engine optimization. Since the implementation of the platform, 90 blog articles have been published by a total number of 21 different authors both within and outside of the consortium, with a total of 18 articles provided by the AAL Market Observatory. As an ongoing process, the consortium invites external experts to write articles. Since May 2017, a total of 9.170 visits were registered to the Awareness & Information Hub. This means about 17 visits a day over the total time and almost 24 visits per day since 2018.

The Awareness & Information Hub furthermore provides a first possibility to gather knowledge about experts: The author view provided within the Awareness & Information Hub lists all authors, most of which are experts within the field of AAL and smart health. When clicking on the profile of a specific author, a short description as well as the articles written for the Awareness & Information Hub are displayed, hinting at the area of expertise a certain expert can offer.

2.1.2 Accessibility Guides

The Accessibility Guides were defined as documents to provide information and showcase retrieval for best practices and knowledge on inclusive design and construction, whether for buildings or for websites. This is mainly important for the government target group, but can also be of relevance for clients and businesses. Defined as such, the consortium decided to focus more on the information aspect, aiming to provide compact knowledge about AAL solutions, exemplary or best practice solutions.

The consortium selected three suitable topics for these guidelines in a workshop during the consortium meeting in Manchester: (i) Dementia (and dementia-friendly products)³, (ii) volunteering⁴, and (iii) travelling and journeys⁵. Our aim was to cover three different, but at the same time relevant topics to older adults and their relatives as well as governmental representatives and businesses. Usage of simple language was identified as important for all target groups, as well as a storytelling style and a link to ActiveAdvice itself (especially where products are mentioned). In line with this aim to ensure plain and simple language, the name was changed from “Accessibility Guides” to “ActiveAdvice Guidelines”.

The template was optimised for usage online, but it is also printable. The three guidelines were created until August 2018, and disseminated online via the project website and the Awareness and Information Hub (with a total of almost 500 views since their publication) as well as at the AAL Forum 2018.



Figure 2: ActiveAdvice guidelines

³ ActiveAdvice Guidelines: Dementia. <https://project.activeadvice.eu/wp-content/uploads/Accessibility-Guide-Dementia-web.pdf>

⁴ ActiveAdvice Guidelines: Volunteering. <https://project.activeadvice.eu/wp-content/uploads/Accessibility-Guide-Volunteering-web-2.0-1.pdf>

⁵ ActiveAdvice Guidelines: Travelling & Journeys. <https://project.activeadvice.eu/wp-content/uploads/Accessibility-Guide-Travelling-web-2.0.pdf>

2.2 Advice modules

Within the ActiveAdvice framework, the advice is provided both, digitally and via so-called “Authorised Active Advisors”⁶. Initially, three modules within the category “Advice” were planned, aiming to support especially clients and governments in finding the right solutions, but also providing businesses with relevant insights about product comparability; and allowing them to add their products and services to the Intelligent AAL Product & Service Cloud. Though mainly addressed at the target groups which are in need for information about relevant solutions, i.e. AAL2C and AAL2G, the digital advisors also provide information to businesses which want to enter or expand their existing AAL business field.

In total, three demonstrators have been created to pilot and test the ActiveAdvice solution, aiming to improve the framework step by step based on the users’ feedback.⁷ In addition to the user tests, feedback from the Expert and Advisory Board has been collected in two iterations⁸, as well as from participants at two workshops at the AAL Forum 2017⁹. In general, some functionalities have been questioned, other have been reinforced and improved.

2.2.1 Category advisor / scenario search / “my situation”

The main functionality of the initially called “Category Advisor”, as described above, is to guide the user from her specific challenge or problem – her individual situation, in short – to the product category that provides a solution to this situation. In a next step, using the Product Advisor (see Chapter 2.2.2), the user is guided to the best product for her needs. The main aim of this is showing the user the type of product (or service) that can support her specific situation.

Initially named “Product and Service Selector”, then “Category Advisor”, the consortium put a lot of thought in the naming for this module. Despite the “problem-based” approach, the usage of the word “problem” was avoided, as not to reinforce a negative image of ageing, or to stigmatise older adults looking for solutions. Furthermore, the word “category” seemed to cause further confusion, as it blurred the distinction between the scenarios and the product categories. After using the idea of “use case search”, which still seemed to be confusing, the consortium chose “scenario search” for the second loop of testing. This, however, still was confusing to many users. For the final demonstrator, therefore, the naming was changed to “my situation”.

This module is based on the TAALXONOMY classification system¹⁰, which consists of eight main use cases (scopes of application) and 43 scenarios (areas of application). The different use cases guide the user from an initial scope to a scenario to the relevant product categories. To distinguish this module from the product categories, illustrations that show each scenario were created.

⁶ See D3.4 Human advisor workflow and authorisation process guideline and D5.5 Training event participation and finding report for more information.

⁷ For more information, see D5.3 Usability test report loop 1 and D5.3 Usability, feedback and survey report.

⁸ Two meetings with the EAB took place: 02 October 2017 | Coimbra (present members of the EAB: Francesca Cesaroni, Georg Aumayr); 09 June 2018 | Antwerp (present members of the EAB: Francesca Cesaroni, Roland Pouillie, Willeke van Staalduin)

⁹ Workshop 12 “How to make the process of UCD easier in AAL projects: increasing adoption through UCD” and workshop 13 “Building trust and confidence in the performance of the AAL marketplace”, see also <https://www.aalforum.eu/previous-forums/aal-forum-2017/>

¹⁰ <http://www.taalxonomy.eu/>

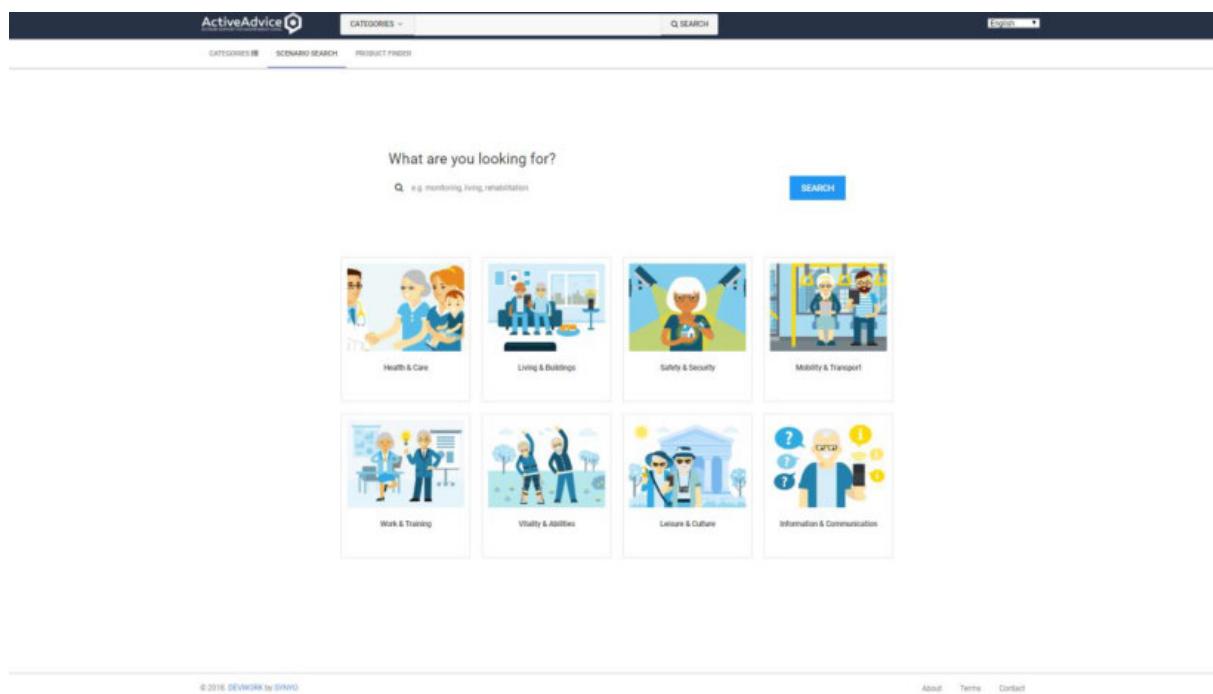
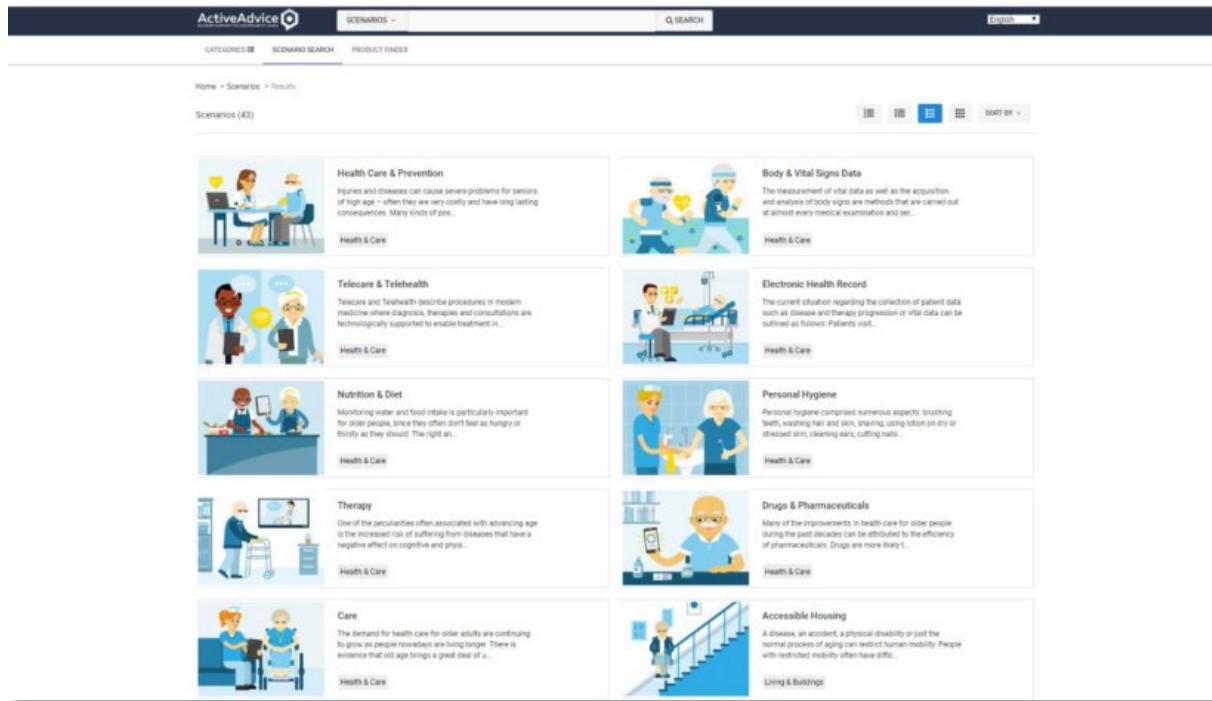


Figure 3: Overview of the TAALXONOMY main categories

As shown in Figure 3, the eight main use cases of the TAALXONOMY are the first step of the Category Advisor.

- **Health & Care:** comprises products and services which collect and manage medical data, which support therapy and care activities, as well as those assisting in nutrition and personal hygiene.
- **Living & Building:** covers products and services for water and energy supply, light management, room climate as well as measures for designing barrier-free rooms, as well as maintenance and access control.
- **Leisure & Culture:** consists of products and services which enrich or enable recreational activities in leisure time and cultural activities. Sports, media and games are covered, as well as the essential requirements for independent living.
- **Vitality & Abilities:** comprises products and services that support, train or enable basic physical, mental and social abilities that are the essential requirements for independent living.
- **Mobility & Transport:** consists of products and services that on the one hand serve as transportation measure for persons or goods, and on the other hand offer travel information, navigation and orientation solutions.
- **Work & Training:** Participation in the working life is covered by the category Work & Training. It contains work supporting measures, and products and services for job-specific learning and training.
- **Safety & Security:** contains products and services which prevent damages and burglary, or which support the user in case of falls. Furthermore, localisation and emergency management are part of this category.
- **Information & Communication:** comprises products and services which on the one hand present knowledge and offer advisory functions, and on the other hand support and enable interpersonal communication and organisation of daily living.

When selecting one of these use cases, the corresponding scenarios for each category show up, allowing to make the selection more precise. A total of 43 scenarios are distributed among the eight main categories of the TAALXONOMY.

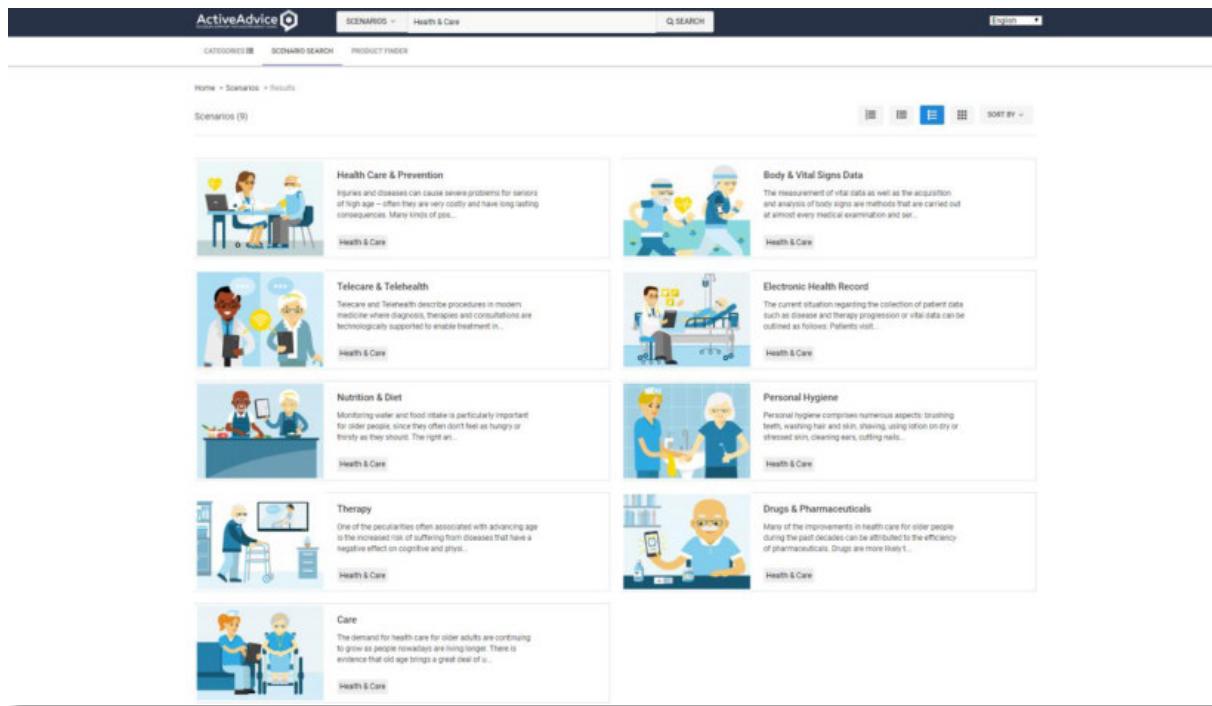


Category	Scenario Title	Description
Health Care & Prevention	Health Care & Prevention	Injuries and illnesses can cause severe problems for seniors of high age – often they are very costly and have long-lasting consequences. Many kinds of... Health & Care
Body & Vital Signs Data	Body & Vital Signs Data	The measurement of vital data as well as the acquisition and analysis of body signs are methods that are carried out at almost every medical examination and set... Health & Care
Telecare & Telehealth	Telecare & Telehealth	Telecare and Telehealth describe procedures in modern medicine where diagnosis, therapies and consultations are technologically supported to enable treatment in... Health & Care
Electronic Health Record	Electronic Health Record	The current situation regarding the collection of patient data such as disease and therapy progression or vital data can be outlined as follows: Patients visit... Health & Care
Nutrition & Diet	Nutrition & Diet	Monitoring water and food intake is particularly important for older people, since they often don't feel as hungry or thirsty as they should. The right an... Health & Care
Personal Hygiene	Personal Hygiene	Personal hygiene comprises numerous aspects: brushing teeth, washing hair and skin, shaving, using lotion on dry or stressed skin, cleaning ears, cutting nails... Health & Care
Therapy	Therapy	One of the peculiarities often associated with advancing age is the increased risk of suffering from diseases that have a negative effect on cognitive and physi... Health & Care
Drugs & Pharmaceuticals	Drugs & Pharmaceuticals	Many of the improvements in health care for older people during the past decades can be attributed to the efficiency of pharmaceuticals. Drugs are more likely t... Health & Care
Care	Care	The demand for health care for older adults are continuing to grow as people nowadays are living longer. There is evidence that old age brings a great deal of... Health & Care
Accessible Housing	Accessible Housing	A disease, an accident, a physical disability or just the normal process of aging can restrict human mobility. People with restricted mobility often have diffi... Living & Buildings

Figure 4: TAALXONOMY scenarios

The TAALXONOMY category “Health & Care”, for example, consists of the following scenarios:

- **Health Care & Prevention:** Products and services for the prevention of risks and diseases, the early detection of diseases, and the rehabilitation and secondary treatment of patients.
- **Body & Vital Signs Data:** Products and services for the measurement and monitoring of body and vital data and its transmission and storage, as well as activity profiles and their analysis, the determination of the psychological status and threshold-based alarms.
- **Telecare & Telehealth:** Products and services such as teleconsulting, telediagnostics, telemonitoring, telerehabilitation, teletherapy and other telemedical services.
- **Electronic Health Record:** Products and services for the storage of patient information and the data exchange with health provider systems.
- **Nutrition & Diet:** Products and services for the preparation, dosage and intake of food and drinks, the monitoring of food and fluid consumption, and the nutrition and diet planning or assistance.
- **Personal Hygiene:** All devices for the support of personal hygiene such as washing, brushing teeth, bathing, shaving, showering and cutting nails.
- **Therapy:** All types of therapy such as behavioural therapy, heat/coldness therapy, photo therapy, dialysis therapy, pain therapy, electric stimulation therapy, communication therapy and movement therapy.
- **Drugs & Pharmaceuticals:** Products and services for the intake, administration, disposition, stability control, dosing and scheduling of medication and the information and warning about cross-reactions and contraindications of medication.
- **Care:** Care services, care information exchange and products for care documentation.

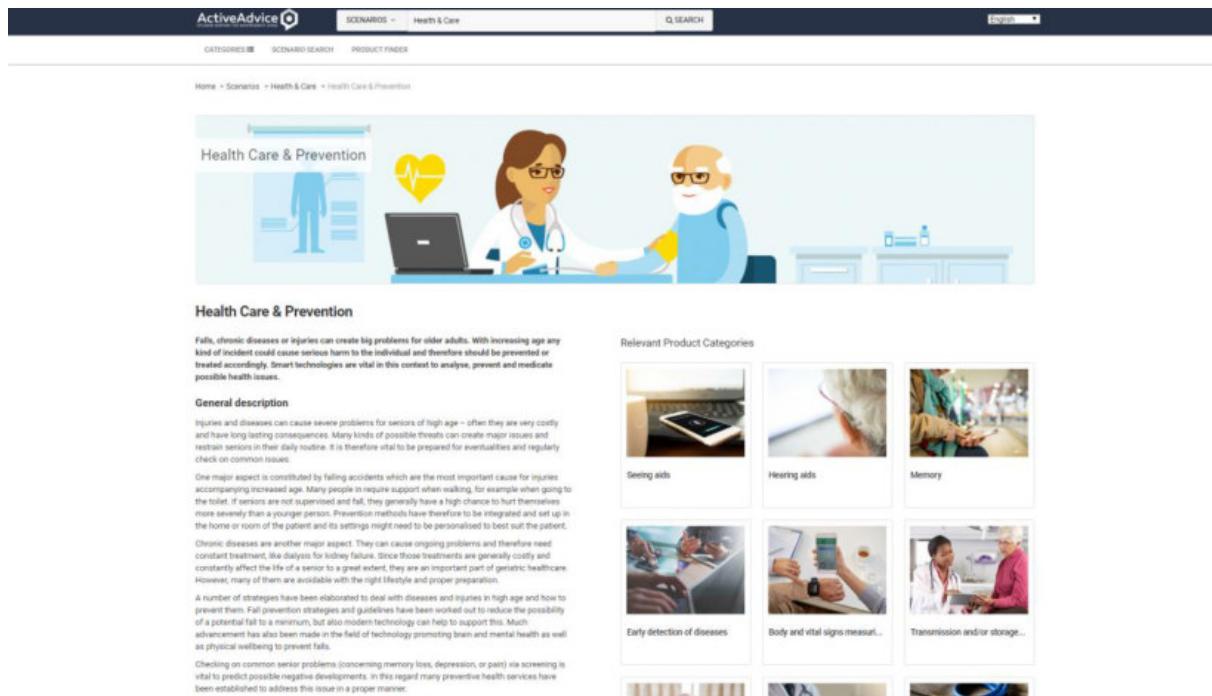


The screenshot shows a grid of nine scenario cards under the 'Health & Care' category:

- Health Care & Prevention:** Describes how injuries and diseases can cause severe problems for seniors of high age, often very costly and long-lasting consequences. Includes a small icon of two people at a computer.
- Body & Vital Signs Data:** Describes the measurement of vital signs as well as the acquisition and analysis of body signs. Includes a small icon of a doctor and a patient.
- Telecare & Telehealth:** Describes procedures in modern medicine where diagnosis, therapy and consultations are technologically supported to enable treatment in. Includes a small icon of a doctor and a patient.
- Electronic Health Record:** Describes the current situation regarding the collection of patient data such as disease and therapy progression or vital data can be outlined as follows. Patients visit. Includes a small icon of a doctor at a desk.
- Nutrition & Diet:** Describes monitoring water and food intake is particularly important for older people, since they often don't feel as hungry or thirsty as they should. The right diet... Includes a small icon of a doctor and a patient.
- Personal Hygiene:** Describes personal hygiene comprises numerous aspects: brushing teeth, washing hair and skin, shaving, using lotion on dry or stressed skin, cleaning ears, cutting nails... Includes a small icon of a person washing their hands.
- Therapy:** Describes one of the peculiarities often associated with advancing age is the increased risk of suffering from diseases that have a negative effect on cognitive and physi... Includes a small icon of a doctor with a patient in a wheelchair.
- Drugs & Pharmaceuticals:** Describes many of the improvements in health care for older people during the past decades can be attributed to the efficiency of pharmaceuticals. Drugs are more likely... Includes a small icon of a person holding a smartphone.
- Care:** Describes the demand for health care for older adults are continuing to grow as people nowadays are living longer. There is evidence that old age brings a great deal of... Includes a small icon of a nurse attending to a patient in a wheelchair.

Figure 5: TAALXONOMY category “Health & Care”

Each of these scenarios is described in a short article, comprising a general description, types and models, and target groups. Furthermore, relevant product categories, as well as relevant products, are suggested. Related scenarios are shown as well.



The screenshot shows the detailed description for the 'Health Care & Prevention' scenario:

Health Care & Prevention

Falls, chronic diseases or injuries can create big problems for older adults. With increasing age any kind of incident could cause serious harm to the individual and therefore should be prevented or treated accordingly. Smart technologies are vital in this context to analyse, prevent and medicate possible health issues.

General description

Injuries and diseases can cause severe problems for seniors of high age - often they are very costly and have long lasting consequences. Many kinds of possible threats can create major issues and restrain seniors in their daily routine. It is therefore vital to be prepared for eventualities and regularly check on common issues.

One major aspect is constituted by falling accidents which are the most important cause for injuries accompanying increased age. Many people in require support when walking, for example when going to the toilet. If seniors are not supervised and fall, they generally have a high chance to hurt themselves more severely than a younger person. Prevention methods have therefore to be integrated and set up in the home or room of the patient and its settings might need to be personalised to best suit the patient.

Chronic diseases are another major aspect. They can cause ongoing problems and therefore need constant treatment like dialysis for kidney failure. Since those treatments are generally costly and constantly affect the life of a senior to a great extent, they are an important part of geriatric healthcare. However, many of them are available with the right lifestyle and proper preparation.

A number of strategies have been elaborated to deal with diseases and injuries in high age and how to prevent them. Fall prevention strategies and guidelines have been worked out to reduce the possibility of a potential fall to a minimum, but also medical technology can help to support this. Medical alert systems also belong to the field of technology promising brain and mental health as well as physical wellbeing to prevent falls.

Checking on common senior problems (concerning memory loss, depression, or pain) via screening is vital to predict possible negative developments. In this regard many preventive health services have been established to address this issue in a proper manner.

Relevant Product Categories

Seating aids	Hearing aids	Memory
Early detection of diseases	Body and vital signs measur...	Transmission and/or storage...

Figure 6: TAALXONOMY scenario description

After selecting a specific scenario, the user is thus guided to the product categories attributed to this scenario, which, in a next step, will guide him/her to the Product Advisor.

2.2.2 Product advisor

Allowing to take the step from finding the right product category to the right product, the product advisor provides an overview of existing AAL products and solutions and a step-by-step guidance to the right product. The digital advisor starts with a certain product category (e.g. hearing aids) and guides the user to the product that fits his or her specific needs. Product categories were defined using the TAALXONOMY level 3.

The product advisor is built on a categorisation system that is comparable to other online product catalogues and e-commerce platforms to show users familiar categories. It is built on five main areas:

- ‘**Construction market**’ contains product categories related to home adaptation such as electric safety, fire safety, leakage detection, intrusion detection, etc.
- ‘**Medical care**’ contains products related to healthcare, such as hearing aids, fall detection sensors, body and vital signs measuring devices, etc.
- ‘**Electronics**’ contains electronic products such as social networks for older adults, home automation systems, localisation devices, etc.
- ‘**Leisure**’ contains products supporting leisure actives, such as memory aids or localisation divides.
- ‘**Living**’ contains products for home improvement such as home automation systems, gas monitoring, and others.

The described categories are not exclusive, a product might be found in more than one of them.

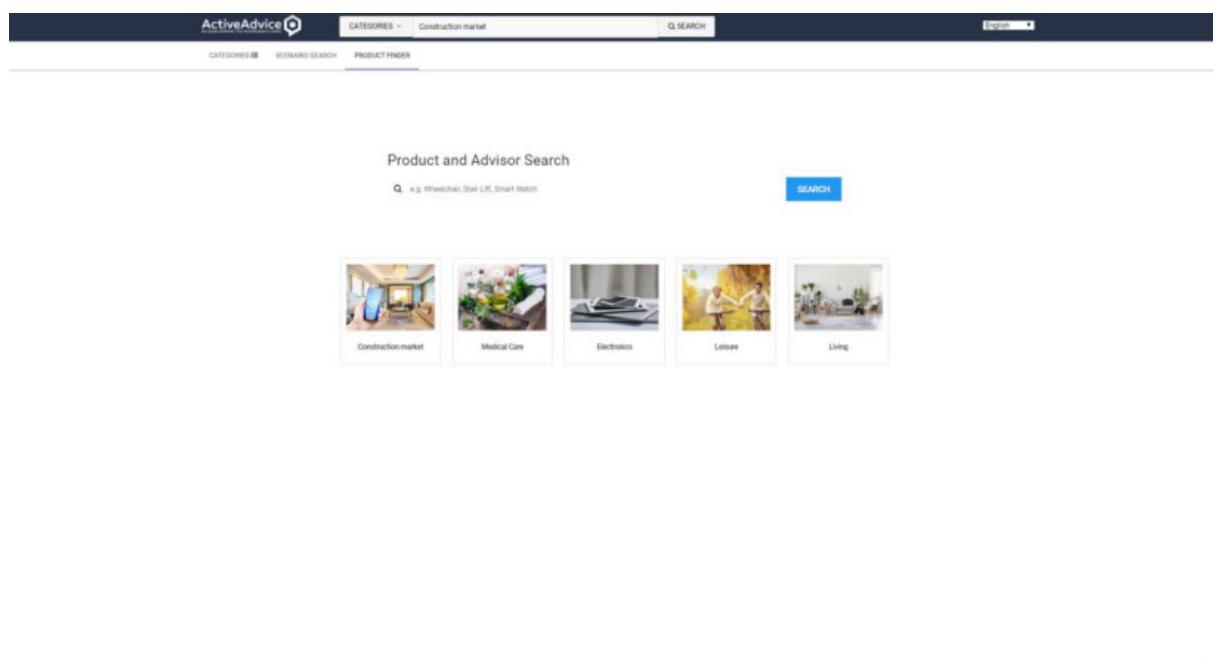


Figure 7: Product advisor search

In a first step, thus, this module allows the user to search for specific product categories and products within these categories. When searching the category “Medical care”, for example, 15 product categories can be found. Each product category has a short description, and show the number of products registered under this category. Furthermore, the product finder, i.e. the digital advisor, can be launched from this overview.

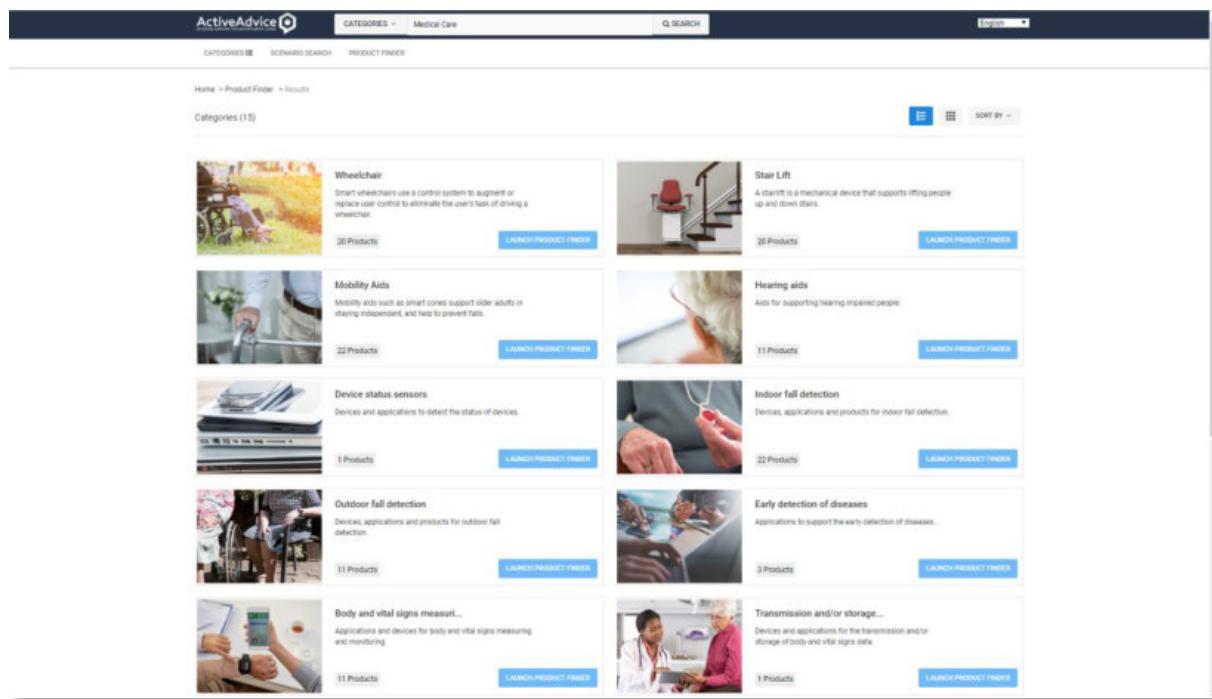


Figure 8: Product categories

Initially, a number of 108 product categories were identified, comparing existing databases on healthcare products or assistive technologies (e.g. Wegweiser Alter & Technik, EASTIN, etc.), as well as the TAALXONOMY. In a next step, the most relevant categories were selected from the TAALXONOMY level 3, which proved to be the most intuitive and helpful classification system.

TAALXONOMY ID	Category - Level 1	Subcategory - Level 2	Functions - Level 3	Products added	Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5	Attribute 6	Attribute 7	Attribute 8	Attribute 9
	Scope of Application	Field of Application	Case of Application										
T01-01	Health & Care	Health Care and Prevention											
5 T01-01-01		Prevention of Risks and Diseases											
6 T01-01-02		Early Detection of Diseases		3	Price movement sen...	Diet	Exercise	Genetic	Informative	Stimulating	motion sensor	memory foam	weight...
7 T01-01-03		Rehabilitation and Secondary Treatment										price	alarm
8 T01-02	Body and Vital Signs Data											battery opera...	portable s...
9 T01-02-01		Body and vital signs measuring and monitoring		8	Wearable	Analog	Digital	Heart Rate	Blood Press.	Respiratory	Wa...	Weight...	Notifications
10 T01-02-02		Telemedicine and Telemonitoring and Vital Signs Data											bluet...
11 T01-02-03		Activity Profiles and Profile Analysis		1	Heart Rate	Blood Pressure	Respiratory	Wa...					
12 T01-02-04		Determination of Psychological Status											
13 T01-02-05		Threshold-based Alarms											
14 T01-03	Telcare and Telehealth												
35 T01-03-01		Teleconsulting		0	Mobile applic...	Audio	Video	Text					
36 T01-03-02		Telediagnostics		0	Mobile applic...	Audio	Video	Text					
37 T01-03-03		Telemonitoring		2	Mobile applic...	Audio	Video	Text					
38 T01-03-04		Tele-rehabilitation and Teletherapy		0	Mobile applic...	Audio	Video	Text					
39 T01-03-05		Other Telemedical Services											
20 T01-04	Electronic Health Record												
21 T01-04-01		Storage of Patient Information											
22 T01-04-02		Data Exchange with Health Provider System IT											
23 T01-05	Nutrition & Diet												
24 T01-05-01		Preparation of Food											
25 T01-05-02		Portions of Food and/or Drinks											
26 T01-05-03		Intake of Food and/or Drinks											
27 T01-05-04		Monitoring of Food and/or Fluid Consumption		0									
28 T01-05-05		Nutrition and Diet Planning and/or Assistance		0									
29 T01-06	Personal Hygiene												
30 T01-07		Therapy											
31 T01-07-01		Behavioural Therapy											
32 T01-07-02		Heat therapy											
33 T01-07-03		Phototherapy											
34 T01-07-04		Dialysis											
35 T01-07-05		Pain Management											
36 T01-07-06		Electric Stimulation Therapy											
37 T01-07-07		Communication Therapy											
38 T01-07-08		Movement Therapy											
39 T01-08	Drugs and Pharmaceuticals												
40 T01-08-01		Intake and/or Administration of Medication		2									
41 T01-08-02		Disposition and/or Stability Control of Medication											
42 T01-08-03		Dosing and/or Scheduling of Medicine Intake											
43 T01-08-04		Information and Warning on Cross Reaction and Contraindication											
44 T01-09	Care												
45 T01-09-01		Care Services											
46 T01-09-02		Care Giver/Service Information Exchange		0									

Figure 9: Product category attributes & use cases

To select a number of initial categories for the demonstration, we made use of the database created during the project.¹¹ The reason for this approach was to select categories which can be easily filled with products, as identified (and already classified) in the collections.

For each category, the consortium defined relevant attributes such as “mobile application”, “two-way communication”, “GPS tracking”, “wearable” and others. These attributes were, first, collected, and, second, selected with a focus on the usage scenario and decision trees created during the development process. Based on these attributes, third, relevant questions for the advisors were elaborated, and, in a later step, refined.

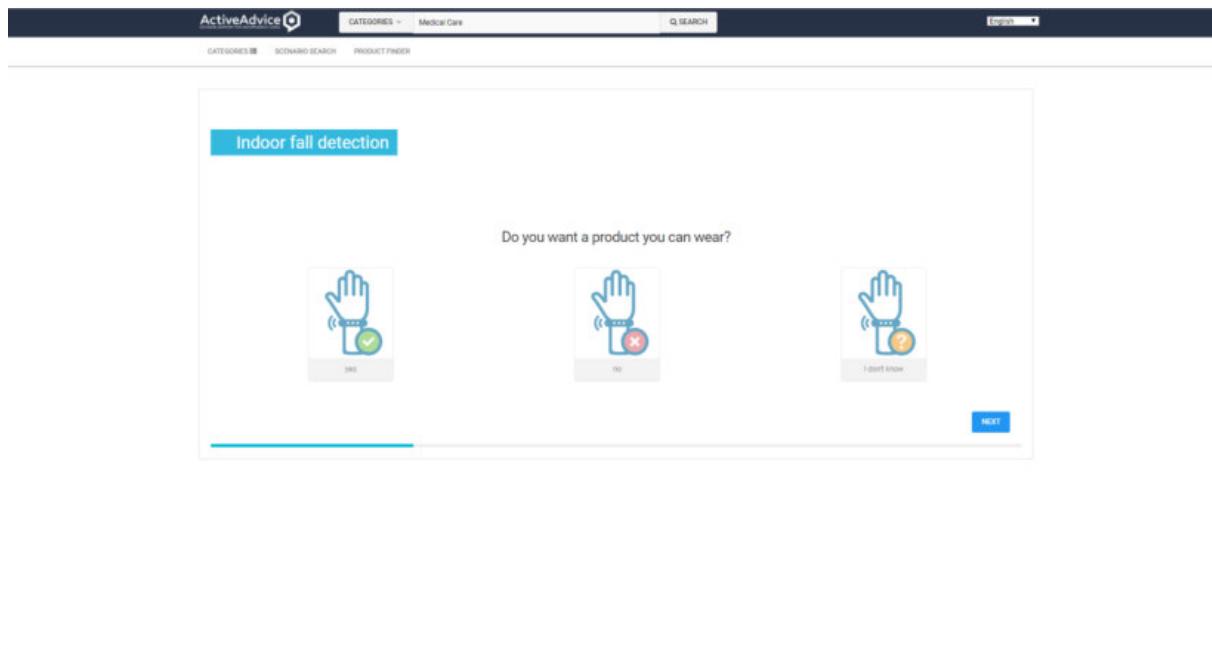


Figure 10: Advisor questions based on product attributes

Each digital advisor asks the user a number of questions (about 5-7), aiming to narrow down the number of products but still showing a relevant selection. Each question, as mentioned before, is based on the scenario/problem which is the starting point of the workflow. Furthermore, it was an important goal to keep the questions short and simple, use plain language and simple icons. Some issues were found in the first two demonstrators, e.g. the usage of a “next” button, not clear enough icons, or ambiguous questions. This feedback was taken into account for the third demonstrator.

After finishing all questions, the user is provided with an overview of relevant products. Each product can also be viewed in detail.

¹¹ See D2.4 Initial collection on relevant AAL solutions, services, product catalogues and solution providers and D2.5 Updated collection on relevant AAL solutions, services, product catalogues and solution providers.

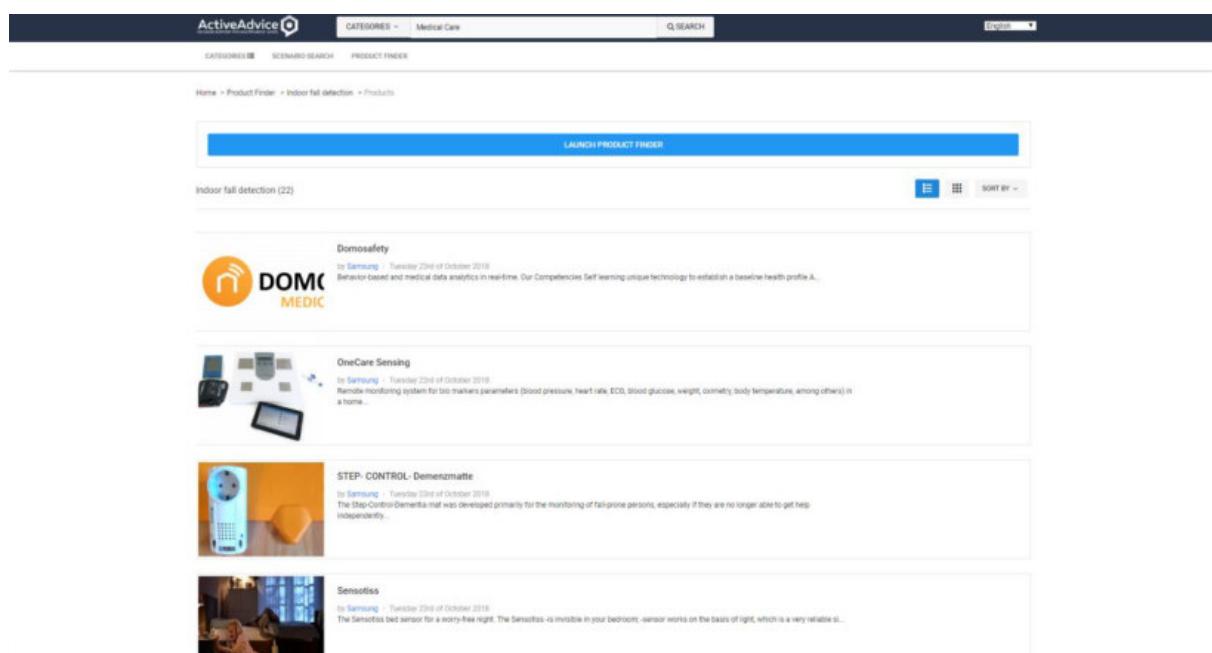


Figure 11: Suggested Products as final step of the product advisor

In addition to these two ways of structured or guided searching (scenario search, product search), users can use keywords to look for relevant products or scenarios. Furthermore, similar to the product advisor, advice about services can be implemented. However, as our initial database only contains products (which are, however, often connected to services, e.g. pendant alarms), we focused on products, the functionality nevertheless allows to add and guide the user to services.

2.3 Promotion modules

So-called “Promotion Modules”, as a third service module category, allow businesses to present their AAL products and provide information about them. This benefits AAL2C and AAL2G, who can retrieve up-to-date and useful information about the offered products and services. The ActiveAdvice solution, thus, creates awareness of the availability of AAL technologies and, at the same time, allows businesses to promote their products.

2.3.1 Product & Service Cloud: Administration Hub

The ActiveAdvice Intelligent Service & Product Cloud, realised in the Administration Hub, accumulates information about products and services fed into the system.¹² Businesses will be able to upload information on products and services they offer, including descriptions, links to vendors, and product images. As shown in **Error! Reference source not found.**, the Product & Service Cloud is designed in a flexible and scalable architecture, and structured on SQL, mainly based on Entry-Attribute-Value (EAV) structure. For the creation of a structure of databases suited for AAL products, services, expert knowledge and showcases, different catalogues are integrated, thus integrating data from already available repositories. The database structures are set out to handle AAL products, services, expert knowledge and showcases.¹³

¹² For more detailed information see *D4.2 Intelligent AAL Product & Service Cloud documentation*.

¹³ For more information see *D4.2 Intelligent AAL Product & Service Cloud documentation*.

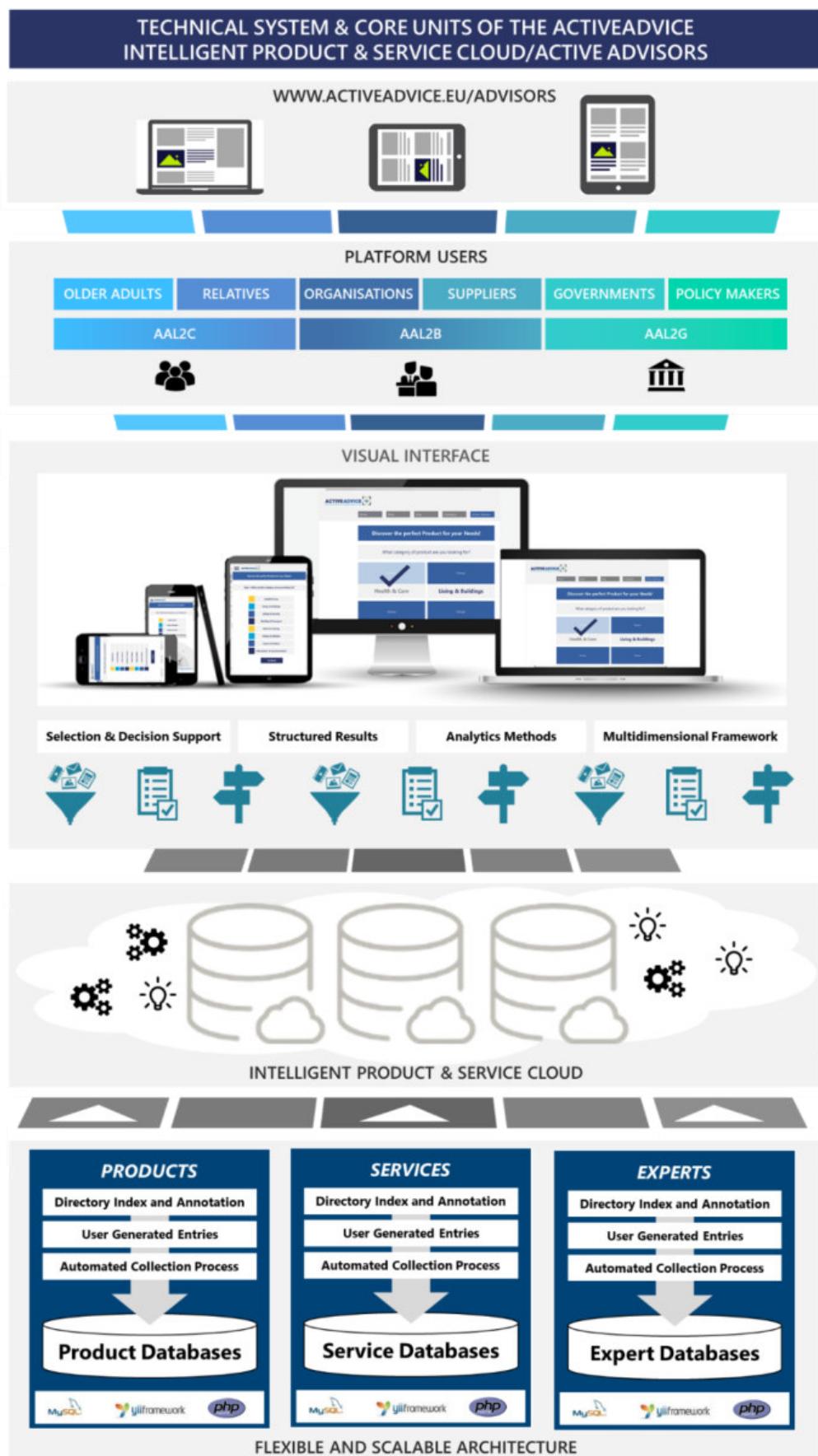


Figure 12: ActiveAdvice architecture

Within the Administration Hub, product providers, products, digital advisors, product categories, attributes etc. can be managed. This also allows to connect the Awareness & Information Hub to the digital advisory platform (see Figure 13).

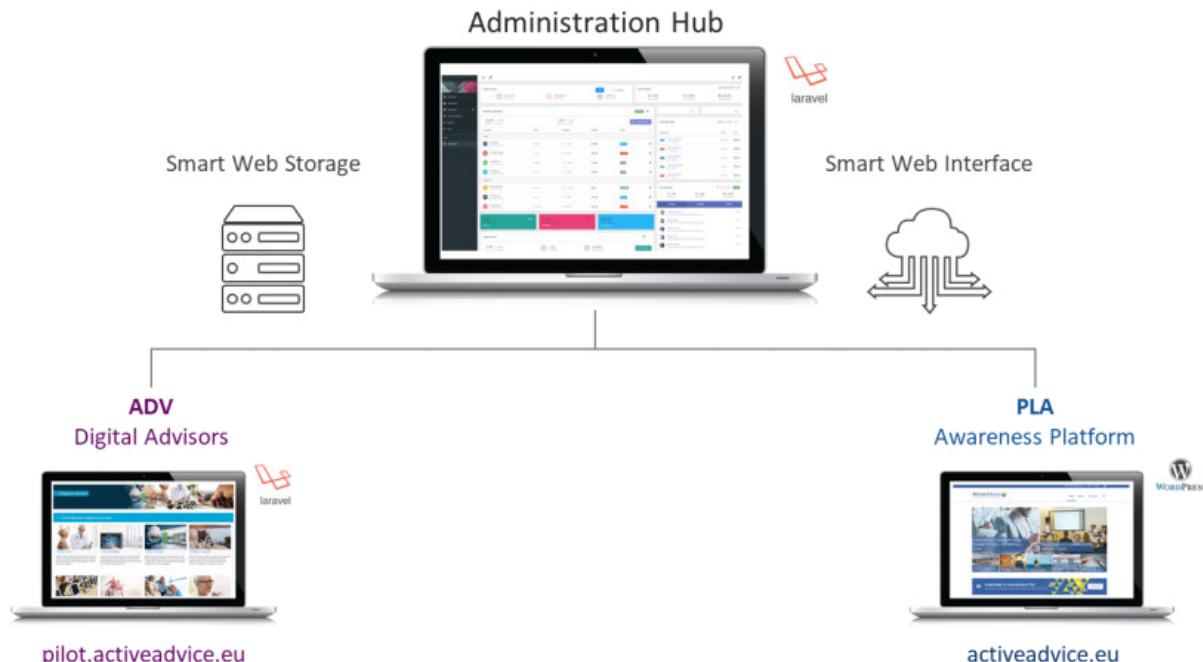
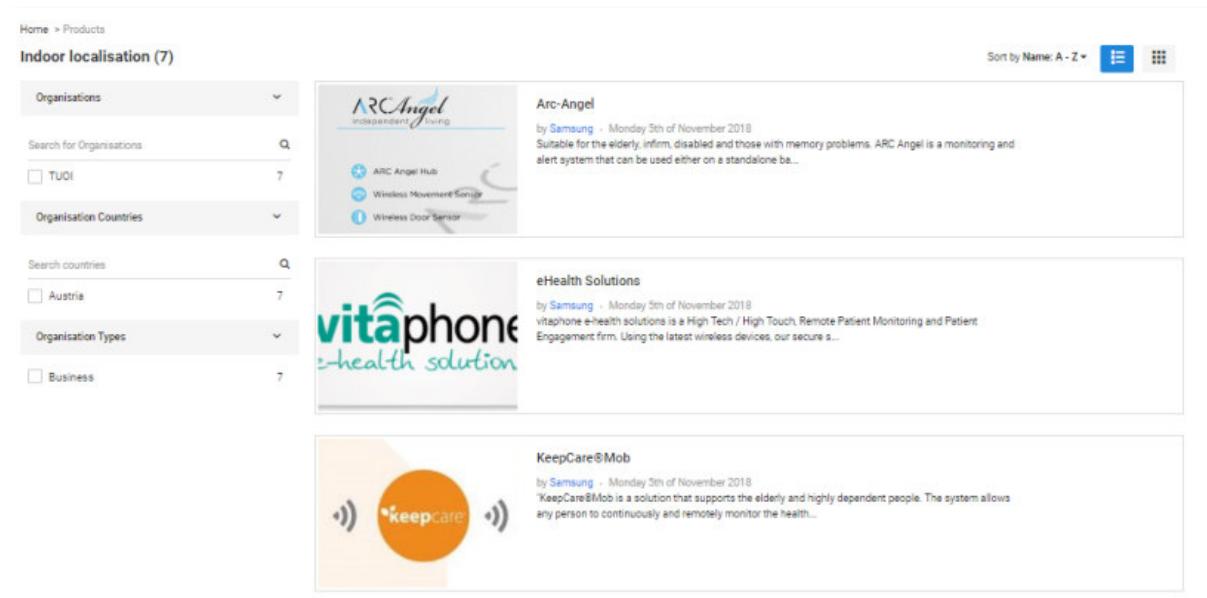


Figure 13: ActiveAdvice components

2.3.2 Vendor, product & service profiles

Profiles for vendors, as well as detail views for products (and services), in line with the functional requirement for promotion and networking, allow businesses to provide up-to-date information about their respective services and products, thus ensuring the timeliness of the provided information. This provides a benefit to both the consumer and government stakeholder groups who are in need of information.



This screenshot shows a web-based application interface for managing vendor, product, and service profiles. On the left, there is a sidebar with filters for 'Organisations' (dropdown menu, search bar, checkboxes for TUOI and Organisation Countries), 'Search countries' (checkboxes for Austria, Business), and 'Organisation Types' (checkboxes for Business). The main content area displays three product cards:

- Arc-Angel**: A monitoring and alert system for elderly, infirm, disabled, and those with memory problems. It includes a 'Wireless Movement Sensor' and a 'Wireless Door Sensor'. The card has a 'Sort by Name: A - Z' button and a refresh icon.
- eHealth Solutions**: A High Tech / High Touch Remote Patient Monitoring and Patient Engagement firm. It features a 'vitaphone e-health solution' logo.
- KeepCare®Mob**: A solution for elderly and highly dependent people. It includes a 'keepcare' logo.

Figure 14: Product filtering & details

3 Further service modules

In addition to the described service modules, a number of others were planned initially. Due to the user feedback and/or technical restraints, as well as the business plan development, some decisions about their implementation were taken, as outlined below.

Table 3 provides an overview of these initially planned modules and their target audience. Some of these modules were identified as not necessary for ActiveAdvice (e.g. due to the exploitation strategy), others were modified based on the end-user feedback. The reasons for these decisions are described in the following.

Table 3: Further ActiveAdvice modules

Service Modules		Targeted End-Users
Information Modules	Review & Rating	AAL2C (AAL2B, AAL2G)
	Showcase & Expert Finder	AAL2C, AAL2G
Advice Modules	Catalogue Advisor	AAL2C, AAL2G (AAL2B)
	Product Locator	AAL2C, AAL2G
Promotion Modules	Customer Contact & Interaction	AAL2C, AAL2B
	Payment Module	AAL2C, AAL2B, AAL2G
	Vendor, Product & Service Profiles	AAL2C, AAL2B, AAL2G

3.1 Information modules

Two additional modules connected to the information functionality were initially planned: A Showcase and Expert Finder, and a Review & Rating functionality. Feedback from the user tests and decisions taken during the development phase, however, showed that both of these functionalities are better provided and discussed face-to-face, i.e. with the Authorised Active Advisors.

3.1.1 Review & rating

One of the main requirements of the AAL2C target group is the possibility for knowledge and experience exchange, i.e. to enable them to generate user content such as rating and reviews for products, services, expert knowledge and showcases within the Intelligent AAL Product & Service Cloud. Based on these identified needs for community exchange and feedback, a feedback function for review and rating was discussed. Such a functionality could enable consumers to generate content and exchange experiences about AAL services and solutions. However, this is in contrast to the requirements expressed by business representatives, who, at the same time valued the possibility to get in contact with customers. With the definition of the concept for the Authorised Active Advisors¹⁴, we identified that rating (in form of testimonies and follow-up) is better provided in a face-to-face or at least personal environment via human advisors. The same principle can be applied to knowledge exchange and community building.

¹⁴ See D3.4 Human advisor workflow and authorization process and D5.5 Training event participation and finding report for more information.

3.1.2 Showcase & expert finder

In close relation to the accessibility guides and awareness sheets, an additional functionality allowing showcase retrieval for best practices was discussed. Such a module would enable governments to gather much-needed information, e.g. on showcases which illustrate AAL products and services as well as their real-life interaction and their innovative and supportive potential. In addition, experts who can provide additional knowledge and support decision making could be found within this module. Partially, this has been realised in the “Practices & Stories” section of the Awareness & Information Hub and experts as authors of the different articles can be found. Furthermore, the Authorised Active Advisors, once registered on the platform, will provide this kind of expertise.

3.2 Advice modules

3.2.1 Catalogue advisor

The Catalogue Advisor was initially planned to guide the users to the right catalogue of their respective needs; showing e.g. national catalogues in a specific language, and providing them with an overview of available catalogues for AAL solutions. Planned to implementation of third-party content, this proved to be a challenge.¹⁵ Initially, a first version of this advisor module was implemented (see Figure 15). However, a decision during the development was taken to implement third-party content via links (e.g. linking a specific product to one or more catalogues), instead of advising on third-party catalogues directly. This still gives the user some choice – but only at the last stage, when he or she is already guided to the right product.

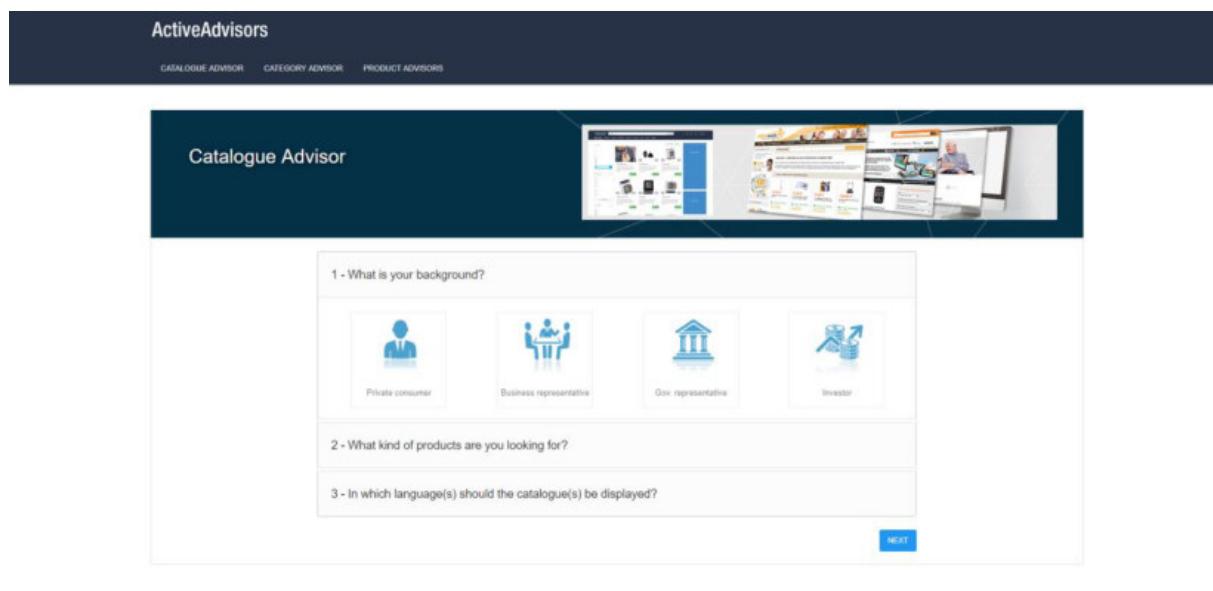


Figure 15: First step of the Catalogue Advisor

3.3 Promotion modules

Promotion modules allow businesses to present their AAL solutions and provide information about them. In addition to the abovementioned modules, further modules were mentioned in the Description of Work (DoW): customer contact and interaction; product locator, payment modules;

¹⁵ See D4.4 Content status report and D4.7 Content update report for more information.

vendor, product and services profiles. These exist as concepts which were discussed during the testing and evaluation phase of the project, considering the business plan development (especially with regards to the payment module) and the user tests (especially regarding the customer contact and customer interaction).

As mentioned above, a number of other modules, initially planned in the project proposal, are in line with the specific needs and requirements of the different stakeholders, but were not of high priority. Therefore, focus during the development was put on the service modules described above. Their realisation was, therefore, based on both the user tests conducted in task 5.3, and the validation of the business plan (task 6.3).

3.3.1 Payment module

The question of integrating payment module, which allows the setting of prizes and receiving payment for AAL products and services offered within the environment, is closely connected to the exploitation strategy chosen for ActiveAdvice. Businesses representatives reported that only products which require low customisation must be sold online. Therefore, only a very limited range of products could be available to sell online, enabling businesses to receive payment for their solutions. Furthermore, during the business plan development, the consortium identified an “intel inside” approach¹⁶ as most likely exploitation strategy leading to success. Therefore, a payment module was identified as not relevant to the ActiveAdvice solution.

3.3.2 Service scheduler

A service scheduler could offer service providers the possibility to schedule their service hours by providing direct appointment making to their customers. This is in line with businesses’ requirement for customer contact and customer interaction but at the same time the group of AAL2C expressed concerns of being approached by businesses online. Similar to the abovementioned payment module, this functionality was identified as not relevant to the exploitation strategy.

3.3.3 Product locator & shop and vendor locator

The DoW also mentions both a product locator and a shop and vendor locator. Both modules are described as map-based solutions which could enable locating products and sellers of special products in a certain area, respectively. Furthermore, this tool could support businesses and Authorised Active Advisors to find partners for their projects. However, using a different approach, the ActiveAdvice solution allows filtering of suppliers based on areas/countries, and thus provides this functionality in a simple and easy way.

4 Risk Assessment & Risk Mitigation Measures

Risks to be addressed within the ActiveAdvice Platform are, the/a misuse of data, hacking, and the/a risk of data breach(es). Due to the ActiveAdvice platform’s public nature and possible collection of sensitive information (e.g. in product and vendor profiles), best-effort security, especially since the EU General Data Protection Regulation (GDPR), is a must. The protection of participants’ privacy is

¹⁶ For more details see *D6.6 Updated Business plan including revenue model specifications and marketing measures*.

therefore an important responsibility in the development. Privacy means that the participant can control the access to personal information; they decide who has access to the collected data in the future.

At the moment, there is no personal data collected when using the digital advisors, as they are based on the TAALXONOMY classification system and product information. Therefore, there is no need for protective measures. However, especially when following the “intel inside” exploitation strategy, a detailed and secure data protection strategy, in line with the partnership, has to be outlined, ensuring that all data stays with the partner organisation (e.g. the municipality of Alkmaar).

For the Awareness & Information Hub and the demonstrators, HTTPS for secure communication is used; and captchas have been installed for commenting on articles to avoid spam.

5 Conclusion & Outlook

This deliverable outlined the implementation of the various ActiveAdvice service modules based on the requirements identified in WP2, as well as the decisions taken during the development and implementation phase based on the gathered user feedback of the user tests, and the decisions taken in the elaboration of the exploitation strategy. The modules implementation progress was described, as well as security and risk considerations.

This deliverable also outlined the frontend components and modules implementation and contained the technical information on the primary implementation of the frontend components and modules as well as on the primary integration of third-party AAL components.

References

Teles, S., Bertel, D., Kofler, A. Ch., Ruscher, S. H. & Paúl, C. (2017). *A Multi-Perspective View on AAL Stakeholders' Needs. A User-centred Requirement Analysis for the ActiveAdvice European Project*, available at <http://www.scitepress.org/DigitalLibrary/PublicationsDetail.aspx?ID=h6YnwwJ96Mk=&t=1>